International Journal of Communication 18(2024), 5382-5404 1932–8036/20240005

Are Public Service Media Innovative? Developing a Tool for Assessing Innovation in Production Processes

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In the current media ecosystem, innovation has become an incipient but key element of public service media (PSM) value. However, what is often alluded to yet not consistently comprehended is that its application is predominantly observed in the technological realm. Thus, based on the Spanish case study, this article presents a tool for assessing the state of innovation in PSM production processes. A qualitative methodology is applied. First, we analyze prior innovation indicator models and both the regulation and gray literature about the 14 Spanish PSM organizations. Second, we conduct structured interviews with 45 managers of these PSM. Once designed, the instrument was validated by applying the Fuzzy Delphi method. The results allow for the development of a tool structured in nine dimensions that contain 68 indicators whose application will make it possible to know the state of internal, external, and cross-cutting innovation in the production processes of PSM.

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Date submitted: 2024-01-19

[1] This work was supported by the research projects "Public service media in the face of the platform ecosystem: Public value management and evaluation models relevant for Spain (VALCOMM)" and "Innovation ecosystems in the communication industries: Actors, technologies, and configurations for the generation of innovation in content and communication" (Ref. PID2020-114007RB-I00)," both funded by the Spanish State Program of R+D+I oriented toward the Challenges of Society of the Ministry of Science, Innovation and Universities (Government of Spain), Agencia Estatal de Investigación (AEI) and the European Regional Development Fund (ERDF); and the research project "Audiovisual platformization: A propositional diagnosis of the platformization processes in the current Spanish media landscape" (2022-GRIN-34309), funded by the UCLM Research Grants Plan and the ERDF.

Keywords: innovation, public service media, production processes, innovation assessment and innovation indicators

Public service media (PSM) are at the crossroads of adapting to the current media ecosystem, dominated by transnational private companies expanding their businesses into the platform space (Cañedo, Galletero-Campos, Centellas, & López-Cepeda, 2023; Donders, 2019; Martin, 2021). In the era of platformization—the penetration of the economic, infrastructural, and governmental extensions of digital platforms into the communication market (Nieborg & Poell, 2018)—PSM are obliged to rethink their public service mission based on the audience's demands, technological progress, and digital interaction but without losing their independence or ceasing to be at the service of democracy and the empowerment of society (e.g., Campos-Rueda, 2023; Donders, 2019; Goyanes & Campos-Rueda, 2022; López-Golán, Rodríguez-Castro, & Campos-Freire, 2019; Sørensen, Van den Bulck, & Aalborg, 2020; Van den Bulck, Donders, & Ferrell Lowe, 2018). To this end, they should implement innovative strategies (Martin, 2021; Túñez-López, Campos-Freire, & Rodríguez-Castro, 2021) in response to the difficulties faced by PSM: fragmentation of audiences, decline in funding, questioning of their legitimacy, societal demands for independence, and regulatory and market challenges (Tambini, 2015). In this vein, it is not a coincidence that innovation is considered a key component for conceptualizing the public value of European PSM (Cañedo, Rodríguez-Castro, & López-Cepeda, 2022).

Previous literature has focused on the connection between innovation and PSM, mainly targeting its technological dimension (e.g., Jones & Jones, 2019; Pérez-Seijo & Vizoso, 2022; Zaragoza Fuster & García Avilés, 2020) or the implementation of citizen participation actions (e.g., Dragomir, 2021; López-Golán et al., 2019; Vanhaeght & Donders, 2015; Zaragoza Fuster & García Avilés, 2022). However, despite its cross-cutting nature, it is not yet clear how to evaluate this element of public value. Therefore, this study aims to build a tool for assessing the state of innovation in PSM production processes.

From the specific case study of Spanish PSM, we applied three qualitative research techniques (documentary analysis, individual interviews, and Fuzzy Delphi) to obtain our results. These techniques allow us to propose a tool for assessing innovation structured in nine dimensions, grouped into three main categories depending on whether the innovation is developed internally by the corporation, externally, or through a combination of both. The main contribution of this study, beyond its novelty, is justified by the fact that it provides a useful tool that contributes to improving knowledge on the state of innovation in the production areas of PSM.

Literature Review

Innovation as a Driver of Corporate Change

Innovation is a continuous process of significant changes made by a corporation to improve its efficiency. Everett M. Rogers (2003) defines it as "an idea, practice or object perceived as new by an individual or other unit of adoption" (p. 12). For their part, Baregheh, Rowley, and Sambrook (2009) propose a holistic definition that recognizes that innovation is not limited to creating new products or technologies

but also includes changes to processes, services, business models, and other aspects that create value for both the company and its stakeholders. Innovation is therefore "the multi-stage process whereby organizations transform ideas into new/improved products, services or processes, in order to advance, compete and differentiate themselves successfully in their marketplace" (Baregheh et al., p. 1334). This interpretation is in line with the Oslo Manual (Organization for Economic Cooperation and Development [OECD], 2018), a seminal reference in the field of organizational innovation that defines it as a set of practices and processes that generate new products, processes, marketing, or organizational structure. These innovative changes are implemented through the application of new knowledge and technologies developed internally or through external collaborations and acquisitions (OECD, 2018).

