EmpleaPY: Research on the Automation of Processes for Employment Policies in Paraguay

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INTRODUCTION

Over the last few decades, large-scale technology use has permeated diverse areas of life, including political, economic, social and cultural spheres. Decisions by governments that drive the digitalization of their institutions have played a critical role, and the emergence of Artificial Intelligence (AI) has brought major challenges. In this context, global interest has grown in defining what AI is.

The term Artificial Intelligence appeared in 1956 at the end of the Second World War as a concern of the industrial, political and academic fields (Puyana, 2019). AI refers to the ability of machines, computing systems, applications and algorithms to complete tasks that normally require human intelligence. The completion of tasks is fed by uploaded data on experiences, and this enables AI to reason, understand languages, solve problems, and make predictions and decisions.

AI involves a set of information-processing technologies that use models and algorithms to develop learning abilities and perform cognitive tasks, which produces predictions and decision-making in virtual environments (UNESCO, 2021). It is also defined as a machine-based system, designed to operate with different levels of autonomy and able to generate results such as predictions, recommendations or decisions that have impact on physical or virtual environments (European Union, 2018). They are machine-based systems that, for a set of human-defined objectives, can formulate predictions, recommendations or decisions that affect both real and virtual environments (OECD/CAF, 2022).

AI's ability to use mathematical-statistical calculations to identify patterns, generate typologies and predict behaviors depends on the availability, categorization and labeling of data; on algorithmic models responsible for the calculations; on operation of the interface for interacting with users or with other systems; and on the operation of a whole telecommunications-related physical infrastructure (Venturini, 2024).

For several years different projections have been offered on the development of societies based on AI use and any ensuing prosperity or crisis. It is said that thanks to this technology the growth of multiple industries could be enabled, leading to unprecedented production of wealth via the automation of tasks and processes, as an accessory that boosts and strengthens human work (Corvalán, 2019). However, this situation could end up replacing certain jobs, increasing salary polarization, making work more precarious and widening equality gaps (Puyana, 2019; Garcia, 2023). Given the high degree of job informality in Latin America and especially in Paraguay, this situation could be sharply exacerbated.

AI's incursion into the job market goes hand in hand with the need to develop new skills to integrate the changing dynamics of work. The extraordinary speed of technological development and AI's efficiency in performing tasks leads to a scenario where workers are displaced by machines, which won't demand labor rights (schedules, vacation, social security, etc.). These aspects are barreling towards a crisis in the working world, both in jobs themselves and in salary levels (Garcia, 2023).

For this reason, States must take a stand and make decisions to avoid negative consequences for society. Accepting the neutrality of technological development — and especially AI — turns a blind eye to inequality and the deepening of socioeconomic gaps that characterize today's society (Puyano, 2019). Digital governance must be developed as a commitment from society as a whole, and in particular, it must be adopted by government leaders to guarantee the principles agreed to under the international human rights framework. The AI supply chain requires compliance with data protection and privacy standards, among others (Venturini, 2024). The existence of ethical, transparent algorithms requires the inclusion of diverse minorities in the process of technological development.

In Paraguay, efforts are underway to implement and regulate AI. According to official Paraguayan government sources and the Inter-American Development Bank (IDB), in 2019 AI use was implemented in the employment system. This study focuses on documenting and analyzing the development and impact of automated decision-making systems in Paraguay, focusing on the case of the country's main digital employment platform, EmpleaPy,[1] promoted by the Paraguayan government.

1 Government of Paraguay, Ministry of Labor, Employment and Social Security. https://emplea.mtess.gov.py/ (reviewed May 5, 2024).

The study's main goal is to better understand the development of public policies incorporating AI techniques in Paraguay, identifying potentialities, risks and threats in terms of digital security. Although it was confirmed that the current version designed by the Ministry of Labor, Employment and Social Security (MTESS) does not use AI per se, in a few months they will attempt to implement automated decision-making (ADM) in their systems.

Another critical aspect is that the implementation of ADM is being done with no personal data protection legislation in the country. This absence leaves platform users with neither guarantees nor adequate protection. The overlapping regulations among the interoperative systems of public agencies creates an uncertain scenario for data protection, a responsibility that should be guaranteed by the Paraguayan government.

Methodology

The EmpleaPy web portal was created to increase employability through process automation, offering fast, simple mechanisms. The main goal of this study is to better understand the development of public policies incorporating AI techniques in Paraguay, identifying potentialities, risks and threats in terms of digital security.

The study used qualitative methods to investigate AI use in the case of the EmpleaPy web portal. Specifically, a review was conducted of the web portal's functionality features; interviews were held with key informants from the Ministry of Information and Communication Technologies (MITIC) and the MTESS; and both secondary sources and AI-related regulations were consulted. The study was conducted from April to June 2024.

The case study analyzes EmpleaPy through five dimensions: the national context for implementation, the regulatory and institutional context, data infrastructure, the decision-making process and technological design.

This effort essentially considered the impact on society of AI use within the framework of human rights.

