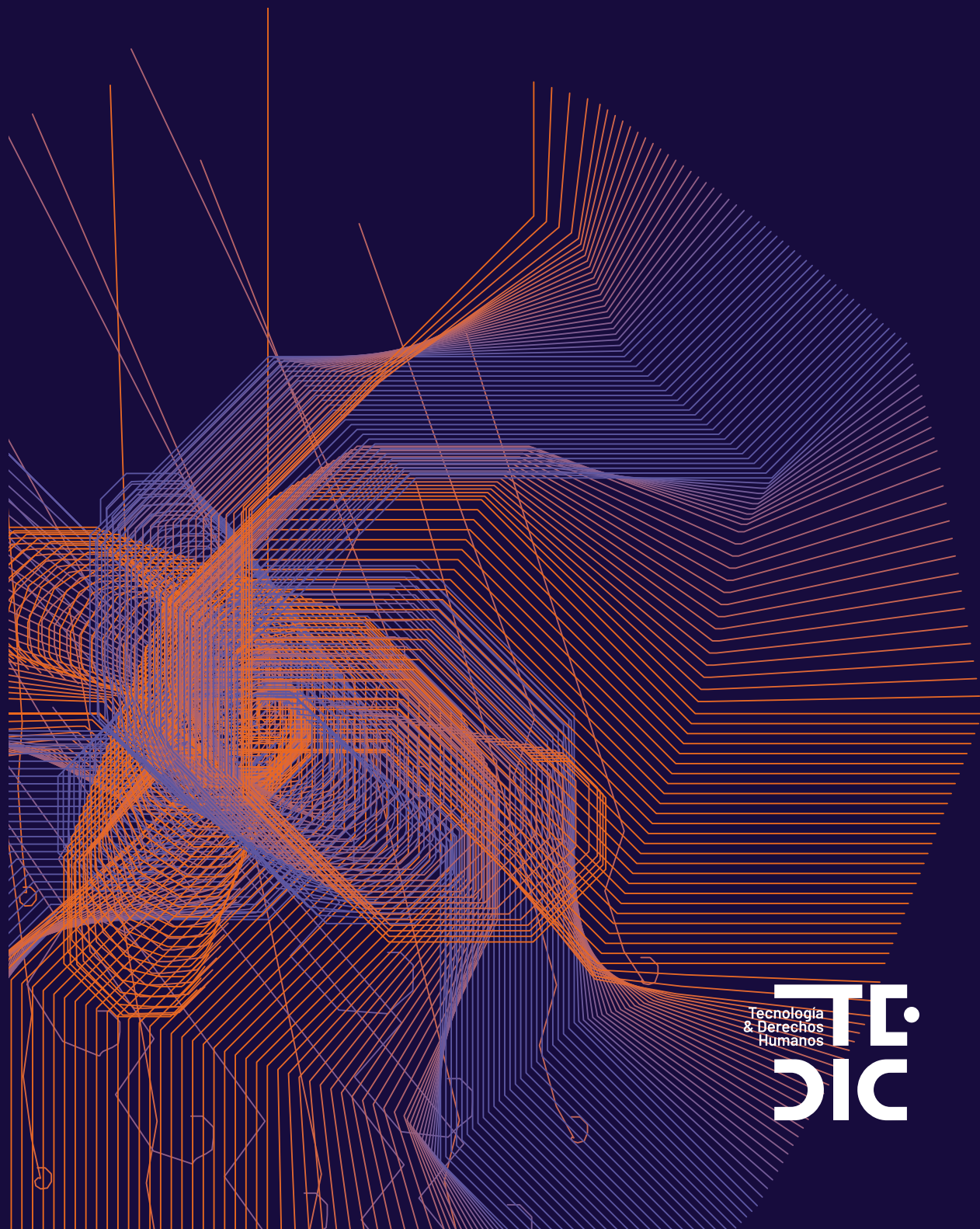


NATIONAL ELECTRONIC TICKETING SYSTEM IN PARAGUAY

An exploratory approach



Tecnología
& Derechos
Humanos

TIC



This report has been produced by **TEBIC** as part of a project funded by Privacy International.

TEBIC is a NGO founded in 2012, with the mission of defending and promoting human rights in the digital age. Among its main areas of interest are freedom of expression, privacy, access to knowledge and gender on the Internet.

NATIONAL ELECTRONIC TICKETING SYSTEM IN PARAGUAY

An exploratory approach

MAY 2022

RESEARCH COORDINATION

Maricarmen Sequera

RESEARCH

Eduardo Carrillo

PROOFREADING

Luis Pablo Alonzo

LAYOUT

Horacio Oteiza

TRANSLATION

Victoria González



This work is available under Creative Commons Attribution 4.0 International license. (CC BY SA 4.0)

<https://creativecommons.org/licenses/by-sa/4.0/deed>

NATIONAL ELECTRONIC TICKETING SYSTEM IN PARAGUAY

An exploratory approach

TABLE OF CONTENTS

Executive Summary	5
Introduction	6
Methodological design	7
Legal framework	7
Documentary review	7
Interviews	8
Legal framework	9
Laws 2051/03 and 3439/07	9
Law 5102/2013	9
Law 5230/2014	10
Law 6534/2020	11
Main findings	12
Documentary review	12
<i>History and current situation of the SNBE</i>	12
<i>Requests for access to public information</i>	14
<i>Current situation of Public-Private Partnership (PPP) projects</i>	17
Interviews	18
<i>Objective of the SNBE</i>	18
<i>GSD Plus and SNBE background</i>	18
<i>Transparency of the SNBE</i>	19
<i>Personal data gathered by the SNBE</i>	20
<i>SNBE information management</i>	21
<i>Incidents</i>	22
<i>Trends</i>	23
<i>Interviewees' opinions on PPP systems</i>	25
Visual characterization of the SNBE	28
Conclusion	29
Transparency of the SNBE	29
The importance of ensuring proper monitoring of the SNBE	30
The importance of a comprehensive personal data protection law	30
Knowledge transfer and further strengthening of the State	31
Regarding public-private partnership projects	31
Research limitations	32
Bibliography	33
Annexes	37
Annex I: Interview Guide - Vice Ministry of Transport	37
Annex II: Interview guide - DNCP	39
Annex III: Stakeholder map	40

EXECUTIVE SUMMARY

This paper offers an exploratory overview of the National Electronic Ticketing System in Paraguay (SNBE for its acronym in Spanish). It focuses particularly on identifying the public and private actors involved in the design and implementation of the system and the impact of the SNBE in respect with privacy and protection of personal data of public transport users.

Additionally, due to the significant control of the private sector in the design and implementation of the SNBE, the research focused on characterizing the current legal framework for Public-Private Partnership (PPP) projects, and its possible impact on technological development projects for the Government. Among the main findings of the research, it has been identified that:

- After almost two years of partial and then total deployment of the electronic ticketing system, the Vice-Ministry of Transport still does not have a complete and operative Control and Monitoring Center as far in terms of its technological component.
- A comprehensive personal data protection law is necessary. Specifically, the research identified that in the design phase of the electronic ticketing system, there was little or no attention to impact studies on personal data and human rights. This shows a weakness in detecting potential risks linked to a system such as the SNBE.
- There is a lack of strategic vision from authorities who do not foresee knowledge transfer mechanisms that are parallel to the implementation of public services by private stakeholders. This is particularly evident in the lack of capacity on the part of the Vice-Ministry of Transport to effectively follow the different steps to validate a potential Service Provider Company (EPS for its acronym in Spanish) without the help of the company GSD Plus S.A.S.
- At present, there is only one project ongoing and under the PPP project modality. The investigation also identified a project related to the provision of ICT infrastructure for the issue of biometric identity cards. Although the project was rejected, it is important to highlight that no arguments were identified considering the negative impacts of the implementation of this type of systems from a human rights and personal data protection perspective.

KEYWORDS: *Electronic Ticketing, e-ticketing, Public-Private Partnership, personal data, privacy, digital sovereignty, digital sovereignty*

INTRODUCTION

This research is an initial effort to understand the current electronic ticketing system. From beginning to end, private, national and foreign companies are involved in the implementation of electronic ticketing in Paraguay.

This was particularly highlighted when, in the context of the computation of the technical fare¹ for public transport, statements by authorities of the National Public Procurement Directorate (DNCP) pointed to a dependence on the Service Providers Companies (EPS for its acronym in Spanish) to access information from the system.

Thus, the TEDIC organization seeks to generate better understanding of the implementation of electronic ticketing. The main objective of this research is to shed light on the electronic ticketing system in the city of Asunción and to understand the current practices regarding the protection of personal data in the National Electronic Ticketing System (SNBE for its acronym in Spanish).

On the other hand, taking into account the high degree of involvement of the private sector in the implementation of the service, an opportunity was identified to characterize the current framework for Public-Private Partnerships (PPPs). It also seeks to understand the extent of implementation of this type of projects in the development of digital infrastructure for the provision of public services, and what are the safeguards for the protection of personal data related to these types of projects.

PPPs are still a novelty in Paraguay and were introduced in the legal framework through Law Nº 5.102/13 “On the Promotion of Investment in Public Infrastructure and the Expansion and Improvement of State Goods and Services” (2).

The involvement of the private sector in the provision of public services in the Paraguayan state, and particularly in regard to the SNBE, is an issue that deserves attention from a perspective that takes into account the sovereignty of the information generated by the provision of public services, as well as the safeguarding of personal data protection. This research is a novel effort that incorporates this perspective in the local context related to the SNBE and PPPs.

1 The technical fare of the Metropolitan Area Public Transportation System is the sum of the cost of the fare paid by the user plus the subsidy per passenger paid by the State. More information at <https://www.mopc.gov.py/index.php/noticias/analistas-explican-resultado-de-la-tarifa-tecnica-del-transporte-publico>

METHODOLOGICAL DESIGN

In order to meet the main objective of this research, a combination of methodological strategies for the data collection from different sources was adopted, aiming to generate a full understanding of the situation and to avoid biases from the research team. The data was gathered during the months of September to December 2021.

Legal framework

The research provides an initial systematization of the current Paraguayan legal framework for PPPs, the public procurement system, electronic transportation ticketing and the protection of personal data.

