Toward a Certification Framework for TV 3.0

Building Trust in the Ecosystem

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ABSTRACT

The transition from TV 2.x to TV 3.0 shifts the digital television ecosystem from middleware-mediated interactivity to an application-oriented platform, where broadcaster applications and cross-layer orchestration are central to new business models and user experiences. This evolution makes interoperability and reliability prerequisites, exposing the insufficiency of the self-certification model that characterized TV 2.x. We argue for the establishment of a network of accredited laboratories, coordinated by INMETRO and ANATEL, hosted in universities, and supported by industry contributions. Beyond technical assurance, it would foster broadcaster trust, enable new commercial opportunities, and serve the public interest, while simultaneously advancing research, innovation, and professional training in digital television.

KEYWORDS

digital television, TV 3.0, conformance testing, certification framework, interoperability

1 INTRODUCTION

The transition from TV 2.x to TV 3.0 represents a structural shift from broadcast-centric architectures, in which interactivity was introduced as an ancillary layer mediated by middleware, to an application-oriented platform where software assumes the role of central organizing element [22]. In the TV 2.x environment, interactive services were deployed on top of linear broadcasting flows, exposing a wide range of heterogeneous capabilities and behaviors across receiver implementations. As a consequence, broadcasters frequently regarded interactivity as an optional or experimental component, since development and quality assurance processes had to address divergent device performance, which significantly increased deployment costs and reduced predictability in service roll-outs.

In contrast, TV 3.0 adopts an inverted technological arrangement in which applications constitute the entry point of the stack and directly orchestrate media, data, and device resources across broadcast and broadband environments [12]. This application-centric model is designed to enable advanced functionalities (e.g. such as personalization, targeted advertising, electronic commerce, and the integration of complementary services) as intrinsic elements of the platform rather than peripheral enhancements. The viability of these opportunities, however, is contingent upon consistent, conformance-tested implementations, making interoperability and ecosystem-wide reliability essential prerequisites for meeting both the business expectations of broadcasters and the quality-of-experience requirements of TV viewers.

Despite the acknowledged importance of interoperability and reliability, the certification model adopted in TV 2.x was based primarily on self-declaration by manufacturers and middleware providers. Although the SBTVD Forum provided its members with a middleware test suite, its use was neither accompanied by an obligation to publish test results nor subject to independent auditing of compliance claims. In practice, this allowed implementations to assert adherence to the specifications without undergoing rigorous third-party validation. The absence of transparent and verifiable conformance testing led to significant fragmentation, with receivers often supporting only partial or divergent interpretations of the standards. Consequently, applications that executed correctly on one device could fail or behave unpredictably on another, undermining broadcaster confidence in the platform.

This historical experience is particularly relevant in the transition to TV 3.0. Unlike its predecessor, TV 3.0 positions applications at the core of the value chain, making them the starting point for advanced functionalities such as targeted advertising, e-commerce, and personalized services. The success of this model depends on broadcasters' ability to deploy interactive services with the assurance that they will function consistently across the ecosystem. Without mechanisms to guarantee compliance and performance, the fragmentation observed in TV 2.x may be reproduced, jeopardizing both audience trust and the economic sustainability of the new platform.

The objective of this position paper is to propose a framework for establishing a network of accredited laboratories to support the TV 3.0 ecosystem. Developed through partnerships between academic institutions and companies specialized in conformance testing, this network would initially operate under a voluntary certification scheme. Even if optional, certification could evolve into a valuable seal of quality promoted by broadcasters and their industry partners, signaling compliance and reliability to the market.

2 CURRENT PRACTICES AND LESSONS FOR TV 3.0 CERTIFICATION

The discussion on certification and conformance in TV 3.0 benefits from a broader examination of existing practices in telecommunications, information and communication technologies (ICT), and previous generations of digital television. Different ecosystems have adopted diverse strategies to mitigate fragmentation, ensure

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compliance with technical specifications, and foster confidence among stakeholders. While some domains rely on robust certification processes conducted by accredited laboratories, others have delegated responsibility to industry consortia or to manufacturers themselves, with varying degrees of success. In what follows, we review relevant precedents in telecommunications and ICT, analyze the limitations of certification approaches in TV 2.x, highlight initiatives aimed at harmonization in the television domain, and identify emerging requirements and opportunities for collaboration in the transition to TV 3.0.

