Contributions of some Ibero-American Governments to Making Public Transport Viable with Artificial Intelligence, Neurotechnology, and the Quantum Internet

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Abstract : The present Research is valuable because It addresses the usefulness of the futuristic internet . **objective:** analyze that contributions they have done by the some governments Ibero-American to make transport viable public with artificial intelligence (AI), neurotechnology and quantum internet , and what evidence Lack of information to decide . **Method :** qualitative documentary review , of scope descriptive-interpretive , from 17 sources : 14 journal articles Ibero-American and international publications, published between 2022 and June 2026; and three rules or recommendations public officials . A governance matrix was applied that cross five government functions with three technologies , and the evidence of each Each cell was classified as sufficient , partial , or absent . **Results :** The evidence is sufficient to regulate AI and protect rights in the face of neurotechnology, partial for planning and operating with AI, and scarce for the quantum internet; UNESCO's recommendation is considered for monitoring and evaluation. There are contributions to regulatory frameworks and advances in public policy, but no source evaluates their application to public transport. **Conclusions / Contributions :** the governments Ibero-Americans they have contributed Marcos general , not instruments specific for transport public . They are proposed five alternatives Subject to validation : assess the impact on the data , postpone monitoring neurophysiological assessment of staff, designate a sectoral focal point, monitor the quantum internet without investing even in his deployment and establishment subsequent evaluation .
Keywords: Governance , artificial intelligence , neurotechnology , quantum internet , transportation public.

Aportes de algunos gobiernos iberoamericanos para viabilizar el transporte público con inteligencia artificial, neurotecnología e internet cuántico

Resumen: La presente investigación es valiosa porque aborda la utilidad del internet futurista. **Objetivo:** analizar qué aportes han hecho algunos gobiernos iberoamericanos para viabilizar el transporte público con inteligencia artificial (IA), neurotecnología e internet cuántico, y qué evidencia falta para decidir. **Método:** revisión documental cualitativa, de alcance descriptivo-interpretativo, de 17 fuentes: 14 artículos de revistas iberoamericanas e internacionales, publicados entre 2022 y junio del 2026, y tres normas o recomendaciones públicas oficiales. Se aplicó una matriz de gobernanza que cruza cinco funciones de gobierno con tres tecnologías, y la evidencia de cada celda se clasificó como suficiente, parcial o ausente. **Resultados:** la evidencia es suficiente para regular la IA y proteger derechos frente a la neurotecnología, parcial para planificar y operar con IA, y escasa para el internet cuántico; se considera la recomendación de la UNESCO para el seguimiento y evaluación. Existen aportes al marcos normativos y avances en política pública, pero ninguna fuente evalúa su aplicación al transporte público. **Conclusiones/Aportes:** los gobiernos iberoamericanos han aportado marcos generales, no instrumentos específicos para el transporte público. Se proponen cinco alternativas sujetas a validación: evaluar el impacto sobre los datos, aplazar el monitoreo neurofisiológico del personal, designar un punto focal sectorial, vigilar el internet cuántico sin invertir aún en su despliegue y establecer evaluación posterior.
Palabras clave: Gobernanza, inteligencia artificial, neurotecnología, internet cuántico, transporte público.

Contribuições de alguns governos ibero-americanos para viabilizar o transporte público com inteligência artificial, neurotecnologia e internet quântica

Resumo: A presente pesquisa é valiosa porque aborda a utilidade da internet futurista**. Objetivo:** analisar quais contribuições algunos governos ibero-americanos fizeram para viabilizar o transporte público com inteligência artificial (IA), neurotecnologia e internet quântica, e que evidência falta para decidir. **Método:** revisão documental qualitativa, de alcance descritivo-interpretativo, de 17 fontes: 14 artigos de revistas ibero-americanas e internacionais, publicados entre 2022 e junho de 2026; e três normas ou recomendações públicas oficiais. Aplicou-se uma matriz de governança que cruza cinco funções de governo com três tecnologias, e a evidência de cada célula foi classificada como suficiente, parcial ou ausente. **Resultados:** A evidência é suficiente para regular a IA e proteger direitos diante da neurotecnologia, parcial para planejar e operar com IA, e escassa para a internet quântica; considera-se a recomendação da UNESCO para o acompanhamento e a avaliação. Existem contribuições para os marcos normativos e avanços em política pública, mas nenhuma fonte avalia sua aplicação ao transporte público. **Conclusões/Contribuições:** os governos ibero-americanos forneceram marcos gerais, não instrumentos específicos para o transporte público. Propõem-se cinco alternativas sujeitas a validação: avaliar o impacto sobre os dados, adiar o monitoramento neurofisiológico do pessoal, designar um ponto focal setorial, acompanhar a internet quântica sem investir ainda em sua implantação e estabelecer avaliação posterior
Palavras-chave: Governança, inteligência artificial, neurotecnologia, internet quântica, transporte público.