NATIONAL CONTEXT OF THE CASE STUDY

Country-level sociodemographic data

Paraguay began its official census process in 1950, using international measurement criteria. Since 1962, the census has been held every 10 years, although coverage has varied significantly. In 2012, the census covered just 74.4% of the country, but the data were considered sufficiently reliable for making population projections. In 2022,

the census reached 97.5% coverage, documenting a population of 6,109,644 people, a significantly smaller number than the previous projection of 7,554,796 inhabitants.[2] This difference has led to a revision of population projections for 2000–2025, using the new 2022 data.[3]

Paraguay's population is distributed mainly in urban areas, with 63.7% living in cities and 36.3% in rural areas, according to the 2023 Permanent Household Survey.[4] The most populated departments are Central, Alto Paraná, Itapúa, Caaguazú, San Pedro and Asunción, which together house more than half of the country's population. The Central and Asunción departments represent 37.7% of the total population. Furthermore, 16 cities were identified has having more than 100,000 inhabitants, with Asunción being the most populated. The population structure shows a decrease in the youth population and an increase in the young adult population.[5]

Paraguayan population and workforce

The results of the Permanent Household Survey for fourth quarter 2023 show that the workforce rate[6] was 71.1% nationally, equivalent to 3,101,607 people. This percentage represents a significant increase as compared to 69.2% for the same period in 2022, translating to 107,704 additional people. According to the International Labor Organization (ILO), the employed population includes people with paid work, freelance activity, or who work at least one hour during the reference week. For fourth quarter 2023, the employed population was approximately 2,939,332 people, with a distribution of 57.3% men (1,684,213) and 42.7% women (1,255,120), showing a 14% gap favoring men. The overall increase in the employed population was 119,061 people, mainly in the tertiary sector.

2 In the 2023 presentation of preliminary results, Director Ivan Ojeda attributed the decrease to the mass migration of Paraguayans to countries like Argentina and Spain, as well as a significant drop in fertility. Another data point, no less important, is the period in which the 2022 census was held, given that it took place during the COVID-19 pandemic.

3 An important milestone in terms of statistical governance is Law 6670/2020 which modernizes the National Statistical System (SISEN), creates the National Statistics Institute (INE) and is the governing body for official statistics in Paraguay.

4 Boletín Trimestral de Empleo de la Encuesta Permanente de Hogares. https://www.ine.gov.py/Publicaciones/Biblioteca/documento/243/Boletin%20trimestral_EPHC_%204%C2%BA%20Trim%202023.pdf (reviewed May 20, 2024).

5 The sources of information used to develop the population estimates and projects were as follows: National Population and Housing Census for 1982, 1992, 2002 and 2012.

6 Workforce is defined as the sum of employed and unemployed people (Neffa et al., 2014).

Within the employed population, underemployment is noteworthy, defined as part-time work with availability to work more hours without finding additional employment. In fourth quarter 2023, underemployment was estimated at 97,862 people, with a higher percentage of women (51.4%) as compared to men (48.6%). In addition, the unemployed population was around 162,275 people,[7] with a slightly higher proportion of women (50.2%) than men (49.8%). The combined rate of unemployment and underemployment, which represents labor unsuccessfully seeking employment, was 8.4%, an improvement over 9.9% for the same quarter in 2022.

The population outside the workforce in fourth quarter 2023 was 1,261,070 people (30.8%). These people may be available to work, but they did not actively seek employment in the last few weeks for a variety of reasons. Compared to the previous quarter, there was a decrease of nearly 2%, equal to 73,149 people. This decrease shows an improvement in workforce participation and a slight recovery of the job market.

Data related to information and communication technology use in Paraguay

According to the Permanent Household Survey (EPH, 2023), 76.3% of the Paraguayan population uses the Internet,[8] equivalent to approximately 4,556,000 people. From 2015 to 2022, Internet access grew by 26.6 percentage points, increasing from 49.7% to 76.3%. There is a marked difference between urban and rural areas in terms of access, with 83.2% of the urban population and 63.7% of the rural population using the Internet. In addition, nine out of ten households in Paraguay have access to at least one type of information and communication technology, such as a telephone, television, radio, computer, cable TV or tablet.

Internet use varies significantly by age. The group of people aged 20 to 34 is the one that most uses the Internet, with a use rate over 90%, while people over 35 show a use rate of 69.3%, young people aged 15 to 19 ‘ 87%, and children aged 10 to 14 a rate of 51.6%. In terms of sex, 77.6% of women and 74.9% of men use the Internet. A correlation is also observed between education level and Internet use, which is over 90% among people with more than 13 years of schooling. The unemployed population uses the Internet the most, with an average of 80% from 2015 to 2022, compared to 58% for the employed workforce.

7 MTESS. 2024. https://www.mtess.gov.py/noticias/mas-de-119000-personas-encontraron-empleos-en-el-cuarto-trimestre-del-2023 (reviewed May 22, 2024).

8 Interviews were held with people 10 years and older.

In terms of professions, in 2022, people engaged in scientific and intellectual activities, technicians and mid-level professionals, office employees and members of the Executive, Judicial and Legislative branches were those who most use the Internet, with use in the 97% to 98% range. On the other hand, farmers and agricultural and fishery workers are those who use it least, at 57.7%. In 2022, 97.8% of people used the Internet on their cell phones, mainly for instant messaging (97.8%), social media (84.2%) and phone communication (82.6%).

This is in addition to constant violations of the principle of net neutrality. Most Internet providers in the country offer free applications with zero rating,[9] such as WhatsApp, which is neither reflected nor disaggregated in the EPH. This lack of information makes it hard to determine if users are accessing a full Internet connection or if they only have access to a limited, precarious connection, restricted to applications like WhatsApp (TEDIC, 2018). This means that people without full Internet access are excluded from the possibility of accessing government services.

LEGAL AND REGULATORY CONTEXT

Personal data protection and access to public information

The legal framework for use of personal data in Paraguay is primarily found in several articles of the National Constitution. Article 33 on the right to privacy, guaranteeing respect for private, personal and family life, states that these are inviolable, and Article 135 on Habeas Data guarantees people's right to have access to, correct or destroy information on themselves held in official or private records. In addition, the American Convention on Human Rights and the proposed Organization of American States (OAS) Declaration of Principles on Privacy and Personal Data Protection in the Americas complement these guarantees (Guerrero & Paciello, 2022).

Paraguay is one of the few countries in South America that still lacks a comprehensive personal data protection law. Since 2016 several civil society organizations and academia have been pressuring the legislature to draft a comprehensive protection bill. In 2021, the Personal Data Coalition (2018) drafted a bill to regulate personal data processing, which has been adopted as the main draft for making relevant amendments and adjustments[10] by the legislature and Executive branch of the current government.