Documentary review

To understand the context from the implementation of the electronic ticketing system in the city of Asunción, there were a series of queries to public and private web portals, which were later searched by keywords related to the topic. Table 1 shows a summary of the used keywords, the consulted portals and the number of systematized entries:

Portals accessed	Keywords	Total number of entries accessed
Portal of Access to Public Information; Ministry of Public Works and Communications (MOPC); National Public Procurement Directorate (DNCP); Public Registry of Public-Private Partnership Projects; ABC Color; La Nación; Ultima Hora and Agencia IP.	Public-Private Partnership, PPP, Electronic Ticketing Monitoring Center, Control and Monitoring Center (CCM for its acronym in Spanish), Service Providers Companies (EPS for its acronym in Spanish), Electronic Ticketing, EPAS (MAS), TDP S. A. (JAHA), Electronic Ticket Control (ETC)	70

TABLE 1. Prepared by the researcher based on web queries.

The value of the documentary review and the 70 entries consulted² lay in gaining an understanding of the contextual situation and the period during which it was conducted, during September to November 2021. It was also fundamental for the identification of names, for the request for interviews in the public and private sector (national and international) and the design of questions for the interview phase.

² Not all entries were included in this report because some of the news or blogposts from state websites were outside the research focus.

Interviews

Three interviews were conducted with specialist sources in the public sector, to complement the main findings and concerns of the documentary review, as well as to try to identify potential gaps in the current legal framework.

In order to guarantee truthful answers, we chose to conduct anonymous interviews, naming only the public institution of the personnel interviewed. Table 2 provides a summary of the people interviewed and the respective institutions.

Public institution	Number of interviewees
National Directorate of Public Procurement	1
Viceministry of Transport	2

TABLE 2. Prepared by the researcher.

In addition, interviews were targeted with two representatives of the private sector involved in the testing and implementation of the electronic ticketing system. One of the selected individuals did not respond, and the other expressed an initial interest but was never able to be interviewed during the timeframe established for the interviews, between November and December 2021.

The interviews were essential to gain a thorough understanding of the e-ticketing system implementation process, as well as its future projections at the national level.

The templates used for the interviews are available in Annex I and II.

LEGAL FRAMEWORK

Laws 2051/03 and 3439/07

Two laws that define and regulate the public procurement system are discussed.

Law Nº 2051/03 “On Public Procurement” establishes the public sector procurement system and regulates the pre-bidding, bidding and contractual stages and establishes the guiding principles of the bidding process (3). It includes all sectors of the economy where competition is possible, and clearly lists those operations excluded under the law and in article two (3)(4).

Law Nº 3439/07, which amends Law Nº 2051/03 “On Public Procurement”, establishes the organic charter of the National Public Procurement Directorate.

Both Law Nº 2051/03 in Section 5 and Law Nº 3439/07 in Section 3, establish that the National Public Procurement Directorate is empowered to establish policies on public procurement and the subsequent verification of the procurement procedures in all its stages (3).

It is also important to note that the law establishes as the only official access point to an online portal for all procedures and information related to public procurement. In addition, it requires that the software used for e-procurement and related communications shall be non-discriminatory, free to use and interoperable with Information and Communication Technology (ICT) products in general circulation (4).

Law 5102/2013

Law 5102/2013 “On promotion of investment in public infrastructure and expansion and improvement of goods and services provided by the State”, as well as its regulatory decree establish a legal framework to promote private investments both in public infrastructure and in the provision of services provided by agencies, entities, public companies and corporations of which the State is a party (2).

This Law creates and establishes the Public-Private Participation Projects Unit as the main governance body for such projects. It also prioritizes a Public Registry of Public-Private Participation Projects, to make accessible on a website, all information related to PPP projects, contracts and their execution (2).

Finally, it is important to note that the Law already has a regulatory decree, Nº 4183/2020, which was enacted almost seven years after the bill. Such decree deepens on issues such as the Public Registry of Public-Private Participation Projects as the main information bank related to PPP issues and complements it with already existing issues such as the Public Procurement Information System of the National Public Procurement Directorate (DNCP).

Specifically, it establishes that the DNCP must disseminate, through its official website, all processes and acts that require publicity in accordance with the provisions of the Law and the regulations, in order to guarantee their transparency. They must also provide their technological platform for the development of the different stages of the processes and contracts of PPP projects (5).

Law 5230/2014

Law 5230/2014 “Establishing the electronic fare collection for public transportation” and its regulatory decree, creates the electronic fare collection system in public transportation services, for all users of national transportation. It defines electronic fare collection as using contactless smart cards or other valid electronic means of payment. It also sets forth the importance of adopting security levels that safeguard the integrity of each application in isolation and, in general, of all the equipment necessary for the correct operation of the system (6).

On the other hand, it designates the Vice-Ministry of Transport as the authority of application and control of the system, and obliges it to form an *Ad-Hoc*³ Regulatory Council aimed to design, evaluate and propose the specific regulations required by the system (6).

It is important to point out that the bill itself establishes that in the regulatory decree, the Executive Branch must establish the technical specifications that any system or subsystem to be supplied must comply with. It must also include the definition of the technology of cards or means of payment and readers, data model, security architecture, **guaranteeing the use of totally open systems and software** [Emphasis of the research] based on international technical standards (6).

Finally, it is established that the Vice-Ministry of Transport must have a central control and monitoring system that allows having the necessary information to comply with the purpose of the law in real time (6).

Three years later, Decree 6912/2017 “*Whereby Law Nº 5230/2014, “Which establishes the electronic collection of public transportation fares’ is regulated*” was issued, and Decree Nº 4043/2015 is abolished.

The decree delves into issues such as establishing the National Electronic Ticketing System, formed by the Control and Monitoring Central and the Interoperable Electronic Ticketing Systems formed by each Service Provider Company (EPS) (7). It also establishes issues such as the manuals⁴ to be provided by the enforcement authority, and the stages to be followed by the EPSs to request authorization to operate in the territory.

3 The law establishes that the Vice-Ministry of Transport is the president of the Council, and the other members of the Council are: “a representative of the country’s municipalities; the director of consumer defense; a representative of the public passenger transport businessmen’s guild; a representative of public passenger transport users; and a representative of the national quality system”. More information: <https://www.bacn.gov.py/leyes-paraguayas/2984/ley-n-5230-establece-el-cobro-electronico-del-pasaje-del-transporte-publico>

4 Specifically: Manual of Rules for Acceptance of Payment Methods; Manual for the Definition of Operational Processes; Manual of the Authorization Procedure for Service Providers; Manual of Technical Regulations; Manual of the Commercial Negotiation Process between Service Providers; Manual of the Compensation Process between Service Providers; and Manual of Service Levels and Application of Infractions, Penalties and Fines. More information at: <http://todoleyes.com/c1cc0a086bfb42ec-73576d75c824a77e>

Law 6534/2020

Law 6534/2020 “On the protection of personal credit data”, revoked the previous Law 1682/2001 on personal data, and its amending laws (8). As observed in its title, it is focused on the credit sector (8)

It does not effectively incorporate standards of personal data protection principles, such as purpose, purpose limitation, retention period limitation, integrity and confidentiality, accountability, security, redress, openness and data quality.

Significantly, it also fails to establish an independent body for its supervision and effective enforcement.

MAIN FINDINGS

The documentary review and the interviews allow an early insight into the implementation of the electronic ticketing system. They provide a series of results on the public and private actors involved in its development. They also illustrate a series of problems related to the implementation of electronic ticketing and problems of transparency in accessing information about the system.

Documentary review

History and current situation of the SNBE

Due to the interval between the enactment of the law and the implementation of the system, there are six years old news reports, which show other competing companies that are not the ones currently providing the service. A 2016 release presents statements by the President of Center of Public Transportation Entrepreneurs (*Spanish: CETRAPAM Centro de Empresarios de Transporte Público*), announcing the signing of a contract with the company Pronet⁵ to operate the electronic ticketing service, and the enabling of the service since March of that year (9).

However, the implementation of the system occurred years later and was carried out by other companies. According to the Ministry of Public Works and Communications (MOPC) these are: EPAS S. A. for the brand Jaha⁶ and TDP S. A. for the brand Más Card⁷ (10).

This implementation occurred with a series of delays due to a lack of stock of electronic ticketing cards. Although the service already started to operate in 2019 -in a mixed format that allowed the payment of fares in cash or with the card- only in October 2020 the MOPC announced the mandatory use of the electronic system as the only payment method (11). Finally, the mixed format was extended until February 2021 (12).

Since its implementation, a significant number of transactions have taken place. Specifically, the Vice Ministry of Transport reports that from October 2019 to December 14, 2020, 12.411.738 travel payments have been made with the Jaha and MAS cards. As for top-ups in general, 2.744.670 were made and 614.478 cards were sold (13).

An additional public information request by the research was made to access more current data. The information provided by the Vice-Ministry of Transport shows that, since the implementation of the system to date, a total of 152.830.489 travel payments have been made by means of Jaha and MAS cards; 30.231.074 top-ups in general (14). Also, the request for access to public information mentions that SNBE does not have data on the total number of plastics sold, because this information is not shared within the SNBE.

Through the documentary review, a number of information regarding the Control and Monitoring Center (CCM) of the Vice Ministry of Transport were found. As noted in the legal section above, the CCM is a fundamental part of the National Electronic Ticketing System (6). The importance of this system lies in the fact that it allows the Vice-Ministry of Transport to have access to reliable, real-time data on the movements of the public transportation service in the metropolitan area (15).

5 More details about Pronet S.A: <https://www.contrataciones.gov.py/proveedor/pronet-sa.html>

6 More details about the Jaha card: <https://www.jaha.com.py/>

7 More details about the Más card: <https://mastarjeta.net/>

Among the main findings related to this issue, it was identified an important gap in terms of the creation of the CCM and the implementation of electronic ticketing: the bidding process and the bidding between the consortium Electronic Ticket Control (ETC) and Comtel S. A. to win the bidding process and build the CCM (16). The bidding involved building and designing the center's system for electronic ticketing control. This involved the provision of software, hardware and building construction to be connected to the bus validators (16). The ETC consortium was finally awarded the contract.