Thus, to generate innovation, it is necessary to coordinate numerous factors and understand that the capacity to execute it will depend on adapting to new environments or processes. It is also necessary to guarantee the effective use of the latest technologies (Lam, 2011; Medina, Mazaira, & Alén, 2022). In his contribution to the theory of Diffusion of Innovations, Rogers (2003) identified five stages in the process of adoption of new ideas or technologies: Awareness, Persuasion, Decision, Implementation, and Confirmation. Each stage represents a progressive step toward acceptance or rejection of the innovation and enables classification according to its influence on the spread of the innovation in society—from innovators to laggards (Rogers, 2003). In this vein, prior literature has noted that highly hierarchical and rigid corporations show more difficulties in the process of adapting to change, while the flexibility of organic corporations allows them to face the challenges derived from a process of transformation more quickly (Burns & Stalker, 1994).

From an economic perspective, the foundational literature considers innovation to be a strategic factor contributing to the development and growth of companies (Schumpeter, 1934). In this sense, although the constructs of successful innovation differ between organizations, in the field of private management, it is considered a means for increasing productivity, improving profit margins, and leading the market (Laforet, 2013). However, for public companies, because they are entities that are not subject to profitability imperatives, the study of innovation must be linked to their public value as servants of the common good (Mazzucato, 2018).

About innovation management, Drucker (2002) understands innovation as a process that combines rational analysis with creativity and argues that companies must develop a discipline to be successful in the long term. To do so, corporations follow internal procedures, external procedures, or a mixture of both. The internal procedure is understood as a closed process based on vertical integration, while the external procedure refers to a company's use of internal and external knowledge flows to accelerate innovation and expand markets (Bogers, Chesbrough, Heaton, & Teece, 2019). The latter is what Chesbrough (2003) calls "open innovation." Likewise, the Hexagon for Public Innovation (HIP) sets out six drivers of change for achieving an open and flexible organization (Oliván, 2020): open—open to collaboration; trans—working in a cross-cutting manner; fast—using agile dynamics; proto—focusing on the production of prototypes; co—fostering collaboration and building community; and tech—boosting the use of technological tools and personalization.

In the media industry, worldwide media are undergoing a global change that affects public and private companies alike (Oliver, 2018). Indeed, previous scholars have pointed to media innovation as an inexorable adaptation to the inextricable changes in the industry, especially those resulting from technological development (Carvajal, Arias, Negredo, & Amoedo, 2015; Klaß, 2020). In line with the Oslo Manual, Storsul and Krumsvik (2013) identify four areas in which innovation can manifest itself in media corporations: products, processes, strategic positioning, and paradigm shift or competences. About production processes,[2] the authors qualify these as changes in the way products are created and distributed. However, it is necessary to innovate in processes to introduce a new media product in the broadcasting sector, so the interdependence between products and processes is a characteristic of media innovation that affects several steps in the value chain (Ranaivoson, Farchy, & Gansemer, 2013).

On another note, prior research differentiates between disruptive and incremental innovation (Christensen, 1997; Prudkin & Mielniczuk, 2019), depending on the degree of novelty applied in the product, service, or process. Disruptive innovation exists when there is a total break from traditional production or distribution methods to generate new products, markets, business models, or value chains. This type of innovation results in a paradigm shift in the traditional business environment of a given sector. Incremental innovation, on the other hand, is associated with implementing gradual changes to processes, products, or services to improve them.

In the media industry, disruptive innovation is represented by new competitors (Porter, 2017) in the platformization process, such as streaming platforms. These companies have revolutionized the audiovisual ecosystem by implementing new business models and alternative organizational, production, and distribution practices (Afilipoaie, Iordache, & Raats, 2021; Burroughs, 2019). Moreover, its method of supplying content has generated a change in consumption habits and has created new audiences' profiles (Martin, 2021). On the other hand, incremental innovation is evidenced by new developments related mostly to technological advances, which can also improve the product (e.g., smart TV or LED/OLED screens; 4K or Ultra HD technology) or the processes (e.g., new multimedia narratives).