9 *Zero-rating* is defined as rates with zero economic costs to the user. Generally, it is a practice offered by phone companies.

10 File D-2162170. "Protección integral de datos personales en Paraguay." Legislative information system of the Legislative Congress of Paraguay. https://silpy.congreso.gov.py/web/expediente/123459 (reviewed May 28, 2024).

This law is essential for authorizing the storage and processing of any personal data. It is necessary to implement legislation that provides guarantees and oversight for the personal data stored in digital systems, ensuring that those who sell and distribute personal data are brought to justice.

Interestingly, Law 6534/2020 on personal credit data protection[11] has a definition of personal data and sets forth the following in Article 3(a) and (b):

> Personal Data: Information of any type referring to determined or determinable legal or physical persons. Determinable is understood as the person who may be recognized by some identifier or by one or more physical, physiological, genetic, psychological, economic, cultural or social characteristics of that person. Personal data protection rights and guarantees are extended to legal persons where applicable.
>
> Sensitive personal data: Data referring to the private realm of the data holder, or whose misuse could lead to discrimination or carries a serious risk to the holder. Personal data are considered sensitive when they can reveal aspects such as racial or ethnic origin; religious, philosophical and moral beliefs or convictions; union membership; political opinions; data related to health or sexual life, preference or orientation; genetic data or biometric data targeted to unambiguously identifying a physical person.

However, this law does not address the comprehensive, general processing of personal data since it focuses exclusively on credit data. In addition, Law 1682/2001 regulating information of a private nature has been repealed, along with its amending laws, as stipulated in Article 30, leaving the protection of people's data and rights orphaned since 2020.

On the other hand, there is Law 5282/14 on Access to Public Information.[12] This law covers all data produced, obtained, controlled or in the hands of public sources, regardless of its format, creation date, origin, classification or processing, unless classified as secret or reserved by law. It also mandates institutions to not just respond

11 Law 6534/2020. "De protección de datos personales crediticios." https://www.bacn.gov.py/leyes-paraguayas/9417/ley-n-6534-de-proteccion-de-datos-personales-crediticios (reviewed June 16, 2024).

12 Law 5282/2014. "Libre acceso ciudadano a la información pública y transparencia gubernamental'." https://www.bacn.gov.py/leyes-paraguayas/3013/libre-acceso-ciudadano-a-la-informacion-publica-y-transparencia-gubernamental (reviewed June 17, 2024).

to requests for information but also guide the citizen so that their requests reach the right destination. The Access to Public Information web portal offers the option to select "I do not know who to request from," and the Ministry of Justice must redirect the request within 24 hours, pursuant to Article 24 of Decree 4064.[13] Institutions must create or collect the requested information when it falls within their purview and respond in no more than fifteen business days; they may request an extension if necessary, but this extension is not regulated by law. Furthermore, institutions must periodically publish relevant information on their websites, usually under the "transparency" or "Transparency Law" sections. The catalogue of open government data[14] also collects and makes the data available. This law is the necessary counterpart to personal data regulation. To guarantee a balance between transparency and privacy protection, it is essential that the two laws are in harmony, ensuring that access to information does not compromise people's privacy.

Regulations relevant to implementing ADM

According to the Global Responsible Artificial Intelligence Index (GRAI, 2024), transparency and data protection are two important guidelines for implementing AI. In this report, Paraguay is ranked 84 of 138 countries (TEDIC, 2024). However, the report emphasizes that Paraguay still lacks a comprehensive legal framework regulating the two areas in a coordinated way. There are also no specific laws, decrees or administrative decisions that could be relevant to the implementation of ADM.[15] Significant judicial interpretations and pertinent decisions that could guide implementation of these systems in exercising rights are also absent.

In addition, no codes of conduct or ethics standards, either national or international, have been adopted for the implementation of ADM in Paraguay. This lack of regulation leaves citizens without the necessary guarantees for protecting their privacy and having access to public information safely and transparently. The people affected by algorithmic systems must have access to the information needed to challenge automated decisions and have available accessible, effective legal resources. Likewise,

13 Office of the President of the Republic of Paraguay. (2014). "Decreto N° Id 001: Por el cual se reglamenta la Ley N° 5282/2014 'De libre acceso ciudadano a la información pública y transparencia gubernamental." Ministry of Justice. https://informacionpublica.paraguay.gov.py/public/de.

14 Ministry of Information and Communication Technologies (MITIC). Open-source data. www.datos.gov.py (reviewed June 3, 2024).

15 Request for information on implementation of the ADM system in Paraguay. (2024). "Request date: JUL/03/2024." https://informacionpublica.paraguay.gov.py (reviewed July 3, 2024).

if their rights are violated, they must receive appropriate compensation. Transparency is essential for guaranteeing justice and protecting individual rights.

In the in-depth interview, the Directorate-General for Digital Inclusion and ICT in Education at MITIC not only confirmed the official response regarding the lack of regulation of ADM and AI provided through a request for access to public information, but it also acknowledged that the country is at fault for lacking a comprehensive personal data protection law.

AI and self-regulation

Self-regulation in AI, in the Paraguayan context, refers to efforts undertaken by companies and organizations themselves to establish standards and responsible practices in the use of this technology, with no need for direct intervention from the government or the imposition of external regulations. This means that the entities developing or implementing AI create their own ethics guidelines, transparency standards and oversight mechanisms to ensure that their use of the technology is secure, fair and beneficial to society. In Paraguay, although there are initiatives driven by MITIC to foster technological development, the lack of specific regulations could lead to companies adopting self-regulation practices in their AI projects.