Also, authorities reported that at the same time that the CCM was under construction, the electronic ticketing control system was in operation, since the data collected was in the database in the cloud since October 2019 (15). However, it is noted that the delivery of this tool by the ETC consortium was delayed and that even one year after the award, there was still no delivery date for it (17).

Such delays and certain modifications in the delivery dates of the CCM ended up with the involvement of the DNCP, which conducted an ex officio investigation of the agreement signed between the Ministry of Public Works and Communications (MOPC) and the ETC Consortium (18) and challenged it. Moreover, the challenge to the adjudication took place at a sensitive political and economic moment, when the technical tariff for the public transport service was being defined (18).

The DNCP investigation concluded with the annulment of the agreement between ETC and the MOPC, which could have benefited the former in a possible relaxation of delivery terms (19). Specifically, Resolution 4136/2021 of the DNCP highlights in particular the lack of response from the ETC Consortium to provide documents to the DNCP, as well as the lack of sending —by the Convener⁸— of documents to verify the progress, certification and regularity of the payments made under the bidding (20).

On the other hand, the DNCP resolution makes visible a series of companies that are constituted as suppliers of the ETC consortium, and illustrates an important chain of private actors for the provision of the technology behind the CCM. These companies are held responsible by ETC to justify the delays in the works. The arguments are largely related to the disruption of the supply chain due to the Covid-19 pandemic. The companies listed are: SOLNET S. A.⁹, BONUS S. A.¹⁰, ESTILO MADERA S. A.¹¹ and AREA DATA S. A.¹² (20).

It is worth noting that within the framework of the ex officio investigation carried out by the National Directorate of Public Procurement, its chief authority made press statements pointing out that the data handled in the electronic ticketing system are provided by the companies EPAS and TDP, thus expressing concern about the integrity and reliability of the electronic ticketing data, due to a lack of independent control over how the SNBE data are collected. It also clarifies the importance of the CCM in alleviating this situation (21).

Finally, and beyond the national public and private actors made visible in the documentary review, it is important to mention the role of the international consulting firm GSD Plus SAS in the implementation of the electronic ticketing system. The consultant has been the certifying entity in charge of the e-ticketing approval (22). Moreover, it has been supervising the updating of the interoperable remote recharge process in the CCM (23).

8 In this specific case the MOPC

9 State supplier data SOLNET S.A: <https://www.contrataciones.gov.py/proveedor/yaguati-sa.html>

10 Information about the company BONUS S.A: <https://www.bonus.com.py/>

11 State supplier data ESTILO MADERA S.A: <https://www.contrataciones.gov.py/proveedor/estilo-madera-s-a.html>

12 State supplier data Area Data S.A: <https://www.contrataciones.gov.py/proveedor/lowell-s-a.html>

Also, the role of this consultancy firm for the implementation of the National Electronic Ticketing System (SNBE) at the intermunicipal level is in progress. The documentary review identified the International Public Bidding (LPI) No. 401213 for a “Consultancy for the elaboration of additional regulations for the interoperable electronic ticketing in the intermunicipal transportation service at the national level” (24). This bidding is called by the National Transportation Directorate (DINATRAN)¹³.

According to the DNCP website, the bid has been awarded. Only one stakeholder applied for the bidding: the Electronic Ticketing Technology Consortium (formed by GSD PLUS SAS and BURJ AL CB S. A.) (24).

Documentation available from the ICB (International competitive bidding) shows that GSD Plus SAS was one of the companies consulted for the elaboration of the reference prices of the call for the consultancy, due to the specialty of the consultancy services (24).

Finally, the note D.G.C Nº 100 addressed to the DNCP (General Directorate of Bidding) mentions that DINATRAN expects to promote electronic ticketing systems in the transportation services under its supervision (24). For this purpose, the note mentions that specific expertise is required, and that it considers that the fastest way to achieve this objective is to hire an international consultancy given the particularity and experience in the developing of the system, and because there are no national suppliers in the country for the services to be hired (24).

Requests for access to public information

By reviewing the portal for access to public information, it was identified a series of requests for access to public information that allow to understand the transparency of information about the SNBE, both at the technical level and the data generated through the system.

The request for access to public information Nº 21521 made by the TEDIC organization is the most complete of the requests accessed and in terms of personal data issues. It is important to underline that the MOPC provided the requested information only after TEDIC filed a judicial protection action (amparo). It is also important to highlight the recognition by members of the TEDIC organization of the good will of the MOPC when answering the request (25) and after the amparo action.

Among the main findings in request Nº 21521, the name of the international consulting firm GSD Plus SAS and its role in the design and evaluation of all the regulations of the system contemplated in the Manuals issued by the Vice-Ministry of Transport, comes up again¹⁴ (26).

13 DINATRAN is the regulatory entity for national and international passenger and cargo transportation services and the agency responsible for the application of conventions and agreements within the scope of its jurisdiction. More information at <http://www.dinatran.gov.py/>

14 Namely: 1. Acceptance Rules and Means of Payment Manual 2. Operational Processes Definition Manual 3. Service Provider Company (EPS) Authorization Procedure Manual, 4. Manual of Commercial Negotiation between Service Providers, 5. Manual of Compensation Process between Service Providers, 6. Manual of Service Levels and Application of Penalties and Fines, 7. Technical Standards Manual

Regarding access to data by third parties, the response to the request states that the data collected and/or stored will not be available to the general public. They may only be disclosed to the Vice-Ministry of Transport and the legally authorized EPS. They also mention that although they do not foresee a deadline for the deletion of data, they assume a storage period of 12 months for subsequent deletion (26).

The response provided by the MOPC also states that there are three types of public transport users associated with the card. Table 3 provides a summary of them:

Users with general access “unregistered and/or anonymous”	Users with general access “registered”	Users with special access
Full fare paid. Only payment and boarding point will be recorded. This information will be used to calculate transportation system usage statistics and/or monetary transactions.	Full fare is paid and names, surnames, and ID numbers will be provided voluntarily in order to safeguard the remaining balance in case of theft or loss. This information will only be made available to EPS officials based on complaints from users.	Reduced or exempted fees are paid. In order to access this data, the respective institutions must issue the corresponding certificates. The type and cost of the fare will be recorded, as well as the boarding point. This would apply to people with disabilities and students [Research emphasis].

TABLE 3. Compiled on the basis of the request for access to public information N° 21521

The response also states that the data collected during the use of the card are the type and cost of the fare and the boarding point (GPS coordinates). They also mention that no passenger drop-off data is collected. Finally, in the case of users with special access and beneficiaries of gratuity and special fares, the response to the request points out that the means of payment will be personalized with the data provided by the institutions in charge of registering the people who qualify for such benefits (26). This will be further discussed later in this report.

It is important to point out that in its response, the MOPC does not foresee the possibility of publishing statistical information in real time for citizen access, but that it will be published in the corresponding government portals on a weekly or monthly basis.

Finally, although the response to the request includes an annexed document to support some of the arguments referring to the technical part, the TEDIC organization highlighted the absence of such annex, called “SNBE Technical Standard Manual” (*Manual de Normatividad Técnica del SNBE*) (25).

The queries using the keywords mentioned above allowed the identification of three additional requests for access to public information. This information of which can be seen in Table 4.

Requests for access to public information
Nº 40788
<p>There are questions about the reason why it is not possible to obtain information on kilometers traveled for each passenger. The response from the Vice-Ministry of Transport highlights that the information recorded in the payment method (card) recognizes the transaction validity (at the time of fare payment) for all SNBE access profiles, in GSP position coordinates fields, i.e. latitude and longitude. Additionally, an explanation is requested as to why the information collected by the CCM cannot be made freely accessible. The Vice-Ministry's response refers that the information in the CCM allows visualizing the number of transactions of use, top-ups, operational fleet and other data that make the transactional operation of the SNBE. However, some of this information cannot be made available to the public because it involves sensitive information of users of the transport system (27).</p>
Nº 42832
<p>In response to the query of what data can be provided by the CCM to citizens, the Vice Ministry of Transport responds that it is established in the requirements document of the LPN Nº 670/2019 of "Requirements of the goods and/or services required" the following minimum reports are listed:</p> <ul style="list-style-type: none"> ■ Transactions performed by each company providing the service (validation top-up, blocking, unblocking, and other transactions) ■ Transaction history of a means of payment detailing in which company each transaction was made, as well as the type of transaction, including transaction amounts and previous and final balances ■ Transaction report for each company for a given period of time: day, month, year. ■ Transactions for a specific payment method ■ Card sales report for a provider company for a period of time: day, month, year ■ Card top-up report for a period of time: day, month, year ■ Transaction validation report over a period of time: day, month, year ■ Credit trip validation report in a period of time: day, month, year ■ Transfers validation report in a period of time: day, month, year ■ Transaction reporting by user profile and card types ■ Geographic location of transactions report ■ Report of bus routes (itinerary) ■ Report of frequency by itinerary, company in a range of time ■ Report of service levels of each service provider for different time periods ■ Report of incidents detected in the system <p>However, the response also clarifies that not all of these reports may be available to the public, as they may contain sensitive information, such as geographic location, among others (28).</p>
Nº 45857
<p>Among a series of queries, there is one requesting the report of incidents detected by the system on a daily basis. The Vice-Ministry of Transport responds that this information is not yet available, as the system is in its final implementation phase (29).</p>

TABLE 4. Prepared based on the request for access to public information Nº 21521.

Current situation of Public-Private Partnership (PPP) projects

The Public Registry of Public-Private Participation Projects, a tool provided for in the PPP law and already mentioned in the legal framework section of this research, provides an overview of the implementation of projects in Paraguay under this modality.

The tool divides the information into PPP projects under study, under execution and rejected (30). Most of the projects —both under study and rejected— are related to road construction, sewage networks, construction of short and long-distance railway networks, and social issues such as the construction of prisons and social reintegration centers (31) (32).

As of today, there is only one project awarded and underway under the PPP modality, which consists of the widening and doubling of national routes 2 and 7, section Ypacarai-Coronel Oviedo 8 (Route 2) and Coronel Oviedo Km 183 (Route 7) (33). It can therefore be concluded that beyond the high participation of the private sector in the design and implementation of the Electronic Ticketing System, it has no relation with the PPP system, neither in the implementation phase, nor with any previous potential project that sought to develop the system under such modality.