Innovation in Public Service Media

Concerning PSM, innovation should be accomplished in addition to the obligation to fulfill its public service mandate, without losing sight of the need for accessibility and diversity in the content (United Nations Educational Scientific and Cultural Organization [UNESCO], 2006). More than ever, innovation represents both a technological and social axis for improving PSM offerings (Cañedo et al., 2023; Cunningham, 2015; Martínez-Fernández, Juanatey-Boga, & Crespo-Pereira, 2018). Thus, innovation is seen

[2] Given the polysemy that characterizes the term "production," we clarify that it is an expression that is widely used to refer only to the shooting phase, although it alludes to the entire process. In this sense, it also applies to other non-creative activities that are necessary for the correct execution of the audiovisual product and that are linked to management tasks (Ortiz, 2018). Thus, innovation in production processes will be understood in this article as the use of new or improved methods, equipment, technologies, or knowledge for the creation and management of audiovisual products in broadcasting corporations.

as a tool for changing the corporate culture of PSM to reconnect with audiences and renew processes (López-Golán et al., 2019; Ranaivoson et al., 2013).

The citizen participation fostered by PSM in content production is in line with the characteristics of the open innovation model because of the technological development that has led to digital platforms, social media, Big Data, and Artificial Intelligence (AI; López-Golán et al., 2019; López-Olano, Soler-Campillo, & Marzal-Felici, 2022). In turn, these tools enable organizations to expand their possibilities for fostering productive collaborations (Cañedo, Pérez-Seijo, & Rodríguez-Castro, 2024; Sehl & Cornia, 2021). In this sense, the most dynamic European corporations are developing strategies to establish a foothold in an emerging environment and attract younger audiences who are seeking to interact with the content (European Broadcasting Union [EBU], 2020). The latter is not trivial in the current media context, where a recent study on the Spanish case revealed that younger generations were most likely to financially support PSM (Háló, Campos-Rueda, & Goyanes, 2023).

Another performed innovation is the development of innovation laboratories. This is the case with BBC News Labs or the RTVE Lab—both examples of structural departments in which innovative formulas to produce and distribute content are being explored (Salaverría, 2015; Zaragoza Fuster & García Avilés, 2020). Although their mission points to product innovation, these laboratories also represent process innovation by contributing to organizational change in the traditional model of media production (Salaverría, 2015). These labs become environments that foster continuous innovation outside of day-to-day operations by avoiding the inertia and time pressures that often hinder innovation efforts within the core structure of organizations (Christensen, 1997). Herein, previous research has shown that PSM workers link innovation mainly to process-related issues and less to product-related issues (Evans, 2018).

In Spain, apart from the existence of the RTVE Lab, the state-level corporation Radiotelevisión Española (RTVE) is experimenting with AI to generate automated content (Aramburú-Moncada, López-Redondo, & López-Hidalgo, 2022) and is concluding agreements with Spanish universities and the audiovisual sector to put into practice R&D&I projects linked to innovation activities (Cañedo et al., 2024). Related to distribution processes, RTVE is pushing for alternative channels, the use of new technologies, such as 5G, and the design of VoD platforms (Cañedo et al., 2024; Direito-Rebollal & Donders, 2023).

For their part, Spanish regional PSM are characterized by poor development of innovation, mostly focusing on the technological dimension (Cañedo et al., 2024; Fernández-Quijada, Bonet, Suárez-Candel, & Arboledas, 2015). However, given the diversity of coexisting corporations, the scenario is not homogeneous. To lead innovation, the most active regional corporations seek to enrich the user experience through new interactive content, transmedia productions, participation portals, and personalized access apps (Izquierdo-Castillo & Miguel-de-Bustos, 2021; Larrondo-Ureta, 2020; López-Olano et al., 2022; Pérez-Seijo & Vizoso, 2022). Moreover, as with RTVE, these PSM are involved with other agents in R&D&I projects focused on the technological field (Cañedo et al., 2024). In terms of distribution processes, the regional corporations have significant activity in digital media apart from their linear broadcasting, which usually includes a website, VoD services, and mobile applications. However, they are still in an immature state in the process of platformization (Cañedo et al., 2023).

Overall, at this early stage of implementing innovation in PSM, concrete indicators for measurement have not yet been identified in the previous literature. Therefore, considering innovation to be one of the specific value elements of PSM (Cañedo et al., 2022; EBU, 2014), this research aims to build a tool for assessing the state of innovation in the production processes of PSM corporations.

Method

A qualitative study based on the application of three research techniques (documentary analysis, individual interviews, and the Fuzzy Delphi method) was applied in two phases. Phase 1 of the research, in which the first two techniques were applied, aimed to propose an indicator of innovation in PSM production processes. For these techniques, the research sample was made up of the 13 Spanish regional PSM and the state-level PSM (Table 1). The Spanish PSM system was selected as a case study because of its heterogeneity, because although the 14 companies operate both television and radio, they have their own independent structures and management models that comply with the respective regulations.

Table 1. PSM Objects of Study.