2.1 Certification in Telecommunications and ICT Ecosystems

Certification procedures constitute a fundamental mechanism in telecommunications and information and communication technologies (ICT) for guaranteeing compliance with technical specifications, operational safety, and interoperability. These procedures typically require that equipment undergo systematic evaluation by independent laboratories accredited by national regulatory authorities prior to commercialization.

In the Brazilian context, the Agência Nacional de Telecomunicações (ANATEL) mandates certification for all telecommunications and mobile devices introduced into the domestic market [3]. This process is conducted through laboratories formally accredited to perform conformance and performance assessments, such as the Laboratório de Sistemas de Potência e Inovação Tecnológica (LASPI) at the Federal University of Rio de Janeiro (UFRJ) [18].

Typical certification procedures in the telecom domain include radiofrequency (RF) conformance tests, which verify compliance with spectral masks, channel bandwidth requirements, and transmission power limits, and Wi-Fi interoperability tests, which confirm correct implementation of IEEE 802.11 protocols and reliable operation with access points from different manufacturers. Such evaluations are essential to guarantee not only regulatory compliance but also consistent functionality and quality of service in real-world deployment scenarios.

The institutionalization of that framework demonstrates the feasibility and effectiveness of lab-based certification schemes, which both ensure technical compliance and strengthen the stability and competitiveness of the national telecommunications ecosystem.

2.2 Certification Approaches in the TV Domain

In contrast to the rigor of telecommunications certification, TV 2.x in Brazil largely relied on self-declared compliance by manufacturers and middleware providers. The SBTVD Forum's middleware test suite has been made available to members, however there is no requirement to publish results publicly or engage third-party auditors. This led to divergent interpretations of the specification, resulting in inconsistent receiver behavior and diminishing broadcasters' willingness to invest in interactive services.

Alternative strategies have been pursued internationally. Within the Hybrid Broadcast Broadband TV (HbbTV) community, interoperability has been promoted through the organization of "plugfests" [19] in which manufacturers, broadcasters, and developers collectively test their products to identify and resolve compatibility issues. These collaborative events play an important role in reducing fragmentation but remain informal mechanisms, dependent on voluntary participation and lacking the enforceability of systematic certification.

Another important reference is the Consumer Electronics Association's (CEA) Web Media API Snapshot [4], a consensus-based profile of web APIs recommended for consistent support in television receivers. By defining a minimal interoperable set of functionalities, this initiative sought to mitigate fragmentation and provide developers with a predictable baseline for application development. The Web Media API Snapshot illustrates that even in mature markets outside Brazil, industry stakeholders recognized the need for harmonization measures to ensure application reliability across heterogeneous devices.

Additional European initiatives provide further insight into voluntary certification and labeling approaches. In Finland, the telecom association FiCom coordinates the Antenna Ready and Cable Ready HD certification programs [15], designed to guarantee compatibility of receivers with terrestrial and cable infrastructures. Devices that successfully complete conformance tests administered by specialist partners such as Sofia Digital receive a certification mark recognized by consumers and operators. Similarly, the "HD Ready" label, developed by DIGITALEUROPE in 2005 [17], established baseline requirements for high-definition capability in television receivers, including display formats, decoding, and DVB tuner integration. Although these initiatives are voluntary and not legally mandated, they have demonstrated the capacity of industry-coordinated certification and labeling systems to improve interoperability and consumer confidence.

2.3 Emerging Requirements for TV 3.0

The deployment of TV 3.0 introduces certification challenges of a qualitatively different order compared with prior generations. Whereas TV 2.x primarily required validation of middleware compliance, the new environment integrates a wide spectrum of technologies: high-efficiency media codecs, broadband connectivity, multipath transmission, accessibility features, and advanced emergency alerting, in addition to the application execution environment. Each of these layers must operate under strict conformance to ensure predictable end-to-end behavior, which implies the need for testing frameworks far more comprehensive and sophisticated than those available in earlier generations.

A particularly critical issue is the validation of cross-layer functionalities. For example, in TV 3.0, broadcast–broadband integration is enabled from the transport layer [6] upward, allowing broadcaster applications [12] to directly control features such as content synchronization, targeted ad insertion, or data-driven enhancements of broadcast streams. This creates dependencies that cut across layers, where failures in lower-level implementations can propagate into the application layer, undermining service reliability. Certification frameworks must therefore incorporate cross-layer testing to ensure that the orchestration between transmission, middleware, and applications operates as specified under realistic conditions.

