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Systematic Review

Recommender Systems and Over-the-Top Services: A Systematic Review Study (2010–2022)

Paulo Nuno Vicente [1,*] and Catarina Duff Burnay [2]

[1] ICNOVA, Universidade Nova de Lisboa, 1069-061 Lisboa, Portugal
[2] CECC, Universidade Católica Portuguesa, 1649-023 Lisboa, Portugal; cburnay@ucp.pt
* Correspondence: pnvicente@fcsh.unl.pt

Abstract: Artificial intelligence (AI) technologies have been increasingly developed and applied in the audiovisual sector. Over-the-top (OTT) services, directly distributed to viewers via the Internet, are associated with a shift towards automation through algorithmic mediation in audiovisual content led by digital platforms. However, scientific knowledge regarding algorithmic recommender systems and automation in OTT services is not yet systemized; researchers, practitioners, and the public thus lack full awareness about the still largely opaque phenomena. To address this gap, we conduct a systematic literature review in the communication domain (2010–2022) and answer four key research questions: What research objectives have been pursued? What concepts have been developed and/or applied? What methodologies have been privileged? Which OTT platforms have received the most research attention? Challenges and opportunities are highlighted, and an agenda for future research is advanced.

Keywords: recommender systems; over-the-top (OTT) services; algorithms; artificial intelligence (AI); Amazon Prime; Disney+; HBO; Hulu; Netflix

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1. Introduction

Owing to the profound social and cultural transformations underway in the contemporary world, particularly those directly related to digital technologies, the notions of 'automation' and 'algorithm' have been acquiring the sense of a convenient shortcut. In public discourse, these terms often designate the whole by the part, shortening by metonymy the distance to the broader territory of artificial intelligence (AI). AI refers to the development of computer systems capable of performing tasks that typically require human intelligence, such as learning, reasoning, problem-solving, and decision-making (AI HLEG 2019). The emerging relevance of machine-learning algorithms—computational systems that recognize patterns and generate predictions from large-scale datasets—has not gone unnoticed among social scientists. Due to their socio-technical opacity, these systems have been compared with black boxes (Pasquale 2015) and are responsible for one of the great challenges arising from the application of automation techniques: the explainability problem, which is the struggle of computer scientists to clearly understand and specifically explain how these systems produce their results.

As defined by Robert Kowalski (1979) in now classical terms, an algorithm has two layers: (1) logic, which specifies what there is to accomplish, and (2) control, which determines how to achieve it. As such, algorithm = logic + control. When logically structured, an algorithm is less like a 'list of instructions' and more like a conditional formulation: if this = true, then that. It is not a simple list of steps as in a cooking recipe; it corresponds to a finite set of actions, with a single beginning and a single end, based on the recognition of each of the entities that will be used as the raw material for the calculation and on the establishment of commands that must be followed so that the operation can proceed.

Unlike traditional, manually pre-programmed algorithms, machine-learning algorithms are potentially prone to unpredictable 'behaviors'. In domains such as medical and

pharmaceutical research, this unpredictability can lead to a 'Eureka!' moment of scientific discovery, whereas, in the social and cultural sphere, it has generated problematic effects (e.g., Cowgill and Tucker 2020; Gupta et al. 2021; Modgil et al. 2021). Moreover, a contemporary algorithm is, in a strict sense, a multiple of itself: because programmers promote constant efficiency tweaks, the same algorithm has different versions over time and is thus a persistently ephemeral socio-technical entity (Gomez-Uribe and Hunt 2016).

Distinctive contributions have been made to the critical study of algorithms (e.g., Gillespie and Seaver 2016; Kitchin 2017; Bucher 2018), the rationality they internalize (Lowrie 2017), the cultural and social power they embody (Striphas 2015; Dourish 2016; Beer 2017), and the normativities (Lee and Björklund Larsen 2019) and automation anxieties (Goffey 2019) they instate. These endeavors articulate crucial contemporary phenomena such as the politics of digital platforms (Gillespie 2010), the datafication of social life (Van Dijck 2014; Couldry 2020; Møller Hartley et al. 2021), algorithmic governance (Ananny 2016; Ziewitz 2016), the quasi-communication between humans and 'intelligent' systems (Guzman and Lewis 2020; Hepp 2020), how news media shape our ideas about these emerging technologies (Nah et al. 2020), and, more recently, the growing concerns around algorithm literacy (Dogruel et al. 2021; Shin et al. 2021).