Corporation	Abbreviation	Territorial Level
Radiotelevisión Española	RTVE	State-level
Euskal Irrati Telebista	EiTB	Regional
Corporació Catalana de Mitjans Audiovisuals	CCMA	Regional
Corporación Radio e Televisión de Galicia	CRTVG	Regional
Radio y Televisión de Andalucía	RTVA	Regional
Corporació Valenciana de Mitjans de Comunicació	À Punt	Regional
Radio Televisión Madrid	RTVM	Regional
Ente Público Radiotelevisión Canarias	RTVC	Regional
Ente Público de Radio y Televisión autonómico de Castilla-La Mancha	CMM	Regional
Ens Públic de Radiotelevisió de les Illes Balears	IB3	Regional
Radiotelevisión del Principado de Asturias	RTPA	Regional
Corporación Aragonesa de Radio y Televisión	CARTV	Regional
Corporación Extremeña de Medios Audiovisuales	CEXMA	Regional
Radiotelevisión de la Región de Murcia	RTRM	Regional

First, a documentary analysis of regulations, gray literature, and websites of the corporations under study was carried out. Additionally, other indicator models linked to broadcasting and innovation were explored, such as (a) quality indicators of public broadcasters (Bucci, Chiaretti, & Fiorini, 2012), (b) EBU's audiovisual public service evaluation indicators (EBU, 2015), (c) indicators of citizens' perceptions of media pluralism in the EU (Eurobarometer, 2016), (d) public television transparency indicators (López-López, Puentes-Rivera, & Rúas-Araújo, 2017), (e) efficiency indicators for mixed funding of European public broadcasters (Blasco-Blasco, Campos-Freire, & Juanatey-Boga, 2017), (f) indicators for evaluating public broadcasting news services (Campos-Freire, Soengas-Pérez, & Rodríguez-Castro, 2018), (g) the composite indicators as an innovative methodology in communication

(Blasco-Blasco, Rodríguez-Castro, & Túñez-López, 2020) and (h) the Global Innovation Index (GII; World Intellectual Property Organization [WIPO], 2021).

Second, 45 interviews were conducted with Spanish PSM managers, with the average number of interviews per company being between three and four. It was determined that the sample should consist of (a) innovation managers, for their knowledge and experience in innovation management; (b) production managers, for their mastery of production processes and their optimization of material and human resources; (c) technical managers, for their experience in implementing new technologies; and (d) digital media managers, for their ability to lead the internal digitization and platformization process. In the absence of any of the aforementioned managers, the CEOs were interviewed for their influence on shaping corporate strategy.

The interviews lasted 60–90 minutes and were conducted in person between October 2021 and April 2022. At the beginning of the interview, it was clarified that this study worked with the definition of innovation by Baregheh et al. (2009), and it was specified that transformations could be developed internally, externally, or through a combination of both (OECD, 2018). The questionnaire was structured into four blocks, with 30 open- and closed-ended questions to be asked in sequence. The first block relates to the organization of innovation, both within the corporation and in the departments managed by the interviewees. The second block refers to the culture of innovation within corporations, while the third one raises questions related to investment in innovation. Finally, the last section of the questionnaire is aimed at determining the degree of innovation provided by stakeholders in each PSM analyzed.

As a result of this methodological phase, a 67-indicator tool for assessing innovation in production processes was obtained. To check its validity, the second methodological phase of the study was developed. For this purpose, the Fuzzy Delphi method (Murray, Pipino, & van Gigh, 1985) was used. This method is an integration of the traditional Delphi method (Linstone & Turoff, 1975) and fuzzy theory (Zadeh, 1965). While the Delphi method requires a consensus among the experts, the Fuzzy Delphi method takes all opinions into account and does not exclude those that do not meet the majority criteria. Thus, all the expert opinions can be encompassed in one investigation (Ma, Shao, Ma, & Ye, 2011).

According to Hsu and Yang (2000), who established a triangular fuzzy number to obtain expert scores, the fuzzy number of our research will be formed by three singular points that represent it: the minimum, the maximum, and the arithmetic mean. This will allow us to determine the degree of belonging for each proposed variable.

Step 1

A panel of media innovation experts was defined, composed of 16 participants from professional and academic fields, and questionnaires about the tool were distributed to them. Following Coll-Serrano, Carrasco-Arroyo, Blasco-Blasco, and Vila-Lladosa (2012), the questionnaires were organized considering

that the experts would evaluate each indicator based on three SMART[3] criteria: "feasibility," if they considered that it could be measured; "relevancy," if they considered it important; and "specificity," if they considered that it was something concrete. The experts had to assess whether each indicator met one, two, three, or none of the criteria, so that each variable took a final score between 0 and 3. In addition to scoring the indicators, an open question was posed at the end of each dimension so that the experts could make comments or suggest new variables.

The self-administered online questionnaire with the initial proposal tool was sent out in an e-mail on November 15, 2022. After a two-week response period, the valid response rate was 87.5%, corresponding to a total of 14 participants.

Step 2

Once expert opinions were collected for each criterion, the triangular fuzzy number was identified: $T_j = \left(t_j^L, t_j, t_j^U\right)$, where t_j^L is the minimum value, t_j is the medium value, coinciding with the vertex of the triangle, and t_j^U is the maximum possible value.