Equally relevant is the certification of front-end components, which play a decisive role in structuring the viewer experience [12]. These include the Application Catalog, Electronic Program

Guide (EPG), Electronic Content Guide (ECG), metadata aggregation services, search functions, the Persistent Media Player, and mechanisms for privacy protection. If inconsistencies arise in these elements, navigation and service discovery may vary across receivers, eroding both usability and broadcaster trust in the platform. Conformance testing must therefore extend beyond applications themselves to include these enabling components that mediate the interaction between audiences and services.

In this context, voluntary labeling programs emerge as a practical starting point for certification in TV 3.0. Labels can provide an immediately recognizable signal of compliance to consumers, broadcasters, and industry stakeholders, while avoiding the barriers associated with mandatory regulation in the initial stages. More importantly, when administered by independent and accredited laboratories, labeling programs can progressively gain credibility and become a valuable reference for both industry and policymakers.

Nevertheless, labeling alone is insufficient to establish an entrusted framework. While it promotes visibility and awareness, it does not, by itself, guarantee the level of transparency, reproducibility, and accountability required to sustain the ecosystem in the long term.

2.4 Industry Practices and Opportunities for Collaboration

Specialized companies such as Allegro [14] and Resillion [20] already operate internationally in the field of interoperability testing, automated conformance tools, and certification services. Their experience with connected television, OTT platforms, and broadband devices provides valuable expertise for establishing scalable certification workflows. However, these companies are not yet fully prepared to address the entire TV 3.0 stack, which incorporates technologies and functionalities developed within the Brazilian TV 3.0 Project Phase 3 [21]. Such advanced features extend beyond the scope of existing commercial testing practices and demand research-driven knowledge to be effectively validated.

Academic institutions and accredited laboratories, particularly those engaged in digital television research in Brazil, play a decisive role in bridging this gap. Their contribution extends beyond methodology development and reference implementations: academia also offers independence from sectoral interests, making it a trustworthy anchor within the certification chain. This autonomy, combined with scientific rigor, positions universities as credible actors in the design of conformance tools and protocols that can be recognized by industry, broadcasters, and regulators alike.

For this reason, industry–academia cooperation emerges as the most viable path to a credible certification framework. Academia brings direct knowledge of the innovations introduced in Phase 3 of the TV 3.0 R&D Project [21], along with neutrality and methodological rigor. Industry partners, in turn, contribute operational expertise, infrastructures for scalable testing, and alignment with international certification practices. Neither side alone is capable of addressing the certification challenges of TV 3.0. Together, they can design a roadmap in which voluntary labeling programs provide immediate credibility while laying the groundwork for an entrusted certification framework capable of covering the entire stack.

The strategic value of such cooperation lies in its ability to enhance transparency, accelerate adoption, and provide policymakers with a reliable basis for recognizing certification as part of the public-good infrastructure of TV 3.0. Articulating industrial capacity with academic independence and expertise will allow Brazil to advance a certification model that supports technological innovation and commercial differentiation while safeguarding citizens' rights to reliable access to information, essential services, and immersive experiences.

3 PROPOSAL: TOWARD A NETWORK OF ACCREDITED LABORATORIES FOR TV 3.0

The discussion so far has shown that the complexity and breadth of TV 3.0 require certification mechanisms that surpass previous approaches. Interoperability, reliability, and trust cannot be ensured through fragmented or informal practices; they demand a structured framework capable of covering all system layers and guaranteeing transparency in results. To address this need, we propose the establishment of a network of accredited laboratories, grounded in close collaboration between academia and industry.

3.1 General Framework

As aforementioned, TV 3.0 introduces a broader and more interdependent environment. In addition to new physical, transport, audio, video, accessibility, emergency alerting, and receiver requirements, the Application-oriented Platform (ABNT NBR 25608 [12]) expands the target from middleware to a full platform that includes front-end components, lifecycle management, runtime engines and companion/remote devices, alongside cross-layer orchestration of broadcast–broadband features from the transport layer upward. These dependencies cut across the nine TV 3.0 standards and demand end-to-end, cross-implementation verification with published, reproducible evidence. A self-certification model cannot credibly deliver that level of transparency and interoperability at ecosystem scale.

To overcome the limitations of self-certification, we propose the creation of a network of accredited laboratories dedicated to certification of TV 3.0 implementations. Rather than concentrating testing capacity in a single entity, a distributed network allows the diversity and complexity of the nine technical standards to be addressed in a modular way, while ensuring consistency of results through common procedures and mutual recognition of outcomes. This approach reflects both the breadth of the TV 3.0 system and the need for scalability as adoption expands.