Along these lines, there are fragmented efforts to implement AI in Paraguay, especially in a range of government agencies. With a strong emphasis on the business realm and the production matrix, MITIC has coordinated different public initiatives and institutions to drive technological development and innovation in the country. Noteworthy examples include the INNOVANDO-PY program,[16],[17] a government accelerator that jumpstarts technological enterprises. In addition, they offer courses,[18] diplomas,[19] hackathons,[20] bootcamps and other training opportunities. The cases mentioned below

16 Ministry of Information and Communication Technologies. 2024. "InnovandoPY 2024 | Vuelve el programa de apoyo a emprendimientos innovadores." https://mitic.gov.py/innovandopy-2024-vuelve-el-programa-de-apoyo-a-emprendimientos-innovadores/ (reviewed March 14, 2024).

17 Official InnovandoPy web portal. https://innovando.gov.py/ (reviewed June 17, 2024).

18 Paraguay Ministry of Information and Communication Technologies. "MITIC pone a disposición de la ciudadanía curso online gratuito para creación de vídeos." https://mitic.gov.py/mitic-pone-a-disposicion-de-la-ciudadania-curso-online-gratuito-para-creacion-de-videos. (reviewed June 17, 2024).

19 MITIC. N.d. ITC Diploma programs. https://mitic.gov.py/convocatoria2/ (reviewed June 17, 2024).

20 MITIC. 2019 IAckatón. https://mitic.gov.py/innovacion-productiva-economia-digital/hackathon/iackathon-2019/ (reviewed June 17, 2024).

illustrate the scattershot nature of the effort and the urgent need to develop a joint, multi-sector plan with a coordinated approach (TEDIC, 2024b).

In the area of justice, in Paraguay, the efforts of the Supreme Court to develop software to streamline their processes has gained particular relevance. In 2021, the Association for Technology, Education, Development, Research and Communication (TEDIC) expressed concern about the implementation of these technologies in the absence of proper regulatory frameworks (Sequera, 2021). In May 2023, collaboration between the Court and the United States Agency for International Development (USAID) was announced to develop an AI-based software package to analyze the admissibility of actions in the Constitutional Chamber and to develop draft resolutions. We hope that TEDIC on this occasion will consider the previously developed recommendations.

In 2023, MITIC launched a training program in Artificial Intelligence as applied to e-government, with the goal of building the capacity of public officials around big data-and machine learning-based solutions. That same month, Congressional representatives participated in the "Cumbre de Comisiones de Futuro 2023 [2023 Future Commissions Summit]", where Artificial Intelligence was debated. In October, the Senate held the first public hearing on AI[21] to discuss current and future challenges of Artificial Intelligence in different areas, with participation from civil society and other government agency actors. Further, in November the National Tourism Secretariat introduced the "Sentur Relacional" platform, backed by OpenAI GPT-4, which enables tourists from around the world to consult tourism information in several languages using WhatsApp. In that same year, the Paraguayan Artificial Intelligence Society[22] was founded as a nonprofit organization dedicated to conducting research and strengthening the technological sector for ethical AI development.

As can be seen, there are still no specific AI regulations in the country. However, public-sector interest and signs open up the potential for its more frequent use. Therefore, it is critical to develop a joint, multi-sector strategy with a coordinated approach. This plan will make it possible to maximize the potential of Artificial Intelligence, while simultaneously ensuring protection of people's safety and rights.

21 Paraguayan Senate. 2023. Debate over the need to legislate the use and implementation of Artificial Intelligence. https://www.senado.gov.py/index.php/noticias/noticias-generales/12402-debaten-sobre-la-necesidad-de-legislar-el-uso-e-implementacion-de-la-inteligencia-artificial-en-paraguay-2023-10-12-16-40-08 and the public hearing: https://www.youtube.com/watch?v=KgrjMlPSq2g (reviewed July 22, 2024).

22 Sociedad Paraguaya de Inteligencia Artificial. https://www.sopaia.org/ (reviewed July 22, 2024).

THE DIGITAL AGENDA

MITIC is responsible for la *Agenda Digital* [Digital Agenda],[23] a roadmap for technological progress in Paraguay that focuses on improving the government's relationship with citizens and businesses, promoting the digital economy and advancing the country's connectivity. This program, a part of Paraguay's Digital Transformation Strategy, involves public institutions, the business sector, academia and civil society, and it coordinates with diverse plans and programs (Deloitte, n.d.).

The program focuses on four strategic components: Digital Government, which seeks people-centered services that are transparent and open; Digital Economy, which promotes the adoption of technology in companies and the training of workers in technological skills; Digital Connectivity, which guarantees a high-speed, accessible network to narrow the digital gap; and Institutional Strengthening, which improves the management and operational capacity of the State through information and communication technologies.

The history of the Digital Agenda began in 2011 with the I CT Management Plan, approved by Presidential Decree, with the goal of using ICT for long-term sustainable development. It continued with the creation of the Secretariat for Information and Communication Technologies in 2012, and then SENATICs in 2013. In 2018, the Digital Agenda proposal was developed, backed by a loan of up to 130 million USD from the Inter-American Development Bank (IDB), awarded to MITIC in 2019 and valid until 2025. Currently the agenda is carried out by the Vice-Minister of Information and Communication Technologies and the Vice-Minister of Communication.

CASE STUDY: EMPLEAPY (FORMERLY PARAEMPLEO)

Background

Paraguay was one of the pioneers in Latin America in terms of implementing AI in its public employment policies, according to the IDB. In January 2019, the SAAS[24] digital platform known as ParaEmpleo was launched with a loan of 170,000 USD from

23 Agenda digital Paraguay. https://agendadigital.mitic.gov.py/sobre-el-proyecto/ (reviewed June 16, 2024).

24 Software As a Service. It is a cloud-based software service.

the IDB;[25] it was used from 2018 to 2023 (JANZZ.technology, 2018).[26] In the current administration (2023–2028), it was redesigned and replaced by EmpleaPy.[27] The platform is managed by the Ministry of Labor, Employment and Social Security[28] and it is characterized by being a public platform that exclusively channels private-sector job openings. In addition, public-sector job openings are found on the Paraguay Concursa web portal,[29] under administration of the Ministry of Economy and Finance (MEF). Furthermore, the MTESS, via the National Service for Professional Promotion (SNPP), offers the Public Employment Service (SPE).