Step 3

If we define the membership function

$$\mu_{\tilde{T}_j(d_j)} = \begin{cases} \frac{d_j - t_j^L}{t_j - t_j^L} \; si \; d_j < t_j \\ \frac{t_j^U - d_j}{t_j^U - t_j} \; si \; d_j > t_j \end{cases},$$

being $d_j = \frac{t_j^L + t_j + t_j^U}{3}$

if $\mu_{\tilde{T}_j(d_j)} > \alpha$ the variable is accepted as part of the indicator.

Step 4

We set a threefold criterion to select indicators. A threshold $\alpha > 0.75$ was defined to determine which indicators should be part of the final proposal. Based on expert criteria, the indicators with a score higher than 4 of 10 are selected, which means a value of *r* higher than 1.2, provided that in the feasibility criterion, the mode (Mo) is equal to one, so that

If $\alpha > 0.75$, $r \geq 1.2$ and Mo = 1, the indicator is accepted.

[3] SMART is an acronym for specific, measurable, achievable, relevant, and time-bound. In the field of development aid, and specifically in monitoring and evaluation systems, the acronym SMART has been coined to describe "good" indicators (Drucker, 1954; Jones, 2007; Smith & Smith, 1999).

Otherwise, the indicator was rejected.

Once the consensus of the experts was verified, some indicators were modified (deletion and insertion), and the final proposal was drawn up. To ratify the reliability of the proposed instrument and the internal consistency of the items of each dimension, Fleiss' Kappa (Landis & Koch, 1977) was used. The following section details the construction process of the tool as well as its composition.

Results

Phase 1: Thinking and Designing a Tool for Assessing Innovation in Public Service Media

Based on the methodology explained, an initial proposal was put forward with 67 simple indicators grouped into nine dimensions to analyze the innovation of production processes at the internal, external, and cross-cutting levels. First, our research makes it possible to define two large categories of innovation depending on whether they are developed internally by the corporation or by outside contractors: internal innovation and external innovation. However, technological progress urges the adaptation of corporate measures in response. In some cases, the adaptation is due to the internal development of more up-to-date computer programs or the improvement of existing ones. In others, the implementation of new production systems, tools, or digital platforms for distributing audiovisual products is developed by external companies awarded in the tenders given by the corporations for continuous technological renovations. This hybrid innovation strategy prompts the consideration of a third category associated with the technological evolution of broadcasting corporations.

Internal Innovation

This section of the proposed tool measures innovation from the perspective of the relationship between the PSM corporation and its internal stakeholders. The results of the documentary analysis and interviews led to the definition of five dimensions for the analysis and measurement of corporations' capacities to innovate in production processes. These dimensions were delineated by considering innovation indicators from the Oslo Manual—organizational, cultural, intensity, and efficiency (OECD, 2018)—and determinants of organizational growth—economical (Blasco-Blasco et al., 2017; Schumpeter, 1934; WIPO, 2021).

Organizational

This dimension aims to determine how innovation in production processes is coordinated in the analyzed corporations and whether there are differences between them depending on the size, structure, or management model of each entity.

Cultural

This dimension aims to evaluate the behavior of the company's workforce (both workers and managers) in different areas toward innovation based on the assumption that corporate progress depends on the professionals who make up the company and their attitudes toward new processes. Moreover, the

responsibility for generating a new working culture toward innovative production models lies with the managers of the areas concerned, who have the responsibility to empower their staff in the process of change and deal with resistance to it.

Intensity

This makes it possible to study how often innovations are implemented in production processes and the weight each organization attaches to innovation in these processes. Obsolescence, both of old structural formulas and of the more classic formats, urges PSM corporations to streamline and simplify processes that allow them to be at the forefront of the products offered.

Efficiency

This dimension focuses on the results of the innovations implemented in PSM production processes. The restructuring of the organizations for the optimization of resources and the capacity to respond to changes or the results obtained with these changes allows us to know the different levels of efficiency in the corporations when implementing innovation in their production processes.

Economical

This dimension identifies what resources, if any, PSM allocate to innovation. Budget availability for innovation, depending on the economic capacity of each corporation, is the subject of analysis for this assessment tool because, in addition to strategy, investment in research, training, and technology is needed. It is also necessary to analyze the results of investments in innovation.

External Innovation

To understand how external innovation is articulated in the relationship that PSM corporations establish with their stakeholders, three dimensions are proposed: collaborative, contractual, and casual. These dimensions are defined by considering another innovation indicator: cooperation (OECD, 2018). Furthermore, unexpected events (Drucker, 2002) that may lead to breakthroughs or new discoveries are considered to address indicators related to serendipity. Through them, it is possible to evaluate how each corporation makes use of external knowledge flows to accelerate internal innovation and improve the quality of its services.