The governance of this network must rest on formal accreditation and oversight, ensuring both technical rigor and institutional legitimacy. In the Brazilian context, INMETRO provides the national framework for accreditation of testing laboratories, guaranteeing adherence to internationally recognized quality infrastructure principles [16]. ANATEL, as the regulatory authority in telecommunications and broadcasting, is responsible for defining the scope of certification requirements and for validating their alignment with public policy objectives [1]. Together, these institutions establish the regulatory backbone for a certification ecosystem that is technically reliable and socially recognized.

At the operational level, the strength of the framework lies in collaboration between academia and industry. Academic laboratories contribute methodological rigor, scientific innovation, and independence from sectoral interests, ensuring that conformance procedures are impartial and adaptable to new research findings. Industry partners contribute operational expertise, knowledge of existing testing approaches, and the capacity to scale certification practices to meet market demands. The articulation of these complementary strengths enables the network to be both credible and effective: academia secures neutrality and innovation, while industry ensures feasibility and dissemination.

Finally, the network should be conceived as a collaborative infrastructure, where different laboratories can specialize in distinct aspects of the stack—physical and transport testing, codec validation, accessibility and emergency signaling, application platform conformance, while engaging in cross-testing to verify interoperability across implementations. Through this distributed yet coordinated model, the certification network becomes not only a technical necessity but also an institutional safeguard for interoperability, reliability, and trust.

3.2 Scope of Certification

The scope of certification in TV 3.0 must reflect the breadth and interdependence of the system as defined in the nine ABNT technical standards (ABNT NBR 25601–25609). Each of these layers introduces specific requirements that, when taken together, determine the predictability and reliability of the ecosystem. Certification therefore needs to encompass Physical layer [5], Transport layer [6], Video [7] and Audio [8] coding, Subtitles [9] and Sign language [10], Emergency alerts [11], Application-Oriented Platform [12] and Receivers [13].

Among the nine technical standards that define TV 3.0, the Application-Oriented Platform (AoP) [12] stands out as a critical target for certification because it redefines the role of software in the ecosystem. This structural change positions applications not as add-ons but as the entry point to the viewer experience, making their reliable execution central to broadcasters' ability to deliver services and monetize content. The result is a platform in which stability, consistency, and predictable behavior become prerequisites for business models and for user trust.

The AoP introduces a comprehensive set of components that require systematic conformance testing. The Application Catalog and Access Panel form the user's main interface with broadcast services, organizing available content, applications, and metadata. Bootstrap Applications guarantee immediate access to broadcaster services, while Broadcaster Applications extend functionality with personalization, targeted advertising, and interactive commerce.

Broadcaster Application execution relies on the runtime engines TV 3.0 Ginga-NCL and TV 3.0 Ginga-HTML5, which provide standardized APIs for handling broadcaster content and interactivity in different programming paradigms. Complementing these, TV 3.0 WebServices expose APIs for accessing platform resources and enabling interoperability with companion or remote devices.

Supporting these runtime environments are core components such as the Persistent Media Player, which ensures continuity of playback across applications, and the Application Lifecycle Manager, which governs installation, updates, and fault recovery. Additional elements, such as the Electronic Program Guide (EPG), Electronic Content Guide (ECG), metadata aggregation, search functions, and user profile management, extend the scope to service discovery and personalization.

The certification of this platform must therefore go beyond checking individual APIs or rendering rules. It requires validation of front-end behavior (navigation, accessibility, personalization), runtime conformance across Ginga-NCL, Ginga-HTML5, and WebServices, and inter-application interoperability (for example, switching between bootstrap and broadcaster applications without disruption).

To mitigate risks, certification must adopt a dual approach: on the one hand, API-level conformance testing to validate the correctness of individual components and runtimes against the specification; and on the other, scenario-based system testing to reproduce realistic user journeys, assess fault resilience, and confirm interoperability across receivers from different manufacturers. Only the combination of these two layers of testing can provide confidence that broadcaster applications will operate reliably, consistently, and predictably in the diverse conditions of the TV 3.0 ecosystem.

3.3 Governance and Accreditation

The effectiveness of the proposed certification framework depends not only on technical capacity but also on robust governance and credible accreditation mechanisms. In Brazil, two institutions play essential roles in this regard. INMETRO, as the national body responsible for quality infrastructure, and ANATEL, as the regulatory authority for telecommunications and broadcasting. Together, these institutions provide the institutional foundation required for the certification of TV 3.0 to be both technically rigorous and socially legitimate.