This article addresses the absence of a meta-synthesis of scientific knowledge on the automation processes inherent to over-the-top (OTT) services' recommender systems in the field of communication. Overall, this study provides the research community with an analytical summary of what research questions have been proposed and how scholars are investigating about the deep integration of automation mechanisms on digital platforms, such as Amazon Prime Video, Disney+, HBO Max, Hulu, and Netflix, as well as its influence on the contemporary production and reception of audiovisual content. To this end, we conducted a systematic literature review with a longitudinal view (2010–2022). The overarching research question guiding the systematic review is as follows: What concepts, methodological approaches, and perspectives are used in the scientific literature on OTT services and recommender systems in the communication domain? We adopt a quantitative approach (meta-analysis), along with a qualitative approach (research synthesis).

2. Background

OTT services acquired relevance in 2010 when the then video rental company Netflix evolved into a digital-streaming-based business. High-speed Internet allowed access to an online platform comprising a catalogue of premium content from multiple devices directly connected to the network, without relying on television stations or telecommunications companies. This technological shift has promoted profound transformations in the audiovisual sector, with the Internet reinforcing its status as a medium—and no longer a complementary extension—simultaneously merging and directly competing with television (Johnson 2019).

Since its emergence and establishment as a medium in the 1950s, television has been challenged by the evolution of its fundamental basis, with changes in business architectures, in content grammars, and, consequently, in the ways viewers decode the meaning of television. The remote control, the video cassette recorder, and the multichannel era are just a few examples of how technological evolution has imprinted adjustments in market dynamics and created new social experiences, triggering, time after time, questions about what television is. Amanda Lotz (2007, 2018, 2022) and Lotz et al. (2018) mapped and analyzed these evolving contexts, referring to the need to not just understand the announced death of television in the face of the new and disruptive, but rather (re)think and (re)conceptualize the medium and realize how evolution gives way to revolution, in response to the convergence of technology with industrial and social practices.

Although offering different characteristics and experiences of usage and viewing than linear television, streaming services retain many of the practices and strategies of linear television to attract and maintain audience loyalty (Wolff 2015), revealing not only the porosity between different media but also the persistent idea of technological determinism that overshadows different contexts of use and domestication as well as socio-cultural rhythms (Frey 2021) and the short and medium term effects on business operations (Lobato 2019). Among the recent audiovisual phenomena is the strategic offering of weekly episodes/chapters rather than all content at once. *Bingewatching* or *epic viewing* as a practice (Baker 2017) maintains social stigma (Steiner 2017), and its normative use can diminish the life of certain content, contributing to a very time-centric buzz in media coverage and interactivity facilitated by digital social media, and potentially to disinterest in the platform by some subscribers.

Although the audience has been understood as a social and discursive production of media industries, brands and advertisers, and measurement companies (Napoli 2011), its evolution as a concept closely depends on the evolution of the technological field and digital uses, as well as on the environmental characteristics that shape societies and organizations. The ways of measuring and characterizing audiences have also evolved from the classical auditory technique to the widespread television audience measurement system, especially since the deregulation of the audiovisual sector (Bourdon and Méadel 2014) and the adoption of data-driven analytics (Behrens et al. 2021; Wayne 2021; Michalis 2022).

Regardless of the measurement technique used, content producers continue to desperately seek the audience (Ang [1991] 2006) and compete for its attention. However, today, they must deal with two key phenomena for an updated reading of this reality—fragmentation and autonomy (Napoli 2003, 2011)—which challenge established concepts such as mass media, mass audience, and audience work (Napoli 2010).

This platformization of taste shows the importance of knowing and understanding the audience and its agency as well as the strategies to capture and create engagement and its effects; however, many questions remain unanswered in audience research (Morley 2006): Is it enough today that production platforms, such as streaming platforms, provide a continuous and targeted flow of content as opposed to the programmed flow of television to attract and retain audiences (Williams [1974] 2003)? What are the audience analysis and measurement techniques currently used and what do they represent in the agency of individuals and the dynamics of markets?

This new audiovisual ecosystem paradigm affects market dynamics and social practices, showing the growing relevance of the phenomenon. Lobato (2019) defined Netflix as a shapeshifter: it mixes elements of various media and technologies and presents itself in different forms—digital media service, television, cinema, Pay-TV, and new media—depending on the area focused on and the context in which it is inserted. According to the author, television studies are familiar with hybridization and are sufficiently flexible and open to adopting new positions, and OTT services are a pertinent pretext to rethink what is known about television and reconstitute new knowledge. By stating 'what is more important than what we call Netflix is how we think about it', Lobato (2019, p. 44) launched the idea of the importance of looking at OTT services as frontier phenomena and adopting theoretical and empirical approaches that bridge screen and digital media studies.