Collaborative

Establishing alliances and synergies with other entities in both the public and private spheres enriches the optimization of PSM resources, the expansion of markets, and the export of products. Here, it is interesting to evaluate how proactively corporations engage in collaborative activities with their audiences and other organizations to promote innovation. This will improve knowledge of their interests and expectations about PSM value.

Contractual

This dimension aims to determine whether the supplier companies of PSM entities contribute to improving their competitiveness through innovation. Considering that the existing management model of PSM corporations is based on the outsourcing of both services and content, this dimension is highly relevant nowadays.

Casual

The decision to incorporate this dimension into the analysis of external innovation is related to the need to know how some of the unforeseen events that have arisen in recent years (e.g., the COVID-19 pandemic or the eruption of the Cumbre Vieja volcano in Spain) have intervened, if at all, in the innovation strategy of PSM corporations. Following WIPO (2021), this dimension stems from the premise that unforeseen events in organizations, usually because of institutional or other crises, often become an opportunity for the development of innovation.

Cross-Cutting Innovation

The interviews with the technical managers revealed that these corporations consistently strive to enhance process automation. In some cases, the applications that contribute to this automation are developed in-house. However, in other cases, they experiment with tools provided by supplier companies. Given this hybridization, a transversal innovation category associated with the technological dimension (Rogers, 2003) is proposed, as it is considered fundamental to PSM corporations (Cañedo et al., 2024).

Technological

The process of digital transformation and platformization that PSM are currently undergoing makes the technological perspective an important dimension to analyze from the perspective of innovation in production processes. An organization's ability to innovate depends, among other aspects, on the effective use of new technologies whose introduction within a corporation will imply new practices in production processes.

Phase 2: Checking and Defining the Tool for Assessing Innovation in Public Service Media

The experts' judgments confirmed the validity of the proposed tool for analyzing the state of innovation in PSM production processes. The application of the Fuzzy Delphi method validated 91% of the indicators, which were ratified by calculating Fleiss' Kappa in each dimension. However, the experts' assessment in the first round of the Fuzzy Delphi method suggests the elimination of six simple indicators that affect five of the nine dimensions of the initial proposed tool (Table 2).

Table 2. Indicators Removed From the Proposed Tool After Applying Fuzzy Delphi.

Category	Dimension	Simple indicators	Triangular fuzzy number
Internal	Organizational	Percentage of working time devoted to innovation	(0, 1, 2)
	Cultural	Importance of innovation in production areas rating	(0, 1.14, 2)
	Intensity	Number of innovation ideas	(0, 1, 2)
External	Contractual	The "Renting" model is used to keep the technical equipment updated	(0, 1.07, 2
Cross-cutting	Technological	Has the corporation developed virtual assistants?	(0, 1.07, 3)
		Has the corporation developed Blockchain technology?	(0, 0.93, 2)

The experts' assessment also suggests the incorporation of seven new indicators into four different dimensions: organizational, collaborative, economical, and technological. About organizational and collaborative dimensions, Expert 13 believes that "there is a lack of consideration in the tool of how strategic alliances affect innovation from a workflow perspective." In his opinion, "although partnerships and collaborations are considered, its impact on specific aspects such as workflows or costs is somewhat blurred." This feeling is shared by another expert who explains that PSM companies "collaborate with universities and other companies and regularly cooperate with specialized forums in the audiovisual sector" (Expert 10). Therefore, the IOR8 and ICL7 indicators were included.

Moreover, indicator IEC7 was added to the economic dimension. This decision was made by relying on the statement of Expert 3, who noticed the following:

> In the case of PSM, I believe that the capacity to ensure that one of our innovations has been adopted by other media companies (e.g., formats broadcasted by other TVs or the licensing of proprietary developments and applications) is more relevant than the sources of funding. In this regard, I find there's a lack of cross and multimedia stories. (Expert 3)

Following Expert 3's assessment, which highlighted the need to refer to other types of technologies that were not included in the initial tool, we modified the ITC15 to pose the indicator as a general question. In this sense, Expert 10 emphasized that "content creation technologies are constantly being updated."

Finally, Expert 9 clarifies that, in his corporation, "applications and tools have been developed internally and also with suppliers." This raised the need to add indicators related to the innovation development process itself. Thus, the indicators ITC16, ICN7, and ICN8 were added.

Once the changes had been integrated, a second round of consultations was carried out to stabilize the opinions. The results led to the final proposed tool for assessing innovation in PSM's production processes (Table 3). This is composed of three categories, nine dimensions, and a total of 68 simple indicators. According to the experts' criteria, the average number of indicators linked to the internal and external innovation categories ranged between five and eight. This criterion of the close weighting of all dimensions indicates that they are considered similar in terms of importance. The exception is the technological dimension, which belongs to the category of cross-cutting innovation, with a total of 17 indicators. This is

due to the weight of the technological perspective in the entities under study, which is particularly relevant in production processes, showing that technological progress should be part of the innovation strategy of PSM corporations.