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1. Introduction

Transportation public is a service essential whose governance demands decide how to plan networks, regulate operators , protect users and workers , and evaluate results with resources Limited technologies emerging promise support those decisions , but they also introduce risks that the governments must get to know them before adopting them .

In the case of artificial intelligence (AI), the review by Jevinger et al. (2024), based on 87 publications , indicates that in transportation Public is used primarily to predict , estimate the current state of the system , and allocate resources , and that most solutions requires big Large amounts of traveler and system data raise privacy concerns . Caballero- Galeote et al. (2025) provide a review recent on its trends in transportation urban. Studies on new forms of government in the digital age show AI is already part of the public agenda (Fursykova et al., 2023), and the ethical debate is expanding even to production scientific (Vidovic López and Villasmil Espinoza, 2024).

In neurotechnology, the discussion It went from the clinical to the legal . Ligthart et al. (2023) map the foundations ethical and legal aspects of the so-called neurorights , and Chile modified its Constitution through Law 21.383 (2021), which orders the law to safeguard especially brain activity and information originating from her. In the workplace , neurotechnology is accepted better when associated with security that when used to evaluate performance. This matters for transportation, where driver health is a component of service sustainability (Remy and Guseva Canu , 2023) and stress and workload they can alter the perception of risk (Torres Valle et al., 2024).

Regarding quantum internet , the review by Illiano et al. (2022) describes it as a technology still incipient, whose design It requires an effort interdisciplinary field between physics quantum mechanics and engineering Information technology and telecommunications . For a government , its In the authors ' opinion , current relevance is one of vigilance technology further that of deployment immediate .

The governments Latin Americans have already contributed Marcos. Peru passed Law 31814 (2023), which It promotes the use of AI with safety principles . based on risk , ethics and privacy and designates an authority technical-regulatory national ; Colombia has made progress within a framework ethical considerations and bills on AI, with the State as the actor responsible for promoting , regulating and supervising it (Jay Vanegas et al., 2024); and the UNESCO Recommendation (2022) provides a reference international that includes Monitoring and evaluation . However, gaps remain . regulatory and a weak regional articulation in the field of neurotechnology (Martínez, 2025), and the dilemmas AI ethics are not limited to failures techniques correctable , but that They reflect a redistribution of the power to observe , classify and decide about people (Barragán Ramírez et al., 2026).

This article asks that they have contributed by the governments Latin Americans to make transport viable public with AI, neurotechnology and quantum internet , and what evidence There is not enough information to decide . Its objective is to analyze the evidence and the standards. available through a governance matrix and propose alternatives subject to validation .

1.1 Governance as a set of functions

In this study , transport governance public is understood as the capacity of entities public to exercise five Functions : planning, regulating, managing operations , protecting rights and welfare , and evaluating results . It's a framework analytical built for this research , not a standard pre - existing . Enable transport public with these technologies This means , in this study , that the

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government create the conditions regulations , institutional , data and rights protection necessary to adopt them with guarantees .

2. Methodology

A focus study was conducted qualitative , documentary in nature and scope descriptive-interpretive , with a documentary review design supported by a matrix Governance analytics . It was chosen this design because the field is emerging , the evidence this scattered across journals and standards of different nature and purpose is not to estimate effects , but identify that contributions exist , with what Support and where there are gaps . The analysis unit The source was : a journal article , a standard, or a recommendation public official . The study was guided by three Questions , aligned with the title : (Q1) What contributions they have done by the governments Ibero-Americans to make transport viable public with AI, neurotechnology and quantum internet ? (P2) for what Government functions : Is the evidence sufficient , partial , or absent ? (P3) What information How much time is left to decide ?

2.1. Information sources and sampling

Two types of sources were considered : journal articles scientific standards or recommendations public Officials . The collection was done in June 2026 on the websites of the magazines , in search engines academics , through the resolution of DOIs and on portals official standards (El Peruano and the Official Gazette of the Republic of Chile); the UNESCO recommendation was incorporated by Its official link . The sampling was intentional and by variation theme : were incorporated articles from six journals Ibero-American (Cuban Journal of Health and Work, NeuroData , CognitivaTech , Multiverso Journal, Issues Policies and Venezuelan Management Journal) because each one contributes a dimension different from the problem (health) occupational health , neuroscience and ethics , software engineering , law and science social sciences, science policy and management public), and journals international transport , quantum networks, bioethics, urban planning and health public. They were not included journal documents hostess, to prevent conflicts of interest .