3. Methods

To organize the currently available academic knowledge on automation as implemented in contemporary OTT services' recommender systems, this study conducts a systematic literature review, understood as a rigorous method of collecting and synthesizing evidence from multiple studies to produce a whole greater than the sum of distinct research pieces (Purssell and McCrae 2020). In general, two main approaches coexist in the current practice of conducting a systematic literature review: (1) the quantitative, meta-analysis-oriented approach that often seeks to assess the effect of different types of interventions and involves the statistical handling of findings reported across a number

of primary research pieces (e.g., Skoric et al. 2016; Chen et al. 2017; Suri 2017; Spicer et al. 2021) and (2) the qualitative, narrative-oriented approach that focuses on attempting to link together many studies on different topics, either for the purposes of reinterpretation or interconnection. As such, narrative literature reviewing is a valuable theory-building technique, and it may also serve hypothesis-generating functions (Baumeister and Leary 1997, p. 312). In the domain of new media studies, exemplary in the latter approach are, among others, the works of Caers et al. (2013), Zhang and Leung (2015), Williams (2019), and Pérez-Escolar and Canet (2022).

Our approach seeks to reconcile these two epistemological perspectives by bringing the descriptive statistical treatment of the sampled literature, aimed at identifying key scientific trends (frequency of publication, significant journals, patterns of methodological approaches, and most analyzed digital platforms), together with content analysis, codification (thematic categories), and research synthesis (objectives, questions, concepts, theoretical frameworks, results, and future research recommendations) to enable the identification of the nuclei of meaning that reveal new clues about the field of studies.

As such, our systematic literature review addressed original research articles published between January 2010—Netflix's year of business reconversion—and December 2022, allowing for an updated longitudinal view (12 years) of communication studies examining algorithmic recommender systems providing OTT services, and was restricted to English peer-reviewed manuscripts. The sample consisted of articles indexed by the Web of Science Core Collection (category Communication), as well as articles published in Q1 scientific journals in the communication category (n = 92) based on the Scimago Journal Rankings; only the scientific journals also indexed by Web of Science Core Collection were considered. This methodological approach seeks to reconcile the consideration of well-established academic journals (high impact factor) with emerging scientific publications. The feasibility of using Scopus and Web of Science databases for systematic reviews and meta-analyses has recently been demonstrated (Gusenbauer and Haddaway 2020). Nevertheless, we are aware that, by limiting the sampling to indexed journals, we may unintentionally be limiting the scope or foci of the sampled articles.

3.1. Data Collection

The identification and adoption of relevant search terms was based on the deductive articulation of three analytical levels: (1) technology ('algorithmic recommender systems', 'recommendation agent', and 'recommendation system'), (2) digital platform ('algorithmic platforms', 'over the top service', 'OTT', 'streaming television', 'SVoD', 'Amazon Prime Video', 'Apple TV', 'Disney+', 'HBO Max', 'Hulu', 'Netflix', and 'WeTV'), and (3) phenomena ('algorithmic curation' and 'search experience'). Each of the online databases (Web of Science Core Collection, and Scimago Journal Rankings) were queried for original scientific research publications mentioning the above-stated keywords on the fields 'Title', 'Abstract', and 'Author-specified keywords'.

A total of 665 records were initially identified. During the screening stage, both authors reviewed all records to confirm whether each met the inclusion and exclusion criteria: 580 records did not address the specific thematic scope of the review and/or its research questions and were therefore excluded. The remaining 85 records were assessed for eligibility: 41 records did not address the specific relationship between algorithmic recommender systems and OTT services, and 11 articles were duplicated and were excluded as such; and 33 original research articles remained. Figure 1 presents a flow chart of the articles included in the study.