Table 3. Proposal of the Tool for Assessing Innovation in Production Processes.

Category	Dimension	Simple indicators	Order
Internal	Organizational	Is there an innovation department in the corporation?	IOR1
		Is there a laboratory of innovation in the corporation?	IOR2
		Are innovation committees organized?	IOR3
		Are there innovation managers in the production areas?	IOR4
		Are regular training plans developed?	IOR5
		Number of employees performing new professional profiles	IOR6
		Number of tools developed to facilitate workflows	IOR7
		Are strategic alliances contemplated with companies, institutions or other agents to facilitate internal workflows?	IOR8
	Cultural	Innovation leadership rating	ICU1
		Employees' attitude toward innovation rating	ICU2
		Objectives pursued with innovation (e.g., cost reduction, quality improvement) rating	ICU3
		Areas with greater proactivity toward innovation	ICU4
		Number of employees contributing innovative ideas	ICU5
	Intensity	Number of meetings about innovation per year	IIN1
		Number of training courses about innovation per year	IIN2
		Number of innovation projects per year	IIN3
		Number of new tools introduced in the last year	IIN4
		Most frequently renewed technical material	IIN5
	Efficiency	Is there a procedure for registering innovative ideas?	IEF1
		Results obtained with the innovation rating	IEF2
		Total innovative activities per year	IEF3
		Number of successful innovative activities per year	IEF4
		Number of unsuccessful innovative activities per year	IEF5
		Number of innovative activities cancelled before implementation	IEF6
	Economical	Is there a specific budget line for innovation?	IEC1
		Annual investment for innovation	IEC2
		Annual investment in R&D&I projects	IEC3
		Annual benefits from innovation	IEC4
		Sources of innovation funding	IEC5
		Are there new funding models for innovation (e.g., crowdfunding, programmatic ads)	IEC6

		Number of innovative proprietary formats that have been acquired by other PSM or media content companies	IEC7
External	Collaborative	Number of innovation activities developed jointly with other PSM in the country	ICL1
		Number of innovation activities developed jointly with international PSM	ICL2
		Number of innovation activities developed with other public administrations	ICL3
		Number of participations in R&D&I projects	ICL4
		Number of collaborations developed with universities (e.g., chairs, seminars, theses)	ICL5
		Number of collaborations developed with audiences (e.g., focus group, creative production)	ICL6
		Are there strategic alliances contemplated with companies, institutions or other agents to reduce the corporation's costs?	ICL7
	Contractual	Number of innovative activities with supplier-producing companies per year	ICN1
		Innovation of supplier production companies rating	ICN2
		Innovation of telecommunications and transmission services companies rating	ICN3
		Number of training companies contracted to offer courses in innovation per year	ICN4
		Number of companies contracted for the development of management and technological tools per year	ICN5
		Number of technological tools that have been contracted for the development of the corporation's activities	ICN6
		Number of supplier companies with which the corporation has contracted for the development of innovative activities	ICN7
		Number of companies or institutions with which innovative activities have been developed	ICN8
	Casual	Number of new elements introduced because of natural disasters per year	ICS1
		Number of new elements introduced because of unexpected social emergencies per year	ICS2
		Have there been any extraordinary events of a sporting, cultural or religious nature that have accelerated innovation during the last year?	ICS3
		Have there been any extraordinary events of political or institutional nature that have accelerated innovation during the last year?	ICS4
		Have there been any extraordinary events in the PSM history that have slowed down innovation?	ICS5

Cross-cutting	Technological	Are there computerized management and production systems?	ITC1
		Are there Big Data-based systems for audience measurement?	ITC2
		Are there innovative broadcasting systems (e.g., UHD 8K/5G)?	ITC3
		Is there an automatic text generation system?	ITC4
		Does the corporation have an automatically generated news personalization system available?	ITC5
		Has the corporation developed automatic subtitling?	ITC6
		Has the corporation developed an OTT platform?	ITC7
		Has the corporation developed Apps?	ITC8
		Does the corporation apply mobile journalism?	ITC9
		Has the corporation developed immersive narratives (e.g., 360º Video, VR, AR)?	ITC10
		Has the corporation developed tools for Fake News verification?	ITC11
		Has the corporation developed technology for robotization?	ITC12
		Is there automated listening of social media?	ITC13
		Has the corporation developed technologies applying AI?	ITC14
		Has the corporation developed any other technologies than those listed so far?	ITC15
		Number of innovative technologies developed by the corporation	ITC16
		Number of the above techniques that have been developed solely by the corporation (internal development)	ITC17

Once the final proposal was obtained, its reliability was ratified by means of Fleiss' Kappa (Table 4). This coefficient takes values between 0 and 1, where the higher the value, the higher the reliability. According to Landis and Koch (1977), our results confirm that the reliability of the tool is, on average, high and, therefore, adequate.