2.2 Search strategy and selection criteria

The terms were searched in Spanish and English and combined: a technology with a scope or governance term. Table 1 presents the terms by concept and inclusion and exclusion criteria, with its justification.

Table 1 *Search terms and source selection criteria*

Element	Terms or definition	Justification
AI	artificial intelligence; learning automatic; algorithms ; artificial intelligence; machine learning	Technology already operational in transport
quantum internet	quantum internet; communication quantum; quantum internet; quantum networks	Technology prospective; allows appreciate his maturity
Neurotechnology	neurotechnology; neurorights; neuroethics; interface brain-computer interface; neurotechnology; neurorights	Technology that is sensitive to the rights of users and workers
Transport and well-being	transport public; drivers; mobility; well-being; health occupational; public transport	Scope of the study
Governance	governance; policies public; regulation; ethics; governance; public policy	It allows locate the source in a government function

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Element	Terms or definition	Justification
Analysis unit	A source : journal article , standard, or recommendation public official	It allows counting and classifying each source once by cell
Data sources	Magazine websites ; search engines academics ; DOI resolution ; portals Official standards (El Peruano, Official Gazette of the Republic of Chile); official UNESCO link	Combine access Direct access to search engines to expand coverage
Date of consultation	June 2026	Document the validity of the links and the evidence
Inclusion : type of source	Journal articles with DOI or persistent link ; standards and recommendations official with text accessible	Guarantee traceability
Inclusion : period	Articles from 2022 to 2026-1; regulations current (Law 21.383 is from 2021 and is included as a pioneering regulation)	Maintaining the validity of the evidence
Inclusion : language	Spanish or English	Cover production Ibero-American and international
Exclusion	Sources without data bibliographic verifiable , without access to the content or the magazine hostess	Ensure verifiability and impartiality

Note. Elaboration own .

2.3 Collection , extraction and analysis procedure

The procedure continued seven phases (Table 2). In the extraction , the following were recorded for each Source , eight variables: technology treated , government function to which contributes , main contribution , risks identified , gaps , country or area , type of source and year .

Table 2. Phases of the procedure : what was done , how , by what and quality control

Phase	What was done	How it was done	Why was it done ?	Quality control
1. Delimitation	Questions P1 to P3 were defined , three technologies and five government functions	Based on the title and the objective	Focus the search and avoid dispersion	Definitions set before classifying
2. Search	They were identified sources candidates	Terms from Table 1 on journal websites , search engines and portals officers	Expand regional and international coverage	Record of the consultation date (July 2026)
3. Selection	The inclusion and exclusion criteria were applied .	Reading of title and abstract ; verification of authorship , year and DOI or link	Ensure relevance and traceability	Checking the link of each fountain
4. Extraction	The eight variables for each were recorded fountain	Reading the summary and the available text	Order comparable data across sources heterogeneous	Contrast with the card official of the magazine or of the standard
5. Classification	It was assigned each fountain relevant to one or more matrix cells	Source count by cell : sufficient (three or more), partial (one or two), absent (none)	Show that evidence does it exist , and what lack	Thresholds defined before classifying

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Phase	What was done	How it was done	Why was it done ?	Quality control
6. Synthesis	The gaps were compared with the evidence and formulated alternatives	Analysis thematic and interpretation	Guide the decision without replacing local data	Alternatives labeled as proposals subject to validation
7. Final verificati on	Access to each was verified source and consistency between citations and references	Opening the DOI or link and checking the year , volume and pages with the journal or standard information	Avoid citation errors and broken links	Data correction disagreements before the final draft

Note. Elaboration own .

2.4 Data Analysis

The analysis was thematic and was organized with two axes: the three technologies (AI, quantum internet and neurotechnology) and the five Government functions (planning, regulating, managing operations , protecting rights and welfare , and evaluating). Each source relevant was assigned to the cells of the matrix according to his content , and the same fountain could Counting in more than one cell . Four sources (Fursykova et al., 2023; Remy and Guseva Canu, 2023; Torres Valle et al., 2024; Vidovic López and Villasmil Espinoza, 2024) contributed context to the introduction and discussion and were not assigned to any cell . The classification of each The cell was created using the thresholds from Table 2. The alternatives were derived by comparing the cells. partial or absent with the risks pointed out in the sources , and are presented as proposals , not as results .