The laboratories themselves should be primarily hosted within universities, leveraging their research infrastructure, neutrality, and independence from sectoral interests. This hosting model avoids the need for industry to replicate costly physical infrastructure, while at the same time ensuring that certification processes are carried out in environments with academic oversight and methodological rigor. Within these laboratories, industry partners contribute specialized expertise, testing methodologies, and advanced equipment, complementing the academic role with the tools and operational knowledge needed to perform certification at scale.

Such collaboration does not imply fragmentation of responsibilities, but rather the integration of complementary strengths. Universities provide continuity, impartiality, and the ability to incorporate new research findings into testing methodologies, while industry actors ensure that procedures reflect real-world implementation challenges and global best practices. The result is a certification environment that is both independent and attuned to market demands, capable of adapting as TV 3.0 evolves.

Finally, to guarantee that certification reflects not only compliance within individual layers but also system-level reliability, the governance framework must establish mechanisms for cross-testing among laboratories. This requires structured coordination across the network so that results generated in one lab (for example, codec conformance) can be systematically validated in conjunction

with others (such as transport or application platform testing). The central coordination role of INMETRO and ANATEL is critical here, ensuring that procedures are harmonized, results are interoperable, and certification outcomes are trusted by all stakeholders.

3.4 Governance and Accreditation

The credibility of a certification framework depends on transparent governance and internationally recognized accreditation. In the Brazilian context, this means combining the established procedures of INMETRO with the regulatory oversight of ANATEL. INMETRO provides the accreditation processes based on ISO/IEC 17025 [2], ensuring that laboratories follow standardized quality management systems, maintain calibration of instruments, and undergo periodic auditing. ANATEL, in turn, defines the regulatory requirements specific to broadcasting and telecommunications, such as minimum receiver performance thresholds or obligations regarding accessibility features.

The hosting of certification laboratories in universities adds a second layer of credibility and sustainability. Beyond neutrality, this arrangement leverages the existing R&D infrastructure that has been built through decades of public investment in digital television research. Universities can also repurpose the laboratories as training environments for educating new professionals in conformance testing, digital broadcasting, and quality assurance, thereby expanding the pool of qualified experts available to the industry. At the same time, they serve as innovation hubs, where new testing methodologies, automation frameworks, and conformance tools can be developed and refined in response to evolving standards. With the infrastructure in academic environments, industry partners are relieved of the high cost of maintaining physical testing facilities, while the academic sector benefits from closer engagement with industrial challenges.

Industry contributions go beyond expertise alone. Companies are expected to supply specialized test equipment (e.g., RF signal generators, spectrum analyzers, codec stress-testing suites), contribute automated validation workflows, and provide operational knowledge gained from global certification practices in other ICT domains. These inputs ensure that the labs remain technologically up to date and capable of reproducing realistic operational scenarios. Academic teams complement this with methodological development, ensuring that procedures are not merely practical but also reproducible, auditable, and adaptable to evolving standards.

A coordination board, overseen jointly by INMETRO and ANATEL, would define cross-testing protocols, manage test result interoperability, and enforce periodic inter-lab comparisons to ensure consistency. This transforms the network from a collection of isolated facilities into a cohesive certification ecosystem, capable of validating not just compliance with individual standards but the operational integrity of TV 3.0 as an integrated system.

4 SUSTAINABILITY AND ECONOMIC MODEL

The long-term viability of a certification framework depends on a sustainable economic model that balances cost recovery, fair compensation of contributors, and reinvestment in research and training. In the case of TV 3.0, the laboratories are envisioned not as profit-driven enterprises but as public-interest infrastructure, where the value of certification lies in ensuring interoperability, reliability, and trust across the ecosystem. Nevertheless, certification services must generate sufficient resources to cover operational costs, maintain quality, and foster continuous innovation. This includes providing adequate compensation for all actors involved—universities as hosts, industry partners supplying equipment and expertise, and professional staff executing testing and audits—while also reserving resources for the continuous improvement of methodologies and tools.

Charging for services should follow a hybrid model. On the one hand, laboratories can charge per test campaign, with fees defined by the scope of certification—ranging from the validation of a single standard to full-stack receiver certification or application platform conformance. On the other hand, a membership or subscription scheme can be offered to broadcasters, manufacturers, and developers. Members would pay an annual fee, receiving discounted access to certification services, interoperability events, and pre-certification tools. Non-members would still have access to certification, but at standard rates. This dual mechanism balances accessibility with predictability of revenue.