According to MTESS Resolution 661/2023,[30] in which Technical Report No. 1 is cited, the Office of Labor Intermediation, which comes under the General Employment Office, recommends the use of the EmpleaPy platform, the Ministry of Labor, Employment and Social Security's Single Employment Web Portal. This platform has been developed with a focus on accessibility, ease of use, transparency and flexibility in labor intermediation. According to the platform, the main objective is to strengthen the link between the government, businesses and people interested in finding work, thus creating the job opportunities citizens expect.

This software facilitates publishing job openings and linking them to job seekers using AI-based semantic matching developed by JANZZ.technology. According to the

25 Inter-American Development Bank (IDB). Project PR-L1066: Apoyo a la Agenda Digital. https://www.iadb.org/es/proyecto/PR-L1066 (reviewed July 22, 2024).

26 A direct consultancy contract for adaptation of labor intermediation software. Public Procurements. (2019). Award of Tender 370327. https://www.contrataciones.gov.py/licitaciones/adjudicacion/370327-consultoria-adecuacion-software-intermediacion-laboral-1/resumen-adjudicacion.html (reviewed August 19, 2024).

27 Ministry of Labor, Employment and Social Security, Government of Paraguay. EmpleaPy. https://emplea.mtess.gov.py/ (reviewed June 5, 2024).

28 MTESS Resolution 661/2023. "Por la cual se aprueba y se dispone la obligatoriedad del uso de la plataforma Emplea PY, portal único de empleo del Ministerio de Trabajo, Empleo y Seguridad Social." (Reviewed July 1, 2024).

29 Paraguay Ministry of Economy and Finance. "Paraguay Concursa." www.paraguayconcursa.gov.py (reviewed July 22, 2024).

30 Government of Paraguay. *Solicitud #82952*: Request for ministerial regulation/resolution for implementing EmpleaPy or ParaEmpleo. https://informacionpublica.paraguay.gov.py/#!/ciudadano/solicitud/82952 (reviewed July 1, 2024).

company's website,[31] JANZZ.technology was founded in Zurich in 2008 and is managed by experts in ICT and Human Resources. Its directory explains that its progress is focused on performing semantic employment matching[32] to optimize processes on employment and public service web portals around the world: "These solutions, which are superior to conventional full-text-based technologies [... enable] structuring and efficiently [...] using the large volumes of data available today relating to professional qualifications and hard and soft skills [...]." (JANZZ.technology, n.d.). The company mentions that the Paraguayan platform was a test to offer to other South American countries. The IDB website shows that it will be implemented in Honduras starting in 2024.[33]

In terms of the software, Diego Rico, JANZZ.technology Project Manager for Paraguay, stated in an interview held with digital outlet *El Surti* (2020) that the software uses Artificial Intelligence and that it is open to sharing methods and processes as long as their intellectual property is not exposed. In addition, he said that no bias in the Swiss company's methodology has been detected: Janzz has a unique methodology for disaggregating data that could identify a person and categorize them by sex, age, religion, ethnic origin, etc. This helps the candidate and the companies meet one another through objective data that is relevant to both.

Currently, the new platform has logged around 64,000 seekers since its launch in November 2023.[34] According to its homepage, during the tool's first six months, more than 16,097 labor intermediations were created.[35] However, this number of over 16,000

31 JANZZ.technology. Leader in semantic solutions and semantic matching technologies for skills and jobs. https://janzz.technology/sobre-janzz-technology-matching-semantico/?lang=es (reviewed June 11, 2024).

32 Semantic matching is a technique used in computing to identify semantically related information. Given two graphic structures, e.g., classifications, databases of taxonomies or XML schema and ontologies, matching is an operator that identifies the nodes in each of the two structures that match semantically with one another. https://en.wikipedia.org/wiki/Semantic_matching (reviewed August 26, 2024). More information on how JANZZ.technology designs its matching-based technology. https://janzz.technology/janzz-sme/ (reviewed August 26, 2024).

33 Inter-American Development Bank. *Programa de apoyo para la inserción laboral en Honduras.* https://www.iadb.org/es/proyecto/HO-J0001 (reviewed June 13, 2024).

34 Ministry of Labor, Employment and Social Security. (2024). "Portal EmpleaPy anuncia nuevas vacancias con salarios de hasta Gs. 7.000.000." https://www.mtess.gov.py/noticias/portal-empleapy-anuncia-nuevas-vacancias-con-salarios-de-hasta-gs-7000000 (reviewed July 22, 2024).

35 MTESS. (2024). "Portal EmpleaPy arranca el mes con 850 vacancias laborales en diversas zonas del país." https://www.mtess.gov.py/noticias/portal-empleapy-arranca-el-mes-con-850-vacancias-laborales-en-diversas-zonas-del-pais (reviewed July 22, 2024).

applicants registered on the platform was already available on the government's previous platform, which migrated to this new version.[36]

The positions most offered, according to a publication on the MTESS news blog,[37] include call center customer service, supermarket stockers, delivery drivers, quality control analysts, maintenance technicians, cashiers, restaurant waitstaff and cooks, agricultural machinery technicians, dance teachers and mechanics.