Table 4. Reliability Statistics.

Dimensions	Fleiss' Kappa
Organizational	0.31
Cultural	0.20
Intensity	0.44
Efficiency	0.44
Economical	0.29
Collaborative	0.40
Contractual	0.20
Casual	0.56
Technological	0.34

In practice, it is important to note that the questionnaire comprises questions with varying levels of response options. These include dichotomous variables, which can be answered with either a "yes" or "no"; ordinal variables, which are scored on a scale of 1 to 10; and natural number variables, which provide specific information, such as the number of innovative activities developed. Consequently, once the responses have been provided and the data normalized, multi-criteria analysis techniques must be employed.

Overall, this is a generalizable proposal for measuring innovation in the production processes of PSM that could also be adapted. Precisely, the proposal of such a broad list of indicators in each dimension allows innovation to be defined, selecting the weighting of the most appropriate variables that best adapt to the context we are analyzing in each case.

Conclusion

This article aimed to build a tool for assessing the state of innovation in the production processes of PSM from the case study of Spanish PSM. In a context where PSM corporations are redefining their public value (Cañedo et al., 2022), innovation should not be seen as an option but as a reality that must be present transversally within these media (Martin, 2021; Túñez-López et al., 2021). Beyond its technological conception, which is currently the most developed typology of innovation inside PSM corporations (Carvajal et al., 2015; Jones & Jones, 2019; Pérez-Seijo & Vizoso, 2022; Zaragoza Fuster & García Avilés, 2020), innovation is conceived as a key element of public value to adapt PSM production processes to the platformed media market (Cañedo et al., 2022).

This article first reviewed previous literature on the concept of innovation and its organizational implications for both private and public companies (Baregheh et al., 2009; Chesbrough, 2003; Christensen, 1997; Drucker, 2002; Mazzucato, 2018; Oliván, 2020; OECD, 2018; Rogers, 2003; Schumpeter, 1934), which is complemented by a review of prior studies on innovation and PSM (Cañedo et al., 2023, 2024; Cunningham, 2015; López-Golán et al., 2019; Ranaivoson et al., 2013; Sehl & Cornia, 2021; Zaragoza Fuster & García Avilés, 2020). This enabled us to delve deeper into the weak current state of innovation implemented in PSM and the need to design an instrument to diagnose innovation in the production processes of the organizations under study to both assess their management and measure their impact. Thus, the main contribution of this study is the proposal of a tool (1) to determine what resources a PSM broadcasting corporation uses to innovate in its production processes and (2) to measure its internal, external, and cross-cutting innovative capacity in this regard.

A tool composed of 68 indicators categorized under nine dimensions was proposed based on the following: a documentary analysis of innovation indicator models as well as the Spanish PSM regulation and gray literature; the development of structured interviews with PSM managers; and the conduction of a Fuzzy Delphi with experts. It is important to note that the construction of the initial proposed tool, which was checked by the experts, was based on the analysis of data collected from primary PSM sources. In this sense, the main methodological difficulties were related to the disorganized provision of information from these PSM entities—which prevented the clear identification of the innovation activities developed by them—as well as the heterogenic identity and structure of each PSM corporation. About the latter, the reliability of

the instrument confirmed by Fleiss' Kappa allows us to point out that the proposal is adequate for application in different PSM corporation models.

The disparity of the sample and the inherent difficulty of comparability (Cañedo et al., 2024; López-Olano et al., 2022) made it worthwhile to design a standard instrument that covered a diverse range of PSM particularities. The main innovation actions detected about production processes are related to the commitment of PSM to the use of new technologies, both for the generation of content and for implementing more effective production routines, which is consistent with previous research (Cañedo et al., 2024; Fernández-Quijada et al., 2015; Jones & Jones, 2019; López-Golán et al., 2019; Pérez-Seijo & Vizoso, 2022; Zaragoza Fuster & García Avilés, 2020). This phenomenon tips the balance of the indicators toward the technological dimension, although the importance of the other eight dimensions is also indisputable, displaying the cross-cutting nature of innovation.

We believe that the proposed tool is relevant for the academic field, from which we elaborate this study, as well as for the managers responsible for PSM and policymakers. The application of the instrument will make it possible to (1) know the particularities of each PSM corporation in relation to the procedures and resources they are implementing for the development of innovation, (2) compare the state of innovation between different PSM, and (3) identify to what degree a PSM corporation complies with the innovation objectives set out in its public value mission, which is directly linked to the needs of the stakeholders it serves. Moreover, although the construction of a synthetic indicator is not the object of this research, our definition of innovation dimensions will serve as a basis for further developing composite innovation indicators. We believe that this is essential to continuing this work, as innovation is a key element in the present and future of PSM.

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