It is also important to mention that among the list of rejected PPP projects, a project related to a service for the issuance of ID cards and electronic passports was identified: civil and criminal biometric identification system (34). The project was presented as a private initiative by the company MORPHO S. A.¹⁵. Although there is no conceptual or technical description of the project in the public registry of public-private participation projects, it is possible to access the legal opinion of the Public-Private Participation Projects Unit (UPPP).

According to the ruling UPPP DJ Nº 01/2015, this Unit mentions that both Article 3° and 52° of the governing law on PPPs, reserve the production of goods and the provision of services —as would be the case of the service of issuance of identity cards and electronic passports— to those that are proper to the purpose of the companies and societies in which the State is a party (34)(35).

Along the same line, the UPPP clarifies that since the Ministry of the Interior¹⁶ is a portfolio under the Executive Branch and not a public company or a corporation in which the State is a shareholder, the scope of PPP contracts regarding ministries as contracting administrations is limited to those projects that are expressly set forth in Article 52 (35).

Thus, the opinion concludes that MORPHO S. A.'s system cannot be executed through the procedure foreseen in a PPP project (35).

In the letter of communication of the legal opinion to MORPHO S. A., the legal representative of said company is informed that the project was sent to the Ministry of the Interior, and that the Ministry informed the Technical Secretariat of Planning (STP) that the project in question is of interest to the National Police Command (36).

15 The company changed its name and is now known as Idemia, an international company that describes itself as the global leader in augmented identity for an increasingly digital world. More information about it here <https://www.idemia.com/our-journey>

16 The ruling refers to the Ministry of the Interior, as it considers that due to the nature of the services of the PPP project in question, such Ministry should be the appropriate Contracting Authority.

Interviews

The interviews were used to complement the findings of the documentary review and to identify the role of certain private actors involved in the process of designing and implementing the SNBE. Specifically, the interviews allowed a better understanding of the current management of personal data protection and the projections and challenges of the SNBE in the short and long term.

The interviews allowed the research to gain a better understanding of the perceptions of the people interviewed and of projects under the PPP format. A systematization of the main points raised during the interview phase is provided below, grouped by topic.

Objective of the SNBE

In general terms, interviewee 1 from the Vice-Ministry of Transport is clear in stating that the SNBE is only intended to collect statistical data to understand the mobility of public transportation.

The National Electronic Ticketing System aims at a study of the system. To know how many people validated, in what timespan, if they do it frequently in the morning, at noon, in early hours of the morning. Therefore: to know the mobility of public transportation. Generally we do not do that kind of work [...] What we do is to collect that information so that we can have statistical data, and that such statistical data is reflected in the fare. That is the role of the Vice-Ministry (Interviewee 1- Vice-Ministry of Transport. Answer to question 1.4).

GSD Plus and SNBE background

In order to understand the role of the international consultancy GSD Plus, the interviewees from the Vice-Ministry of Transport recall the failed metrobus¹⁷ project in Paraguay. Specifically, they point out that the reason for the SNBE was precisely to interconnect the bus transport service with the metrobus. There, the company GSD Plus was part of a larger consortium in charge of the metrobus infrastructure:

GSD Plus was awarded as part of the urban reconversion scheme. That is, in fact, it is an all-in-one system. Electronic ticketing is a component of the urban reconversion system. **Why did electronic ticketing emerge? Because of the need to build the metrobus** [Emphasis of the research]. Then the metropolitan system would be integrated, which is what is currently operating, and it was going to be integrated in a fare system with what was going to be the metrobus. So, how did the link between MOPC and GSD Plus originate? Through a public bidding back in 2016-2017. It is an alliance with other consulting firms, because one component is infrastructure that had been awarded to another company. The electronic ticketing issue was awarded to GSD Plus, which is a company based in Bogota, Colombia (Interviewee 1- Vice Ministry of Transport. Answer to question 1. 2).

17 More information on the metrobus project <https://www.ultimahora.com/millonarias-obras-del-fallido-metrobus-se-reducen-escombros-n2877990.html>

They also refer to the technical importance of the GSD Plus for the validation of the SNBE.

So that is the link that GSD Plus had, in **regulating the decree so that we know the technical specifications of what the company, future service providers should complete**. Upon initiating this approval process, GSD Plus was in charge of verifying that effectively, at a technological and environmental testing level, the companies interested in operating electronic ticketing could comply with all the legal requirements. To date, this contract is no longer in force (Interviewee 1- Vice-Ministry of Transport. Answer to question 1. 2).

Finally, and beyond the technical role of the Colombian consulting firm, it is noteworthy that it was not foreseen simultaneously with the system implementation process, a process of knowledge transfer from the Colombian consulting firm and within the Vice-Ministry of Transport.

The mechanism is being explored so that we can set up our verification team in these environments and have the expertise at the institutional level. That is the goal for this year, if God allows, to install here a capacity at ministry level so that this process can be carried out. It should be noted that no company, to date, has submitted a request to create a new EPS. Today we have two, which are EPAS S.A. and TDP S.A. Both were approved in 2019 with GSD Plus, and today, with no request, we are focused on installing that capacity at ministry level (Interviewee 1- Vice-Ministry of Transport. Answer to question 1. 2).

Transparency of the SNBE

Aiming for a transparent and real-time SNBE system is a need acknowledged by those interviewed within the Vice-Ministry of Transport. However, problems in the implementation of electronic ticketing, and particularly the CCM, have had a negative impact on the prioritization of this need. There is also a genuine concern on the part of the people interviewed that this does not imply errors that end up sharing personal data collected by the system:

If we expose all, absolutely all the electronic ticketing data, of course a person who has a reasonable understanding of computers, who understands what the fields mean, could suddenly access information that I do not want anyone to access. For example, the system stores the latitude and longitude of the location where the payment is made. So we know where passengers board, but we don't know where they get off, because there is no check-out validation, it's simply check-in. If I know your card number and if all that information is available, I can know what time and what day you got on. It seems to us that this is relatively sensitive information, and if our idea is to publish statistical data, which we fully agree with, that should not be part of it. In addition, the personalization of the payment method because in many cases it is information of underage passengers (Interviewee 2 - Vice-Ministry of Transport. Answer to question 1. 4).

I am also an advocate of transparency. It seems to me that what can be published should be published. But we are in the middle of an implementation and we have other natural constraints due to the implementation of the system and the limited capacity of resources that we have here in many areas. And in the need we have to suffocate other problems. But if we had, if 2022 turns out to be a year as we are expecting, where we could have enough technical capacity and quality so that we can divide the responsibilities and carry out the different projects, one of those should be to enable a public transport data center. And of course, we should gradually enable more things, the daily validations with the companies, the points with the highest concentration of passengers. In other words, information that is of interest to the public (Interviewee 2- Vice-Ministry of Transport. Answer to question 1. 4).

Personal data gathered by the SNBE

Regarding the personal data collected by the SNBE, interviewee 2 from the Vice-Ministry of Transport clarifies that there are currently two major categories of cards in the SNBE

The system allows cards to be personalized if the user decides so, and also the system requires that cards that have some type of benefit must be personalized. In this range are the cards for students, who have the benefit of half fare and the cards for the visually impaired who have the benefit of free fare. Therefore, these groups must necessarily personalize their means of payment. An ordinary user [...] has the option, not the obligation, to personalize his means of payment (Interviewee 2- Vice-Ministry of Transport. Answer to question 1. 3).

On the other hand, and regarding the data collected by the SNBE, once the card is personalized, the same interviewee refers that there are two parallel moments when personal data are gathered:

At the moment of personalizing the payment method, the information that the electronic ticketing system stores is **the person's name, ID number and date of birth** [Research emphasis]. This is all the information that the National Electronic Ticketing System allows storing within the structure of events that are recorded in the card and that is part of the system. **This does not prevent electronic ticketing companies from collecting other types of information** [Emphasis of the research], such as telephone number, place of residence, e-mail, or any other type of information that is important for customer identification in the case of calls to the call center, sending SMS notifications, etc. **And that is already part of the privacy and information provision agreements that exist between the client and the service provider, which at the moment of personalizing the card the client has to read and accept** [Research emphasis] (Interviewee 2- Vice-Ministry of Transport. Answer to question 1. 3).

Finally, it is important to highlight favorably the attention and predisposition of the Vice-Ministry of Transport when requiring the existence of an informed consent by the EPSs and during the process of personalization of the cards.

The only thing we demand is that there should be a statement of what is going to be done with this information and that the user must necessarily accept this in order to provide his or her personal information. We made a couple of observations at some point. It's not like we said "you know what, do whatever you want" either. We observed that there should be that statement in a public place so that the client can see what information they are providing and what is going to be done with that information (Interviewee 2- Vice Ministry of Transport. Response to question 1. 3).

Give consent for this information (Interviewee 1 - Vice-Ministry of Transport. Response to question 1. 3).

SNBE information management

On the one hand, interviewees from the Vice-Ministry of Transport clarified that although the SNBE is a centralized system, there is not only one database, but three:

In fact, there is not really a single database, there are three databases. We as Vice-Ministry, have the role of player within the Electronic Ticketing System, as a major compiler of information. We do not generate information, no type of transaction is generated here. It is not necessary for the Vice-Ministry to respond with “ok” or “go ahead” for the execution of any type of transaction. It is the Service Providers Companies that have the permits, according to technical standards, to operate the system. What they do is to send us and the other service providers a copy of those files, of those events (Interviewee 2- Vice Ministry of Transport. Answer to question 1. 5).

It is also noted that there is not necessarily a unified security standard for these databases, but that it is up to the discretion of each of the companies to apply the safeguards they deem appropriate.

So, we, the three actors, reconstructed the base of the National Electronic Ticketing System. The database we have is in theory a replica of the same database managed by MAS, the same database managed by EDP. Each of the actors applies the security mechanisms it deems necessary to safeguard the information in its database. There are times when we have an incident, such as a database blockage, which does not affect sending information on behalf of the companies. In other words, we can continue receiving the events and we queue the events and the companies do not realize that there is an incident on this side. There are incidents that do force us to tell the EPSs if they can suspend sending information for half an hour (Interviewee 2- Vice-Ministry of Transport. Answer to question 1. 5).