In terms of MTESS updates and improvements to the JANZZ.technology software, it was confirmed in an interview with technical area managers that the new version was developed from scratch, with government financing and internally by the Ministry itself. This version re-used the way that JANZZ.technology processed the data, which was done generically, and it was adapted to specific needs and new features. However, it was stated that the EmpleaPy platform does not yet use Artificial Intelligence. Instead, they have complex, automated processing of certain algorithmic processes, which facilitates the operation of identifying the person, the profile record of both individuals and companies to then group them and make a suggestion using the key and shared words that they both use. They even insist that the grouping process is done manually. The only automated aspect is the querying and validation of the user profile and the company profile in MITIC systems. They also emphasized the importance of having control over the processes for monitoring the software's operations and that perhaps in the future it may make autonomous decisions.

Currently, the platform only covers job openings; it does not channel unemployment situations in terms of financial assistance or coordination with the continuous education and professional training system, as seen in the Brazilian system (Cardoso et al., 2021).

Web portal operations

People who apply to EmpleaPy must register with the www.emplea.mtess.gov.py web portal, where their data are synchronized with those of the MITIC electronic identity[38] portal to be activated in the EmpleaPy system. Currently, it is only set up for people with Paraguayan nationality because the MITIC system only has digitalized documents

36 MTESS X Account. 2019. ¿Conocés la plataforma inteligente de Empleo? https://x.com/MTESS_PY/status/1187110898239971334 (reviewed July 22, 2024).

37 MTESS. (2024). "Portal EmpleaPy abre la semana con unas 500 vacancias laborales." https://www.mtess.gov.py/noticias/portal-empleapy-abre-la-semana-con-unas-500-vacancias-laborales (reviewed June 19, 2024).

38 MITIC. (2024). Electronic ID. https://www.paraguay.gov.py/ (reviewed July 22, 2024).

for public services such as national ID cards; birth, marriage, death, and vaccination certificates; employee or public official registration, etc.[39] It is necessary to fill out the active fields regarding job history and to select the labor profile that best fits the person's search.

The current software, developed entirely in PHP[40] by MTESS, is proprietary to the Ministry. It accesses MITIC electronic identity data using an Application Programming Interface (API) to activate the profile and link the person's information to their identity details, such as national ID number, date of birth and status of registration in the employment system, etc. No explicit consent from the user for processing the data is seen to exist. However, the institutions assume that by registering with EmpleaPy and activating their profile in the electronic identity system, the person is authorizing such consent. Another important point is that the resume from the person's profile and the company's profile are stored in a database, which is designed in PROGRESS,[41] and encrypted at MITIC with ISO-27001 cybersecurity standards,[42] to which only MTESS has access.

People interested in finding a new job provide a series of personal data, such as their first and last names, home address, national ID number, date of birth, academic history and marital status, which are automatically validated with the MITIC system, along with other data such as whether the person is indigenous or has a disability, fields that lack official validation but are nonetheless important for matching with some job listings. In addition, people enter information about their work experience on the form; the validated information is confirmed with the Labor-Management Registration system (REOP) and the Social Security Institute (IPS), while the non-validated information is shown on the resume with no validated source. Finally, the job seeker must proactively apply to job offers and keep track of updates. Notification of new publications are generic, and as of now there is no system for sending updates tailored to the user's profile.

39 MITIC. (2024). https://www.paraguay.gov.py/identidad-electronica/informacion (reviewed July 22, 2024).

40 PHP. What is PHP? https://www.php.net/manual/es/intro-whatis.php (reviewed July 22, 2024).

41 The PROGRESS database is a relational database with instruction-based query and development language. 4Gl. More information is available at https://en.wikipedia.org/wiki/Progress_Software (reviewed July 22 2024).

42 MITIC. PY Cloud. https://mitic.gov.py/nube-py/ (reviewed in August 2024).

In the interview with MTESS officials, it was clarified that the data are not automatically processed on the platform; for now, classification is handled manually. Officials verify the available job openings and compare candidate profiles with the requirements provided publicly by employers to find the suitable profile for new human resources. These requirements include factors such as age range, sex, employment history, languages, education level, soft skills, and disability, among others that are disaggregated in the system; but this does not mean that they are a match.

According to the MTESS news blog,[43] the platform facilitates resume writing, an essential step for applying to job openings. To maximize job opportunities, the MTESS minister emphasizes the importance of correctly completing the resume on the platform, including a detailed description of the candidate's personal and professional characteristics. In the case of first-time job seekers, it is recommended that they highlight personal qualities such as ability to work in a team, responsibility, skills and punctuality, among others.

The platform's flexibility was also highlighted in the interview held with MTESS staff who manage the platform. They state that the user can also apply to listings that do not necessarily match their profile. For example, a person who works as a driver can apply to a call center or computer-related listing; acceptance will depend on the employer's interest.

According to MTESS staff, there are some manual stages, such as activating employer or company profiles in the system. Although this can be done automatically, the Ministry still needs control over their activation. They also need the company to be under national jurisdiction, to have an active employer registration number, to offer the minimum wage as a baseline and to have no history of recurring labor complaints.

According to the interviewees, the major challenge is the lack of companies on the platform, which limits the variety of job listings. To address this problem, the Ministry plans to offer free training through the National Service of Professionalization and Advanced Skills (SNPP)[44] to improve worker skills. Companies can thus select candidates and, with support from MTESS, help them improve their skills with the courses available. This effort is undertaken as a complement to the platform.

43 MTESS. 2024. "Más de 14.200 intermediaciones laborales facilitó la plataforma EmpleaPy." https://www.mtess.gov.py/noticias/mas-de-14200-intermediaciones-laborales-facilito-la-plataforma-empleapy (reviewed July 22, 2024).

44 MTESS. (2024). Courses available in the MTESS and SNPP identification system. https://identidad.mtess.gov.py/cursos_disponibles_identidad/cursos_disponibles_list.php (reviewed July 22, 2024).