The distribution of revenues must reflect the collaborative nature of the network. Universities, as hosts of the laboratories, should receive a substantial share to cover infrastructure, staff, and overhead, while also earmarking a fixed portion (e.g., 10–15%) for reinvestment in research and training activities. Industry partners, in turn, must be compensated for their contributions in equipment, test methodologies, and specialized expertise, either through direct revenue sharing or through credits in the form of discounted certification of their own products. Professional staff, such as test engineers and auditors, must be remunerated according to their role: some may be hired directly by the labs, while others may participate through academic grants and scholarships that support professors, researchers, and students. This hybrid model lowers operational costs, while simultaneously training new specialists and reinforcing the educational mission of universities.

5 ROADMAP FOR IMPLEMENTATION

The implementation of a certification framework for TV 3.0 must be progressive, allowing the ecosystem to build trust gradually while avoiding prohibitive costs at the early stages. We propose a three-phase roadmap that maintains coverage of all nine ABNT TV 3.0 standards (NBR 25601–25609) from the beginning, but increases the rigor, institutional recognition, and economic sustainability of the framework over time.

Short term: voluntary labeling program. In the initial phase, all nine standards are covered, but certification is offered under a voluntary labeling scheme. Laboratories issue a seal indicating conformity with selected or complete sets of standards, depending on the needs of manufacturers and broadcasters. The aim is to demonstrate the feasibility of the network, create early incentives for compliance, and establish a visible quality signal in the marketplace. Fees should remain modest, with partial subsidies from public programs, broadcaster associations, or international cooperation. At this stage, the emphasis is on generating transparent and reproducible evidence of conformity, building stakeholder confidence, and training professionals.

Medium term: consolidation and harmonization. Once the voluntary program gains recognition, the framework should move to strengthen consistency across labs and depth of testing. All nine standards remain within scope, but procedures become more rigorous, including expanded cross-testing protocols and periodic interlab comparisons overseen by INMETRO and ANATEL. Economic sustainability transitions to full cost recovery, with membership schemes for industry partners providing predictable funding. Universities expand their role by using the labs as training grounds for students and researchers, while also developing innovations in conformance tools and methodologies. Industry contributions in equipment and workflows ensure that certification reflects real-world deployment challenges.

Long term: entrusted certification framework. In the final phase, the framework evolves into a formal certification system, recognized by policymakers as part of Brazil's public-good digital infrastructure. Certification becomes a de facto or de jure requirement for large-scale commercialization of receivers and broadcaster applications, ensuring consistent user experience across the ecosystem. Fees align with international benchmarks in ICT certification, and a fixed portion of revenues is earmarked for continuous R&D and professional education. The result is a sustainable infrastructure that secures interoperability and reliability across all nine standards, while simultaneously advancing Brazil's capacity to educate specialists, innovate in testing methodologies, and guarantee citizens' rights to access information, essential services, and immersive experiences.

6 FINAL REMARKS

The transition from TV 2.x to TV 3.0 introduces unprecedented opportunities for broadcasters, manufacturers, and audiences, but it also amplifies the risks associated with fragmented implementations and inconsistent behaviors. To address this challenge, we have argued for the creation of a network of accredited laboratories, coordinated under INMETRO and ANATEL, hosted in universities, and supported by industry contributions in expertise, methodologies, and equipment. This framework would cover all nine ABNT TV 3.0 standards from the outset. Combining academic independence and innovation with industrial operational knowledge, the proposed model offers credibility, scalability, and alignment with global certification practices.

The benefits of such a certification framework extend beyond technical compliance. It would provide trust to broadcasters and manufacturers, lower the risks of deploying interactive services, and create a seal of quality recognizable by the market. At the same time, it would serve the public interest, ensuring that citizens can access reliable information, essential services, and advanced experiences in education, health, and entertainment. Moreover, by embedding the laboratories in universities, the model promotes the education of new professionals and the continuous evolution of testing methodologies.

As a position paper, our intention is not to prescribe a definitive framework but to stimulate debate on its design, implementation, and sustainability. Building consensus around a credible certification framework is a prerequisite for realizing the full potential of TV 3.0 and for ensuring that the Brazilian ecosystem remains competitive, innovative, and trustworthy.

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