Also, the persons interviewed from the Vice-Ministry of Transport refer that there are four actors that have access to the information in the SNBE databases, but depending on the type of card (students or people with disabilities):

The information concerning the personalization of students’ means of payment, of course we, as Vice-Ministry, and also the Ministry of Education, have access to it. And the service provider that issued the payment method. The same happens with the cards for the visually impaired, we have access as Vice-Ministry, and also SENADIS (Interviewee 2 - Vice-Ministry of Transport. Answer to question 1. 3).

Finally, these interviewees clarify that the Ministry of Education and Science (MEC)¹⁸ and the National Secretariat for the Human Rights of Persons with Disabilities (SENADIS)¹⁹ provide the list of beneficiaries for the issuance of cards with differentiated services, and that this work requires an important process of control of the information provided by the Vice Ministry of Transport and the Service Providers.

18 More information about the MEC <https://www.mec.gov.py/cms/>

19 More information about the SENADIS <https://senadis.gov.py/>

And why SENADIS? Because they know which are the active users under the law that protects them in both user segments. Then the MEC provides us with the list of active students in the school period that is relevant, in this case, for example, in 2021. And SENADIS tells us their new users, those people who are affected by disability and go to SENADIS to obtain their disability certificate. Then this is shared with each EPS, [...] so that they can start and issue the payment methods free of charge (Interviewee 1- Vice-Ministry of Transport. Answer to question 1. 3).

The entities send a formal note and attach a list. And they also send us a digital list [Emphasis of the investigation]. We verify that there are no duplicates, that there are no people who have already benefited on a previous batch, etc. We make some inquiries with the entity and then this list is sent to the supplier. We do not have the authority to tell them “you know what for me this person cannot be a beneficiary of the law” since it is the authority of that institution to provide that list. And they are providing that list under oath. So the only thing we do is to make observations on the formatting, some striking issues with the last names, the ID card numbers. Suddenly people are listed twice with the first name, first surname, second name, second surname but the same ID number. We verify that double issuing of payment methods for the same beneficiaries is not allowed (Interviewee 2- Vice-Ministry of Transport. Answer to question 1. 3).

It should also be clarified that the EPS also carry out verifications from their side. Of course, they do not have much intention of issuing double cards. Then they also apply a series of checks and personalize the payment methods and submit them to the Vice Ministry. Cards are reviewed one by one, together with a person in charge of the entity that provided the information, whether it is MEC or SENADIS. A count is done and this is delivered to the entity so that the entity can deliver the means of payment (Interviewee 2 - Vice Ministry of Transport. Answer to question 1. 3).

Incidents

Regarding the way in which incidents are recorded, it is important to point out that it is intrinsically related to the completion of the CCM, since the systematization and recording of this type of problem is part of the package that ETC must deliver to the Vice-Ministry:

The incident report is used to record both internal incidents which have to do with our infrastructure -which is not yet set up here- and technical incidents with service providers [...] And for the module we do have implemented, the training is scheduled for January, and I think that is when we will start recording these events. Likewise, when we have major events, we usually report them to our managers. Of course, they can solve and ask for a technical report of the reason for the incident and what was done so that it does not happen again (Interviewee 2- Vice Ministry of Transport. Answer to question 1. 5).

The interviews also suggest that the full performance of the incident report is linked to the training of officials from the Vice-Ministry of Transport.

Lack of training. And now we are addressing urgent compensation issues. This is a cross-cutting issue for the whole system; it is the heart of what allows the system to function. Today, in fact, there is a meeting that I should be at. All our attention is there right now (Interviewee 2- Vice Ministry of Transport. Answer question 1. 5).

On the other hand, interviewee 2 of the Vice-Ministry of Transport states that although the incident system does not yet operate on its internal servers, it does operate in the database, and that it is part of ETC's commitment to maintain this until the CCM is fully operational.

The ministry has a contract, a national public bidding. And the supplier is a consortium called Electronic Ticket Control, ETC. Which is responsible for the construction of the building, equipment, and development of the software [...] And part of the solution was that the system can be hosted in the cloud as many times as needed. Until then, it can be implemented on local servers. That stage has not yet been completed. (Interviewee 2- Vice-Ministry of Transport. Answer to question 1. 8).

Regarding the type of incidents recorded to date, interviewees from the Vice-Ministry of Transport report that most of them have to do with hardware rather than software issues:

These are events at the infrastructure level of the general type. A machine that got frozen, that was restarted, that has to be reconfigured, temporary blockages in the database that makes some of the processes take longer than expected. I don't know, the expiration of a certificate, which has to be renewed, the renewal of access credentials with the providers. Generally they are of that type [...] At the software level we had a good experience because we were very careful in testing the system before putting it into production. So, generally we don't have major bugs on the software. Generally it is hardware, configuration, suddenly there are days that are very heavy transactionally, we have to resize the machine. Usually these are the type of incidents (Interviewee 2- Vice-Ministry of Transport. Answer to question 1. 6).

Trends

Interviewee 1 gives an overview of the implementation of the SNBE, and explains the intention of the Vice-Ministry of Transport for the Municipality of Asunción to also join the electronic ticketing system:

Electronic ticketing in the metropolitan area of Asunción is 100% operational since February 16, 2021, and we are looking for, that is, it will be a year since then, soon in two months. And what interviewee 2 mentioned to you is that suddenly it is complicated to get real statistics because of the flow of people and also because of everything that the pandemic entails. And I think that this was reflected not only in transportation but in all the productive sectors, and at a national level. And with respect to how it is going to advance. In other words, in the metropolitan area of Asunción, it should be emphasized that it is all the municipalities that make up the metropolitan area of Asunción, plus the lower Chaco, which would be Villa Hayes, Benjamín Aceval, Falcón and Nanawa. So that is the area that the Vice-Ministry of Transport manages as concessionaires, so to speak. We are working so that the Municipality of Asunción can be coupled to the electronic ticketing system, in view of this new year. So, this is the current panorama of ticketing at the level of the Vice-Ministry of Transport (Interviewee 1- Vice-Ministry of Transport. Answer to question 1. 1).

On the other hand, they state that they are not involved in the bidding process led by DINATRAN, mentioned above in the documentary review section, but that in the future they will necessarily be involved:

DINATRAN is responsible for interdepartmental, short, medium and long-distance transportation. [...] It is very important to make it clear that the Ministry of Public Works, through the Vice Ministry of Transport, is the governing body of electronic ticketing. Now, the fact that DINATRAN is engaged in making a report or a review of its fare is a matter that they are probably doing [...]. But DINATRAN is free and autonomous as long as it can summon and make public contracts. Then, finally, what comes out of that bidding process will be an input of the Vice Ministry of Transport, it will have to render accounts to us and we are going to open that call and expand the ticketing. So, probably what DINATRAN is doing is analyzing a consultancy that will serve as input for us to expand ticketing in its area of expertise (Interviewee 1- Vice-Ministry of Transport. Answer to question 1. 2).

Finally, it is important to highlight that interviewee 1 from the Vice-Ministry of Transport mentions that the expansion of the SNBE will necessarily be associated with a greater collection of personal data and other factors such as connectivity in remote areas:

When at some point DINATRAN wants to introduce electronic fare collection within its transportation system, DINATRAN charges per kilometer traveled, then we will necessarily have to adjust our system. We will have to make some adaptations because I suppose we will have to make a check-in and a check-out. We will have to see how it is charged, if a certain amount is always charged at check-in and check-out, the calculation of kilometer traveled will be made [...] In other words, there are a lot of things yet to be seen, but it will be necessary to touch the implementation of ticketing because this was designed for a flat rate. And DINATRAN is per kilometer traveled. It is going to be much more critical than GPS, the coverage. There we have external factors, for example the quality of the signal provided by the telephone companies. It will be a much more costly implementation for the providers, from the point of view that there will have to be two validators for every transport unit, not only one. Connectivity is going to be a key factor [...] In other words, there are a lot of technical details (Interviewee 1- Vice-Ministry of Transport. Answer to question 1. 9).

Interviewees' opinions on PPP systems

Although the electronic ticketing system was not implemented as a public-private partnership project, some questions were included to better understand how the system is perceived by public policy makers.

The interview with representatives of the Vice-Ministry of Transport was not very useful in this regard, as they are not fully familiar with this project modality. However, the person interviewed from the National Public Procurement Directorate did provide a number of interesting responses about the implementation of this type of project, as it intersects with the development of software for the provision of public services.

First of all, it is important to highlight that beyond the interviewee's assessment of PPP projects, he also points out that it is important not to fall into a potential transfer of exclusive powers that are the responsibility of the State:

The dynamics and flexibility of this concept means that this type of contract can be implemented in countless public administrations, from the largest to the smallest. Always taking care that everything is handled within the limits of what is negotiable by the State and that the line of what is a non-delegable public function is not crossed. We cannot make a PPP to hand over State security to a private company, why? Because State security is a public function that cannot be handed over (Interviewee - National Directorate of Public Procurement. Answer to question 2.1).

It also points out that in the purchase of technology for the provision of public services, there are a series of concerns that must be taken into account in order to safeguard the interests of the State and society:

There are always two major concerns in technology. First, the purely patrimonial one, whose is what is being developed? To put it bluntly, am I or am I not going to get the source code? It is not possible to speak in a generic way. Because if the State buys, I don't know, Microsoft Office, you obviously cannot ask for the source code of Office [...] But we can eventually ask for source codes and other patrimonial securities when we are talking about specific developments for the State. And along with this concern, there is the issue of security of the acquired product with respect to possible hacks when it comes to handling important issues, especially financial ones on the part of the State. And on the other hand, there is the concern about personal data, generally of citizens of course, managed through the acquired technology. An example of this was the bidding process for the tax management system of the Municipality of Asunción. I do not remember the result, but it is an interesting topic to analyze. That is, the results of a constitutional lawsuit that taxpayers filed against this contracting for lack of security in the handling of personal information due to the handover to a company (Interviewee - National Directorate of Public Procurement. Answer to question 2.2).