Currently, the job listings are handled manually to prevent the platform from including informal listings that do not meet labor law standards. In addition, companies are informed that their publications must comply with labor regulations. The following are statements from the interviews:

> Some companies seek a driver, but at the same time want that person to handle errands, calls and secretarial work; we have to limit this and better orient employers to avoid abuses.

> Or they just want deaf people because they concentrate better in a very noisy workplace; they may want to use their inclusion of people with disabilities quota, but we have to orient them better.

According to MTESS, in November 2024, approximately one year after launching the platform, they will introduce on the EmpleaPy platform new modules for follow-up, intermediation, final validation of job offers and the psychometric test. As part of a pilot plan, ten national companies will be able to publish their job listings directly, which will then be validated by the Ministry. The intermediation module will include an Artificial Intelligence process to assign scores to soft skills and specific competencies. This will allow employers to see not only the candidates' resume, but also the match percentage between the candidate's profile and the job requirements.

Officials state that there will be no discrimination in the new version of the platform; however, they were interested in this study offering them some recommendations to avoid risks of bias in the relational design of the database.

The future technological tool will attempt to identify the person and perform the profile classification according to commands set up to filter the search and selection process, i.e., thanks to key words that the worker's profile has in common with the company's profile.

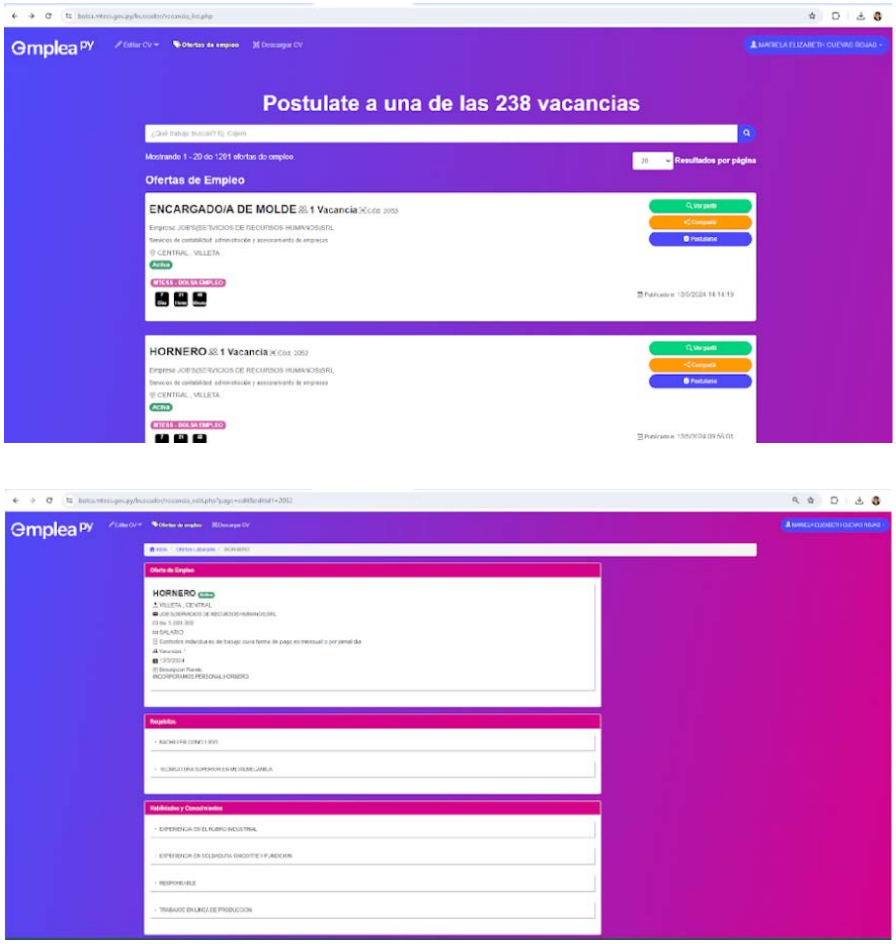
WEB PORTAL DESIGN AND ACCESS

a) Requested information

The web portal can be accessed in two ways: 1) Entering the person's national ID number and the default password is date of birth; and 2) using the electronic identity. Once inside the site, the web portal requests filling out information related to Personal summary and Academic profile. It has three main tabs: Edit CV, Job openings, and Download Resume.

b) Information available on job openings

In the section for job listings or openings, the name of the search is made visible, along with a reference code, the name of the company seeking to integrate new human resources, a short description of the search, the place where the job will be performed (sorted by city and department), the status of the search (active or inactive), the publication date and how much time remains before the search ends. In parallel, the portal offers three tabs: See profile (more detail on what the company seeks, as well as requirements, skills and knowledge); Share (links directly to share the listing on WhatsApp); and Apply (apply for the job).



Screenshot of the EmpleaPY portal with a sample job offer

Finally, the portal allows extracting the information entered, summarizing and making it available in a PDF.

RISK MODEL DESIGN AND DEVELOPMENT

A critical element that is currently lacking in the debate over implementation of the EmpleaPy platform is personal data protection. The country lacks a comprehensive legal framework for protecting these data, which leads to doubt and vulnerability. The lack of proper regulations and the overlap between regulations among the interoperative systems of public agencies creates a scenario of uncertainty regarding the data protection that must be guaranteed by the Paraguayan government.

Application of the principle of informed consent is also absent for processing the personal data of people who sign up with the portal. MTESS and MITIC assume that by registering with the EmpleaPy system and activating a profile using the electronic identity system, people are granting that consent. However, it is essential that prior to this step, the person receives a clear, detailed explanation of how their data will be used and that they explicitly grant consent.

There is some doubt about whether JANZZ.technology, owner of the software of the prior version known as ParaEmpleo, retained access or databases, which could involve a risk to the privacy of the personal data.[45] For this reason, it is critical to guarantee the security and confidentiality of the information processed by MTESS on the new platform.