2.5 Rigor, aspects ethics and reflexivity

The following criteria were applied for rigor: transparency in the selection process , traceability of each fountain through its DOI or link, the separation between evidence and proposition , and the distinction between technologies operational and prospective . The total number of records was not counted . reviewed , therefore a PRISMA flow diagram is not presented , and double screening was not applied Independent . They were used only access sources The publication was published publicly , so no review by an ethics committee was required . The authors declare his link with magazines cited in the declarations section , and the use of AI tools in the search and drafting is declared , with human verification of the data bibliographical information for each fountain .

3. Results

3.1 Corpus analyzed

The corpus included 17 sources : 14 journal articles (eight from magazines) some Ibero-American journals and six from other journals countries) and three rules or recommendations public . Table 3 characterizes them by origin and by the dimension of government to which They contribute .

Table 3. Corpus characterization

No.	Fountain	Origin or magazine	Dimension that contributes
1	Barragán Ramírez et al. (2026)	Multiverso Journal (Spain and Venezuela)	AI ethics and power

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No.	Fountain	Origin or magazine	Dimension that contributes
2	Brenman et al. (2025)	Journal of the American Planning Association	AI ethics in urban planning
3	Caballero- Galeote et al. (2025)	Transportation Research Record	AI in transportation public urban
4	Fursykova et al. (2023)	Questions Policies (Venezuela)	AI and forms of government
5	Gálvez Rogel and Alvarado Galarza (2025)	NeuroData (Ecuador)	Neurotechnology in the workplace
6	Hernández Rosado (2025)	CognitivaTech (Bolivia)	Data protection and learning federated
7	Illiano et al. (2022)	Computer Networks	quantum internet
8	Jay Vanegas et al. (2024)	Venezuelan Journal of Management	Policies AI publics in Colombia
9	Jevinger et al. (2024)	Public Transport	AI in transportation public
10	Law 21.383 (2021)	Chili	Protection of brain activity
11	Law 31814 (2023)	Peru	AI Promotion and Governance
12	Ligthart et al. (2023)	Cambridge Quarterly of Healthcare Ethics	Neurorights
13	Martínez (2025)	NeuroData (Ecuador)	governance of neurotechnology
14	Remy and Guseva Canu (2023)	International Journal of Public Health	Bus drivers ' health
15	Torres Valle et al. (2024)	Cuban Journal of Health and Work (Cuba)	Human factor and risk perception
16	UNESCO (2022)	Recommendation international	Ethics and evaluation of AI
17	Vidovic López and Villasmil Espinoza (2024)	Multiverse Journal	AI ethics in science
	Total		17 sources

Note. Elaboration own .

3.2 Governance Matrix

Table 4 classifies each cell according to the number of sources in the corpus that support it , with the thresholds in Table 2. S: sufficient (three or more); P: partial (one or two); A: absent (none).

Table 4 *Governance matrix : evidence available by function and internet*

Governance function	AI	quantum internet	Neurotechnology
Plan	P (Jevinger et al., 2024; Caballero- Galeote et al., 2026)	P (Illiano et al., 2022)	TO
Regular	S (Law 31814, 2023; Jay Vanegas et al., 2024; UNESCO, 2022)	TO	S (Law 21.383, 2021; Ligthart et al., 2023; Martínez, 2025)
Manage the operation	P (Jevinger et al., 2024; Hernández Rosado, 2025)	TO	P (Gálvez Rogel and Alvarado Galarza, 2025)

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Governance function	AI	quantum internet	Neurotechnology
Protecting rights and well-being	S (Brenman et al., 2025; Barragán Ramírez et al., 2026; Hernández Rosado, 2025)	TO	S (Ligthart et al., 2023; Gálvez Rogel and Alvarado Galarza, 2025; Law 21.383, 2021)
Assess	TO	TO	TO
Different sources by technology (n)	8	1	4
S/P/A Cells	2 / 2 / 1	0 / 1 / 4	2 / 1 / 2

Note. Elaboration The classification describes this corpus and not the entirety of the literature . Four context sources (sources 4 , 14, 15 and 17 in Table 3) were not assigned to cells .

The matrix sample three Findings. First, the functions of regulating and protecting rights concentrate the evidence sufficient, both for AI and for neurotechnology, which reflects the weight of the frames regulations in Peru, Chile, and Colombia, and ethical considerations. Second, planning and operating with AI are backed by few sources, and none evaluates his application in some cities Ibero-American. Third, the function of evaluating does not have support in none of the three technologies, and quantum internet only appears as a technology incipient that It deserves surveillance.