Finally, the DNCP interviewee said that it is very important to start considering the protection of personal data when negotiating with private sector companies that will have access to data collected by the State, and that this task is a great challenge due to the fact that there is no established internal practice on the subject in the administrative management:

When contracting software development, institutional database management, institutional information management, it is necessary to consider these twenty-nine, thirty, one thousand or ten recommendations for handling sensitive information [...] And that would be very interesting to have at the moment of designing the contracting of the tools, or the relationship with the private company that for one reason or another will have access to that data. There are many contracts where the private company can have access to private data managed by the public institution. Let's start from the largest, what is the largest database we have? Identifications [...] Is there access of private companies to identifications? Of course there is. For software maintenance, for implementation of certain hardware connected to the whole management system. And, today about to be finished, the whole backoffice of ID production will be handed over to a private company. Excellent, this is done everywhere in the world. In absolutely every country. And one of the largest and most serious companies is the one that is just in the background, that is, it would be in the ID backoffice by virtue of this contract. **But, whether or not they took into account the information security elements, not with the level of care that they could have because they have not yet matured that perspective. So, it is a fundamental task** [Emphasis of the research] Can the State do it? It can be done, but hand in hand with entities specialized in this analysis, because we are still talking about an area, so to speak, that has not been internalized in the culture of administrative management (Interviewee - National Public Procurement Directorate. Answer to question 2.2).

The public procurement process is a process of data control from a certain point of view [...] We are absorbing more and more information from public databases every day [...] And that automatically means that we are handling information that may be sensitive information. An information that is there, on the edge of a red line, is for example, the one referring to the final recipients of the companies' profits. This information is important for the public procurement system: who is really behind the company, and if this person is pulling the strings of several companies. This is something fundamental in the public procurement system to guarantee real competition. But we are handling very sensitive information. And we have to take into account very fundamental questions about what information we can have, what information we can publish, who within the institution should know certain information and who does not need to know that information [Research emphasis]. So, the analysis of third party information security, in general, is still in its early stages in the Paraguayan public administration in general and in public procurement as well (Interviewee - National Public Procurement Directorate. Answer to questions 1. 3 and 1. 4).

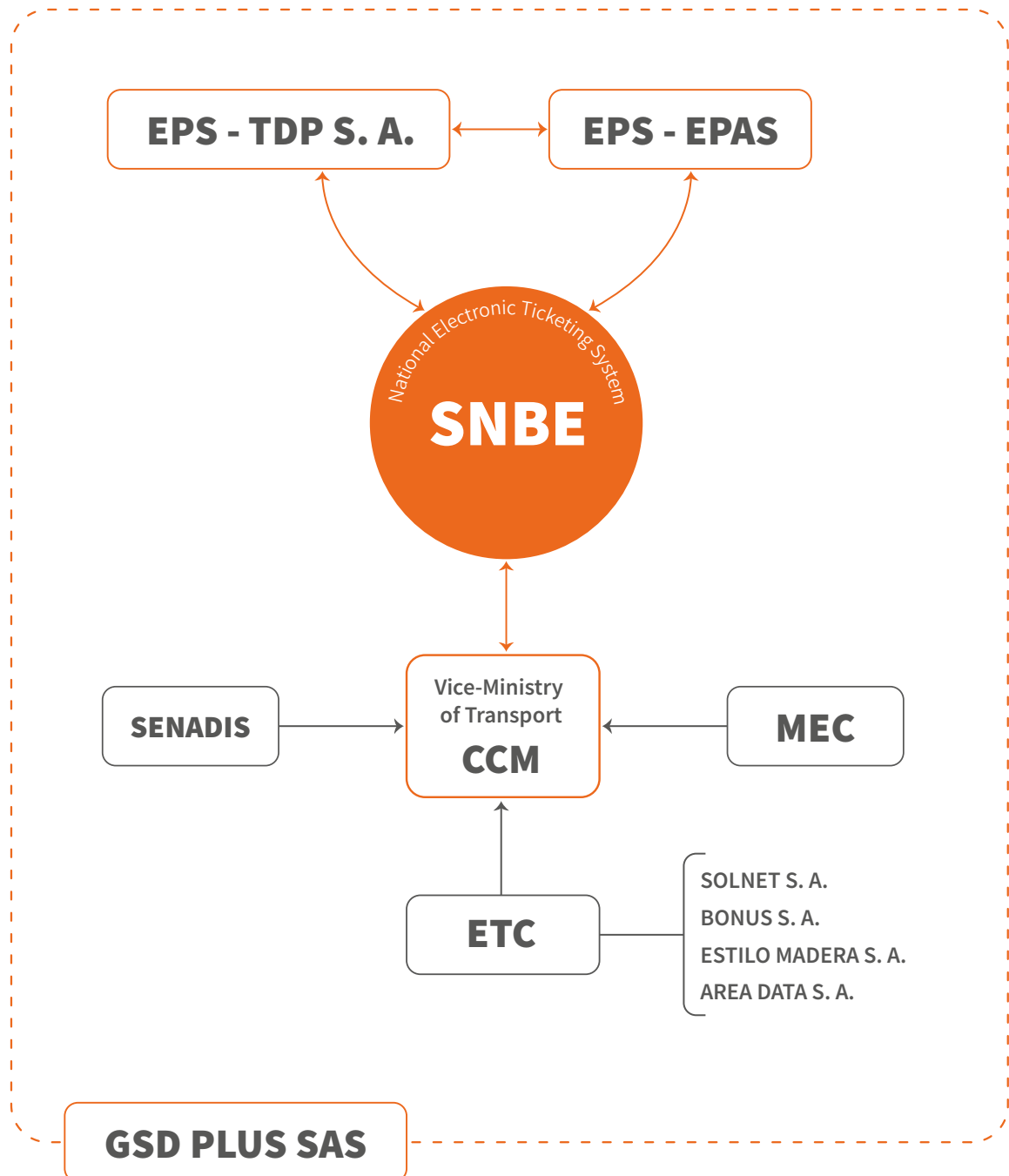
On the other hand, interviewee 1 from the Vice-Ministry of Transport states that during the process of advising the EPSs on the privacy policies they should include to guarantee informed consent from their clients, they were forced to make a series of inquiries without institutional support from specialized entities, and due to the lack of a comprehensive legal framework on personal data protection:

We were engaged in making revisions, like where do you get to ask a private company for an EPS that... In fact, we made recommendations to them, in order to safeguard what is written in what is privacy. That is to say, today there is no law, for instance, where you can take hold of it and say “according to such and such article of such and such law you have to adhere to this procedure” [Emphasis of the research]. We made several reviews of contracts, so to speak, that the telephone companies make with the users and from there we obtained useful information to be able to recommend to the EPS. We also consulted with SEDECO (The Secretariat of Consumer and User Defense) because in fact SEDECO is the one that could provide us with inputs to provide greater protection to the user (Interviewee 1- Vice Ministry of Transport. Answer to question 2.1).

So, at the systems level I don't know if MITIC [Ministry of Information and Communication Technologies] I think it has some standards of good procedures or something like that, but it is very general. I mean, we had to manage it ourselves, and it would be very interesting if MITIC or SEDECO could develop a guide of good practices so that we or all those who provide public services could adopt these measures within the framework of the public-private alliance or in the case that your client is private (Interviewee 1- Vice-Ministry of Transport. Answer to question 2.1).

Visual characterization of the SNBE

This research and the combination of different sources of data collection allowed the design of a stakeholder map that visualizes the main public and private stakeholders involved in the operation of the National Electronic Ticketing System. An explanatory table of these actors is available in Annex III.



CONCLUSION

The implementation of the electronic ticketing system in Paraguay involved a long process marked by a series of problems. This was to be expected due to the complexity of the system and the paradigm shift it implied for public transportation.

It is important to point out that most of the public debate on the subject focused on making visible and questioning administrative irregularities in the delivery of building and digital tools to the Vice-Ministry of Transport. Logistical problems were also highlighted in the first phase of implementation of electronic ticketing, the main one being the lack of provision of the electronic ticketing cards needed to make payments on the buses.

However, the public debate paid little or no attention to the implications of the implementation of electronic ticketing and its security risks in the collection of personal data by the public and private sector involved.

This research is a novel effort to centralize all existing information on the SNBE, with a particular emphasis on understanding the implications of the system on the free exercise of the right to privacy and the consequent protection of personal data.

On the other hand, and due to the presence of the private sector in the entire productive chain of design, implementation and monitoring of the SNBE, the research sought to better understand its role, and to connect with the rising trend of PPP projects for the design and adoption of technology for the provision of public goods and services. Thus, a series of conclusions and recommendations are offered regarding the implementation of the electronic ticketing system, hoping that these recommendations will also be useful for other projects that have a technological development element under the responsibility of a public entity.

Transparency of the SNBE

There is an important need to make the data generated by the electronic ticketing system transparent, in order to generate different control mechanisms for the citizens and to allow a better understanding of the system.

The interview stage shows willingness by officials of the Vice-Ministry of Transport to make the system transparent, but the lack of skilled staff and work overload -due to the fact that the CCM has not been finished - are presented as the main reasons why a tool such as an open data portal of the SNBE has not been implemented.

On the other hand, it is important to stress that the understanding of the system should not be limited to the data generated by it, but also to the technical details that allow its very existence. It is striking that Law 5230/2014 raises the need for the electronic ticketing system to be open source. However, the regulation of the law no longer incorporates such approach, preventing the technical, academic community and civil society from being able to perform independent audits on the system and thus strengthen its security and transparency.

Beyond this, it is important to highlight the high predisposition of the Vice-Ministry of Transport in the framework of this research, and its significant help in understanding the functioning of the SNBE. Such openness was not identified in the case of national and international private actors related to the SNBE.

The importance of ensuring proper monitoring of the SNBE

Both the requests for access to public information and the interviews show that, after almost two years of partial and then total implementation of the electronic ticketing system, the Vice Ministry of Transport still does not have a fully completed and operational Control and Monitoring Center.