In contrast to the prior version, the new EmpleaPy platform does not have specific terms and conditions; therefore, MTESS is not liable for any modification, loss, damage or system failure.

In addition, in both the in-depth interview and the access to public information query, the absence of impact and risk mitigation assessment above and beyond the

45 Further, according to a press brief from Surti, the JANZZ.technology manager states that the company has the most extensive database in the world in terms of job occupations, known as occupational ontology. He emphasizes that the development of this technology required 240,000 work hours, involving data analysts, linguists, human resources experts and data scientists, who constantly analyze new data on occupations, skills, soft skills and education. The data come from different sources, although the specific ones are not listed, and the process is supervised by humans to ensure quality and reliability, adapted to the Paraguayan labor market using algorithms that perform effective job matching (Cáceres, 2020). In terms of data security, the portal states that the data are stored and processed in a "safe, modern [center] in Brazil." The head of JANZZ.technology explains that the Ministry of Labor uses the company's data center in Brazil as a cloud-based service, since they only work with ISO-27001 certified Tier 3 or Tier 4 servers, guaranteeing "99.8% availability and certifying security." In addition, he mentioned that in Paraguay there is currently no data center with these characteristics, due to which they also take advantage of the Internet connectivity and speed provided (Cardoso, Faltay, & Bruno, 2021).

cybersecurity standards established by MITIC[46] was noted. There are no clear privacy policies, specific procedures for processing personal data, test protocols for fraud detection algorithms, or audit and external review protocols for ongoing monitoring.

In the in-depth interview, MITIC acknowledged that they are not very involved in implementing ADM in government institutions, and they are unfamiliar with the internal aspects of how EmpleaPy is being designed, beyond the cloud service offered to MTESS. Both MITIC and MTESS agree on the need for a comprehensive approach to addressing these challenges. In the interview, MTESS confirmed that they conducted an internal impact assessment, but not an external impact assessment or an outsourced one. For this new phase, it will be key to hold public consultations with other stakeholders, such as academia, civil society and the private sector, to mitigate any risk that their platform could pose to socially vulnerable populations.

CONCLUSION

Paraguay was one of the pioneers in Latin America in implementing Artificial Intelligence in their public employment policies to exclusively channel private-sector job openings, according to the IDB. In January 2019, the ParaEmpleo digital platform was launched with an IDB loan; it was used from 2018 to 2023 and managed by MTESS. In the new administration (2023–2028), ParaEmpleo was redesigned and replaced with EmpleaPy in 2023 with new features and fully developed by this Ministry's technical team.

Despite official expectations and publications, MTESS representatives have clarified that EmpleaPy does not incorporate Artificial Intelligence in its current operations. Instead, the platform uses advanced algorithms to automate query management, profile validation, and the identification of candidates and companies in the MITIC, IPS and REOP systems. In this stage of implementation, profile classification and matching with available job listings is still done manually. The matching criteria are based on the applicant's work experience in the area, age, gender or sex. This approach enables detailed control over the processes and ensures that the platform operates in accordance with the required standards, although the possibility of future automation is left open.

Along these lines, MTESS has ambitious plans for EmpleaPy. In November 2024, the introduction of additional modules is projected; these would improve follow-up,

46 MITIC. (2024). ICT Guidelines. https://mitic.gov.py/lineamientos-tic/ (reviewed July 9, 2024).

intermediation and validation of job listings, along with the inclusion of psychometric tests. This new phase is just now considering the incorporation of AI to assess soft skills and specific competencies, providing a more accurate tool for matching candidates with jobs listed by employers or companies, which promises to optimize the personnel selection process.

However, this main benefit shows that there is still no analysis of the risk of bias in classification of profiles, their personal data, their discriminations or errors, to ensure the tool is as inclusive as possible. In addition, the fact that automated data processing in this new stage uses personal data from of electronic identity databases and other large-scale government databases of socially vulnerable populations, demands close monitoring of any impact the system may have. This monitoring must be performed by both the government and organized civil society and academia working on issues related to the protection of human rights and their relationship to new digital technologies.

Therefore, it is imperative that a comprehensive personal data protection law be enacted in Paraguay before Artificial Intelligence and ADM systems are implemented. The existence of an independent agency will be critical for acting in cases of abuse and risks by government institutions, the private sector and academia. Without these regulations, there are no clear rules for safeguarding and guaranteeing the security and rights of the people who use this government platform.

We urgently offer the following recommendations to mitigate the risks to human rights in the use of AI-based technologies:

a) Offer Executive Branch support for the personal data bill that is being considered in the Legislative Branch.

Personal data protection will not only provide a solid legal foundation for processing sensitive information, but also guarantee people's privacy and security, making the safe, ethical advance of emerging technologies possible in Paraguay.

b) Have personal data processing and privacy terms and conditions on the platform's home page.

The platform must have policies for terms and conditions regarding personal data and privacy to ensure the protection of users' sensitive information, comply with legal regulations and foster users' trust in the system. These policies ensure transparency in data processing and establish the responsibilities and rights of both users and platform administrators.

c) Implement appeal processes for users.

The people affected by algorithmic systems must have full access to the relevant information that will allow them to challenge automated decisions. This requires the availability of legal resources that are accessible, affordable and effective. In addition, if their rights are violated, people must receive adequate compensation. It is essential for the process to be transparent to ensure justice and protect individual rights.

d) Assess the impact of ADM-AI systems.

The implementation of Artificial Intelligence systems must be accompanied by an assessment of impact on fundamental rights. In high-risk situations, these assessments must be public to ensure transparency and enable adequate oversight. It is also recommended that an on-line public access registry be established to publish the results of these assessments. This registry will offer companies and authorities an overview of the systems in use, facilitating understanding of automated decisions and enabling civil society and the scientific community to monitor and debate the use of these technologies, promoting a safer and more effective implementation.

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