4. Discussion

Government contributions Ibero-Americans that The corpus collected consists mainly of frames general and not instruments specific for transport Public . Peru designated the Presidency of the Council of Ministers, through his Secretariat of Government and Digital Transformation , as the authority technical and regulatory framework in AI (Law 31814, 2023); Colombia has made progress in a framework ethical and in bills (Jay Vanegas et al., 2024); and Chile elevated to rank The protection of brain activity is constitutional (Law 21.383, 2021). None corpus source evaluates how they are applied these transport frames public , and that is the main gap that Table 4 shows .

In AI, the evidence technique points out Benefits in prediction and resource allocation , but also a dependence on traveler data that raises Privacy risks (Jevinger et al ., 2024). Approaches such as learning federated , that train Models that do not centralize data are a means of mitigation , although his adoption practice go on limited by Security and software engineering challenges (Hernández Rosado, 2025) . A This adds to that the dilemmas AI ethical issues cannot be resolved with adjustments technicians and demand evaluation criteria responsible (Barragán Ramírez et al., 2026), what justifies evaluate biases and transparency before adopting it in urban planning (Brenman et al., 2025). Robledo and Opazo (2025) highlight the importance of the formal and functional variation of discourse connectors and operators in digital interactions. Wilches-Visbal et al. (2024) compare Turnitin and ChatGPT for detecting AI in scientific writing. Their letter shows that verifying the use of AI requires tools whose results can be compared, which supports the ex-post evaluation proposed in this study to validate the available evidence.

In neurotechnology , the evidence It points to a rule of prudence : its acceptance at work is greater when it is linked to safety and less when it is linked to safety . when used to evaluate performance (Gálvez Rogel and Alvarado Galarza, 2025), and regional governance presents empty and little articulation (Martínez, 2025). Like the health of the drivers conditions the sustainability of the service (Remy and Guseva Canu, 2023), any extent has to respect his Autonomy and privacy . Finally , quantum internet is described as a technology incipient (Illiano et al., 2022) , therefore his Surveillance is high on the government 's agenda. technological .

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4.1 **Alternatives to problems current:** They propose five alternatives based on the sources cited . These are proposals , not results of the study , and should be compared with local evidence and validated by experts before being recommended to a government .

- Use of user data with privacy risks (AI × Protect) . Conduct a data impact assessment personal before adopting AI, preferably by approaches that do not centralize the data (Jevinger et al., 2024; Hernández Rosado, 2025; UNESCO, 2022).
- Lack of rules for technologies that read Brain signals (Neurotechnology × Regular). Defer monitoring neurophysiological of the staff until there is a legal framework and consent , and limit it to security purposes (Law 21.383, 2021; Gálvez Rogel and Alvarado Galarza, 2025; Martínez, 2025).
- General frameworks without criteria for transport (IA × Regular). Designate a sectoral focal point that Apply the principles of Law 31814 (security) based on risks , ethics and privacy) and publish AI adoption criteria (Law 31814, 2023; Jay Vanegas et al., 2024) .
- Adoption of technologies Incipient without criteria (Quantum × Planning). Maintain surveillance quantum internet technology , without deployment investment (Illiano et al., 2022).
- Absence of subsequent evaluation (IA × Evaluate). Establish indicators and impact assessment , with bias auditing and transparency of AI systems (Brenman et al ., 2025; Barragán Ramírez et al ., 2026; UNESCO, 2022).

4.2 Limitations: (1) It is a non -exhaustive documentary review , with sampling intentional , so the results are not generalizable to the region nor to the field. (2) The corpus is small and the matrix classification It depends on the number of sources , with thresholds operational. (3) Records were not counted reviewed nor was double screening applied Independent. (4) Various magazines Latin American women are young and have short files, so that an empty space can reflect short publication time and not a lack of interest. (5) The contributions from Brazil , Mexico and Spain were left out of the corpus and should (6) A literature review describes what is available, but does not evaluate the effectiveness of the technologies . neither replaces the local data that It requires a government decision.

5. Conclusions

(1) Governments Ibero-Americans they have contributed Marcos general AI and brain activity protection instruments (Peru, Chile and Colombia), but not instruments specific for transport public. (2) The evidence The combined body is sufficient to regulate AI and protect rights against neurotechnology , partial to plan and operate with AI, and absent to evaluate; the quantum internet only justifies surveillance technological. (3) The alternatives proposals They prioritize assessing the impact on the data and postponing monitoring . neurophysiological assessment of staff and the designation of a sectoral focal point. (4) The following agenda This involves validating the matrix with experts and local governments , and expanding the search . to other bases and countries .

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