This shows a negative effect on the effective control of the data generated by the SNBE. Beyond the arguments of a database system as a parallel tool to ensure such monitoring, it is necessary to impose greater responsibility on private companies that gain contracts with the State for the provision of physical and technological infrastructure. This also has a negative impact on the design of tools and strategies for transparency of the SNBE and for making such information available to the public.

The importance of a comprehensive personal data protection law

Both the documentary review and, mainly, the interview phase, show the need for a comprehensive personal data protection law. In this regard, it was identified that in the design phase of the electronic ticketing system, there was little or no attention to impact studies on personal data and human rights. This shows a weakness in detecting potential risks associated with a system such as the SNBE.

On the other hand, it is important to highlight the role of the Vice Ministry of Transport in generating recommendations to service providers to ensure the incorporation of privacy and personal data protection policies in the processes. However, such practices cannot be linked to the concern of public officials who have a greater or lesser sensitivity on the subject, but must be a state policy compulsorily applied at all levels of public management.

This is particularly important in view of the future challenges identified by officials of the Vice-Ministry of Transport during the interview phase. Namely, the imminent extension of the SNBE to the inter-municipal level entails the collection of more data in the SNBE (e.g., bus entry and exit points). This must necessarily be associated with a higher degree of security and safeguarding of the information generated by the system.

It is also worth pointing out the positive perception and support of officials of the DNCP and the Vice-Ministry of Transport regarding a possible new comprehensive law on personal data protection that guarantees the free exercise of the right to privacy and also safeguards the sovereignty of information by the State. This is also associated to

policy makers paying more attention to intellectual property aspects of the systems and consultancies they hire, for a full protection of the data of people who use private technological infrastructure to access public services.

Knowledge transfer and further strengthening of the State

It is clear that the role of the private sector has been and is crucial in the current implementation of the SNBE. Whether through the implementation of electronic ticketing by the national companies TDP S.A. and MAS; or due to the role in the design and control phase by the international consulting firm GSD PLUS SAS and even in the design and implementation of the Control and Monitoring Center.

Nevertheless, the lack of a strategic vision by authorities that do not foresee mechanisms for knowledge transfer at the same time as the implementation of public services by private actors is a matter of concern. This is particularly evident in the lack of capacity on behalf of the Vice-Ministry of Transport to effectively follow the different steps to validate a potential EPS, since during the implementation process of the SNBE, it was fully dependent on the consultant GSD PLUS SAS for this purpose.

Although it is important to note that officials of the Vice Ministry of Transport recognize the need for greater independence in this regard, the reality is that to date this capacity has not been installed. To avoid such a situation in the future, greater planning by the relevant institutions is needed in order to avoid situations of total dependence on private actors.

Finally, it is remarkable that in the consultation of reference prices in the DINATRAN bidding process, GSD PLUS SAS approached reference prices, even though it was a competitor in the bidding process. Although the interviewees noted the prestige of the company and its consultants, a company cannot be both judge and party in a bidding process. This requires future attention by public policy makers and citizens in general, to make adjustments where necessary, and thus safeguard the independence of the State in relation to its suppliers.

Regarding public-private partnership projects

Although the “Public registry of public-private participation projects” includes both projects under study and projects that have been rejected, there is only one project in the execution stage to date.

The existence of a registry that makes it possible to visualize the different documentation and analyses carried out on public and private initiative projects is a positive development. Regarding the focus of this research and the growing concern at a global level of PPP projects for the provision of software to the State, only one project was identified: “Service for the issuance of electronic ID cards and passports and a civil and criminal biometric identification system”.

This project was rejected on legal grounds of “non-applicability of PPP projects” for that particular service. However, it is important to highlight that no arguments were identified that took into account the negative impacts of the implementation of this type of systems, from a human rights and personal data protection perspective. It is essential to start incorporating personal data protection arguments in the analyses of the Public-Private Participation Projects Unit, for a more complete analysis of PPP projects and their intersection with the development of software and hardware for the Paraguayan state.

Research limitations

The research is a novel effort to characterize the national electronic ticketing system. However, further attention to the technical specifications of the system and involving an independent audit of the system may complement the findings of this research and provide even greater clarity about the system.

Also, while there was an effort to address system ownership issues, specific research that looks in greater detail at intellectual property issues could expand on the findings of this research.

BIBLIOGRAPHY

1. ABC Color. MOPC would not have control over data from the Electronic Ticketing system, according to Public Procurement - La Primera Mañana (The Early Morning) - ABC Color. 2021 [accessed March 1, 2022]; Available at: <https://www.abc.com.py/730am/la-primera-manana/2021/05/28/mopc-no-tendria-control-sobre-datos-del-sistema-de-billeteaje-electronico-segun-contrataciones-publicas/>.
2. National Congress. Law 5102/2013 “On promotion of investment in public infrastructure and expansion and improvement of goods and services in charge of the State” [Internet]. 2013. Available at: <https://www.bacn.gov.py/leyes-paraguayas/4669/promocion-de-la-inversion-en-infraestructura-publica-y-ampliacion-y-mejoramiento-de-los-bienes-y-servicios-a-cargo-del-estado>
3. National Congress. Law 2051/03 “On Public Procurement” With the amendments of Law No. 3439/07, agreed with its regulations and the current chapters of Law No. 1533 “On Public Works” [Internet]. 2003. Available at: https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&ved=2ahUKEwib1sXM8fmgAhUjFLkGHW78CuwQFjAAegQIChAC&url=https%3A%2F%2Fwww.contrataciones.gov.py%2Fdocumentos%2Fdownload%2Fmarco-legal%2F12760&usq=AOvVaw3yqP3_N2J6Ewg8VfMYL15u
4. TEDIC. Transparent Public Procurement Rating- Paraguay [Internet]. 2019; [accessed 20 February 2022]. Available at: https://www.tedic.org/wp-content/uploads/2019/03/PPL_Assessment_Paraguay.pdf
5. National Congress. Decree N°4183/2020 “Whereby Law N°5102/2013, “On the promotion of investment in public infrastructure and expansion and improvement of goods and services provided by the State” is regulated and Decree N°1350/2014” is abrogated [Internet]. 2020. Available at: <http://app.gov.py/marco-legal/>
6. National Congress. Law No 5230 / ESTABLECE EL COBRO ELECTRÓNICO DEL PASAJE DEL TRANSPORTE PÚBLICO. [Internet]. 2014. Available at: <http://www.bacn.gov.py/leyes-paraguayas/2984/ley-n-5230-establece-el-cobro-electronico-del-pasaje-del-transporte-publico>
7. Executive Branch. Decree 6912/2017 “Whereby Law No. 5230/2014, “Which establishes the electronic collection of public transportation fares” is regulated, and Decree No. 4043/2015 is abrogated [Internet]. 2017 [accessed 20 February. 2022]. Available at: https://www.leyes.com.py/buscar/?td=all_1&c=126&d=10
8. National Congress. Law No. 6534/2020 “On the protection of personal credit data” [Internet]. 2020. Available at: <https://www.bacn.gov.py/leyes-paraguayas/9417/ley-n-6534-de-proteccion-de-datos-personales-crediticios>
9. López K. They will sign contract to exploit electronic ticketing service. ::Agencia IP:: [Internet]. on April 18, 2016 [accessed February 22, 2022]; Available at: <https://www.ip.gov.py/ip/firmanan-contrato-para-explotar-servicio-de-billeteaje-electronico/>

10. Ministry of Public Works and Communications. The national electronic ticketing system is under way [Internet]. [accessed February 22, 2022]. Available at: <https://www.mopc.gov.py/index.php/billeteaje-electronico>
11. Ministry of Public Works and Communications. Electronic ticketing: historic first day with more than 410,000 rides [Internet]. 2020 [accessed February 22, 2022]. Available at: <https://www.mopc.gov.py/index.php/noticias/billeteaje-electronico-primer-dia-historico-con-mas-de-410000-viajes>
12. La Nación. Electronic ticketing: from February 17 payment with cards will be mandatory. 2021 [accessed February 22, 2022]; Available at: <https://www.lanacion.com.py/pais/2021/01/22/billeteaje-electronico-a-partir-del-17-de-Februaryrero-sera-obligatorio-el-pago-con-tarjetas/>
13. Ferreira N. Electronic Ticketing: Mixed fare payment will be extended until January 31, 2021 [Internet]. ::Agencia IP::: 2020 [accessed February 22, 2022]. Available at: <https://www.ip.gov.py/ip/billeteaje-electronico-pago-mixto-del-pasaje-se-extendera-hasta-el-31-de-enero-de-2021/>
14. TEDIC. Request for Access to Public Information No. 53158 [Internet]. 2022 [accessed March 28, 2022]. Available at: <https://informacionpublica.paraguay.gov.py/portal/#!/citizen/request/53158>.
15. Ministry of Public Works and Communications. Vice Ministry accesses accurate and real-time data thanks to Electronic Ticketing [Internet]. 2020 [accessed February 22, 2022]. Available at: <https://www.mopc.gov.py/index.php/noticias/viceministerio-accede-datos-certeros-y-en-tiempo-real-gracias-al-billeteaje-electronico>
16. Ultima Hora. Only two companies bid for ticketing control center. [ultimahora.com](https://www.ultimahora.com) [Internet]. 2019 [accessed February 22]; Available at: <https://www.ultimahora.com/solo-dos-empresas-competen-el-centro-control-del-billeteaje-n2857723.html>
17. ABC Color. Expensive control center not yet enabled, but ticketing is mandatory - Nationals. 2020 [accessed 2022 February 22]; Available at: <https://www.abc.com.py/nacionales/2020/10/24/aun-no-habilitan-costoso-centro-de-control-pero-billeteaje-es-obligatorio//>
18. ABC Color. Procurement investigates the contract for the Electronic Ticket Monitoring Center. 2021 [accessed February 22, 2022]; Available at: <https://www.abc.com.py/nacionales/2021/05/26/contrataciones-investiga-contrato-del-centro-de-monitoreo-del-billeteaje-electronico/>
19. ABC Color. DNCP cancels agreement between MOPC and controversial firms - National - ABC Color. 2021 [accessed February 22, 2022]; Available at: <https://www.abc.com.py/nacionales/2021/09/21/dncp-anula-convenio-entre-mopc-y-polemicas-firmas/>
20. National Directorate of Public Procurement. Resolution No. 4136/21 [Internet]. 2021 [accessed 2022 February 22]. Available at: https://www.contrataciones.gov.py/stje-cliente/public/protestas/seguimiento_de_proceso.html?tid=WCU2yxYd24A%3D#documentos
21. ABC Color. Does the MOPC have control over ticketing data? - Nationals - ABC Color. 2021 [accessed 2022 February. 22, 2022]; Available at: <https://www.abc.com.py/nacionales/2021/05/28/el-mopc-tiene-control-sobre-los-datos-del-billeteaje/>

22. Ferreira N. The electronic ticketing process continues by means of an addendum. ::Agencia IP:: [Internet]. on October 2, 2018 [accessed on February 22, 2022]; Available at: <https://www.ip.gov.py/ip/mediante-adenda-consultora-prosigue-proceso-de-billeteaje-electronico/>
23. Ministry of Public Works and Communications. Electronic Ticketing: remote recharges can now be validated on any device without distinction of brand [Internet]. 2021 [accessed February 22, 2022]. Available at: <https://www.mopc.gov.py/index.php/noticias/billeteaje-electronico-recargas-remotas-ya-pueden-validarse-en-cualquier-dispositivo-sin-distincion-de-marca>
24. National Directorate of Public Procurement. Call for Bidding 401213 - CONSULTANCY FOR THE ELABORATION OF ADDITIONAL REGULATIONS FOR INTEROPERABLE ELECTRONIC TICKETING IN THE INTERMUNICIPAL TRANSPORTATION SERVICE AT NATIONAL LEVEL [Internet]. 2021 [accessed 2022 February 23, 2022]. Available at: <https://www.contrataciones.gov.py/licitaciones/convocatoria/401213-consultoria-elaboracion-reglamentacion-adicional-billeteaje-electronico-interoperable-1.html>
25. TEDIC. Electronic ticketing: strategic litigation [Internet]. TEDIC. 2020 [accessed 2022 February 22, 2022]. Available at: <https://www.tedic.org/billeteaje-electronico-litigio-estrategico/>
26. TEDIC. Request for Access to Public Information No. 21521 [Internet]. 2019 [accessed February 22, 2022]. Available at: <https://informacionpublica.paraguay.gov.py/portal/#!/citizen/request/21521>
27. Gonzalez G. Request for Access to Public Information No. 40788 [Internet]. 2021 [accessed February 23, 2022]. Available at: <https://informacionpublica.paraguay.gov.py/portal/#!/citizen/request/40788>
28. Rivas V. Request for Access to Public Information No. 42832 [Internet]. 2021 [accessed February 23]. Available at: <https://informacionpublica.paraguay.gov.py/portal/#!/citizen/request/42832>
29. Pereira G. Request for Access to Public Information No. 45847 [Internet]. 2021 [accessed February 23]. Available at: <https://informacionpublica.paraguay.gov.py/portal/#!/citizen/request/45857>
30. Technical Secretariat of Planning. Public registry of public-private participation projects [Internet]. 2022 [accessed 20 February 2022]. Available at: <http://app.gov.py/>
31. Public registry of public-private participation projects. Rejected projects [Internet]. 2022 [accessed February 27, 2022]. Available at: <http://app.gov.py/proyectos-desestimados/>
32. Public registry of public-private participation projects. Projects under study [Internet]. 2022 [accessed February 27, 2022]. Available at: <http://app.gov.py/en-estudio/>
33. Public registry of public-private participation projects. Projects under implementation [Internet]. 2022 [accessed February 27, 2022]. Available at: <http://app.gov.py/en-ejecucion/>

34. Public registry of public-private participation projects. Project Details: Issuance of electronic ID cards and passports. Civil and criminal biometric identification system [Internet]. [accessed February 27, 2022]. Available at: <http://app.gov.py/detalle-proyecto/>.
35. Public-Private Participation Projects Unit. Opinion UPPPPPP DJ N° 01/2015 [Internet]. 2015 [accessed February 27, 2022]. Available at: <https://nube.stp.gov.py/s/E3OLKEpoj2oaStD>.
36. Technical Secretariat of Planning. STP/S.E/N° 1116 [Internet]. 2015 [accessed February 27, 2022]. Available at: <https://nube.stp.gov.py/s/E3OLKEpoj2oaStD>

ANNEXES

Annex I: Interview Guide - Vice Ministry of Transport

1. About the electronic ticketing system for public transportation and in particular the Monitoring Control Center.

1. Could you give us a general description of the way the National Electronic Ticketing System (SNBE) is operating to date? Is it 100% operational or is there any stage to be completed for it to be fully operational?
2. What was and is the role of the consulting firm GSD Plus S.A. in the implementation process of the electronic ticketing system to date? What was the reason for choosing this particular consulting firm?
3. What type of personal data of transportation users is currently collected by the SNBE on a daily basis? Could you list the public and private institutions that currently have access to this data directly and/or indirectly?
4. According to the request for access to public information²⁰ No. 40788, it is mentioned that there is sensitive information of the users and generated by the SNBE. What kind of data are you explicitly referring to? Could you please list them? Are there special security mechanisms for this sensitive data and in relation to other data generated by the system?
5. The response to access request No. 45857 mentions that the “Report of incidents detected in the system (per day) was not available at the date of said response (September/2021)”. Did the Vice-Ministry of Transport have any other mechanism to document any computer incident in the SNBE since the system began to be implemented last year? Is such incident report available at this date?
6. If the above answer is affirmative, could you please provide us with a list of what type of incidents are reported daily in the SNBE? Does the Vice Ministry of Transport have direct access to this type of information?
7. Could you explain how the CCM currently works and how the reliability, integrity and availability of the databases generated in the SNBE and provided by the companies TDP and EPAS S.A. is guaranteed? How is it guaranteed to access in real time to the data generated by these companies and avoid any type of manipulation?
8. This investigation found a press release that alludes that prior to the creation of the CCM there was a control system “in the cloud” of the MOPC for the control of electronic ticketing. Can you give us more information about this system in the cloud and who provided this service? Is it still in force? What was the reason why electronic ticketing was implemented without the CCM?
9. In your opinion as an expert, what are the future challenges in the expansion of the electronic ticketing system with the intermunicipal transportation service at a national level in general and in terms of data protection? Do you identify any role of the Vice Ministry of Transport in this process?

20 Both requests for access to public information are available at the portal for access to public information.

2. About Public-Private Partnerships

1. Globally, there is a clear concern about the implementation of this type of systems for the development and purchasing of software for the provision of public services, and without the necessary safeguards for the protection of personal data. In general, how do you see this concern applied to the processes in which technology is acquired by the State? Do we [in Paraguay] have the necessary legal safeguards that guarantee the protection of the information stored in these systems and the real control of the State over these systems provided by the private sector?

Annex II: Interview guide - DNCP

1. On electronic ticketing system for public transportation and the Monitoring Control Center

1. As a general question and to get into the subject, could you tell us what was the degree of involvement of the DNCP in the adoption and implementation of the electronic ticketing system by the companies EPAS and TDP S.A.? Was there any kind of exchange with the Vice Ministry of Transport in the review of contracts and implementation of this system?
2. What is the role of the consultant GSD Plus S.A. for the whole process of implementation of the electronic ticketing system to date? Do they have some kind of local representation that allows a more direct dialogue with the company? **[Talk about the fact that it has been very difficult to establish contact with the company and its legal representative listed in the DNCP portal].**
3. What can you tell us about the ex officio summary of the agreement between the MOPC and the Consortium “**Electronic Ticket Control**” and carried out by the DNCP? What was the sense of the investigation and its main results? Was there a good predisposition of all the parties involved?
4. In a media interview and as part of the ex officio summary to the ETC, the Director of the DNCP made a reflection about the degree of real control of the MOPC over the electronic ticketing system and over the data generated in such system. Was this concern considered to be included as part of the investigation carried out by the DNCP? Do you consider that it could be an issue to be included in the future in the framework of the DNCP control over the Control and Monitoring Center?
5. What are the future challenges in the framework of the expansion of the electronic ticketing system with the intermunicipal transport service at national level in terms of data protection and in general? Do you identify any kind of role for the DNCP in this process in view of the bidding process 336871 by way of derogation?

2. About Public-Private Partnerships

1. What is your opinion on Public-Private Partnership systems and in relation to the current legal framework?
2. Globally, there is a clear concern about the implementation of this type of models for the development and purchase of software for the provision of public services, and without the necessary safeguards for the protection of personal data. In general, how do you see this concern applied to the processes in which technology is acquired by the State? Do we [in Paraguay] have the necessary legal safeguards that guarantee the protection of information and personal data stored in these systems, as well as the State’s real ownership and control over these systems provided by the private sector?

Annex III: Stakeholder map

National Electronic Ticketing System	
Institutional actor	Display mode
Vice-Ministry of Transport - Control and Monitoring Center	A bidirectional arrow pointing to the SNBE speech bubble, to illustrate that the flow of information is from and to the CCM.
EPS- TDP S.A.	A bidirectional arrow pointing to the SNBE speech bubble, to illustrate that the flow of information is to and from TDP. Also a bidirectional arrow connecting to the EPS- EPAS to illustrate that information is also shared between them.
EPS- EPAS	A bidirectional arrow pointing to the SNBE bubble, to illustrate that the flow of information is to and from EPAS. Also, a bidirectional arrow connecting the EPS- TDP S.A. to illustrate that information is also shared between them.
Electronic Ticket Control (ETC)	Below the CCM and with a different figure, a unidirectional arrow from ETC to the CCM.
SOLNET S.A., BONUS S.A., ESTILO MADERA S.A. y AREA DATA S.A.	A { will be displayed next to ETC to visualize all the satellite companies visible to date.
GSD PLUS SAS	A symbol will be chosen to cover the whole graphic, to understand the involvement of GSD PLUS in the whole process of the SNBE.
Ministry of Education and Science (MEC)	A uni-directional arrow pointing to the figure of the Vice-Ministry of Transport-CCM.
National Secretariat for the Human Rights of Persons with Disabilities (SENADIS)	A uni-directional arrow pointing to the figure of the Vice-Ministry of Transport-CCM.