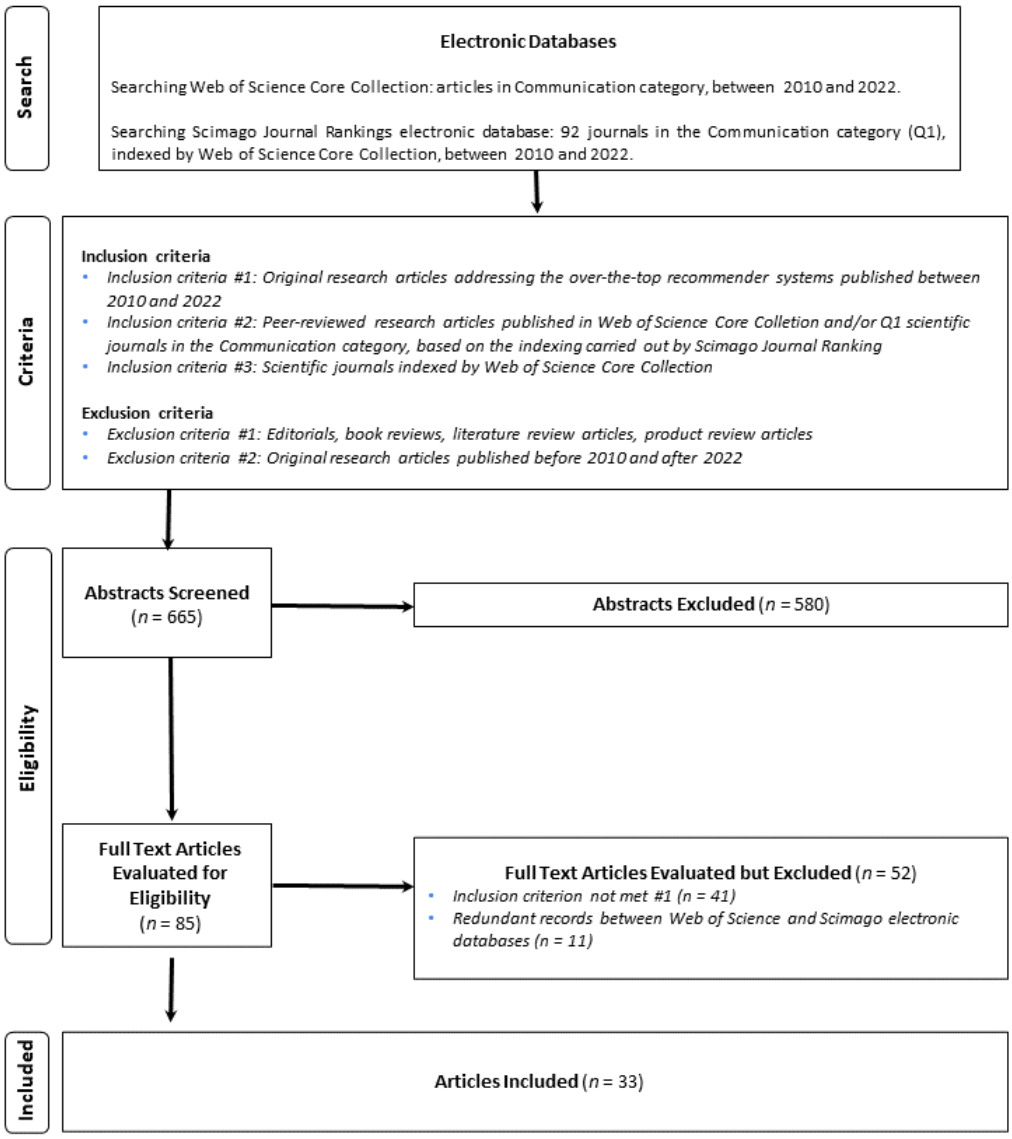

Figure 1. Systematic literature review flow chart.

3.2. Protocol and Coding

To determine the key characteristics of each of the included studies (n = 33), a data collection form was developed by following the procedure recommended by Petticrew and Roberts (2008). Fourteen levels of detail were included: article title, digital object identifier (DOI), journal, keywords, year of publication, research objective(s), research question(s), concept(s), theoretical framework(s), method(s), participant(s), OTT platform(s), results, and recommendation(s) for future research. The form was jointly developed by both authors of this study and piloted with test content: using a shared research protocol, each author independently completed the form. Following Higgins et al. (2019), the content separately extracted by each author was compared and gaps were identified. This procedure aimed to ascertain the adequacy of the synthesis instrument and identify biases on the part of the authors. The form was then established as the basis of the construction of thematic categories during the analysis and coding stage.

To develop the coding scheme, we adopted an inductive approach grounded on the analysis of the examined corpus at the levels of the articles' keywords, research objective(s), research question(s), concepts(s), and theoretical framework(s). This analysis allowed the constitution of five thematic categories: (1) data management as a strategic practice in the media industry, (2) the impact of recommender systems on viewers' experience, (3) the

impact of recommender systems on culture and cultural production, (4) algorithmic bias, inclusion, diversity, and digital divides, and (5) globalization, power, and the political economy of OTT services. Inter-rater reliability was statistically determined using the intraclass correlation coefficient (ICC) in SPSS to verify whether the ratings by the two different coders reflected the dimensions they were purported to reflect. Coder A and Coder B independently coded the full sample of scientific articles (n = 33). The inter-rater reliability test was performed by comparing the coding results of coders A and B. The ICC was 0.857 (in a 95% confidence interval, with a lower bound of 0.786 and an upper bound of 0.929), which means that the agreement between the two coders was very significant. Because the agreement rate was not absolute, the differences in coding were identified by the research team; the two coders returned to the original articles and the research synthesis form, and compared the previously assigned codes with the specific descriptions articulated in the coding scheme. This procedure allowed for collegial consensus-building. Table 1 summarizes data for each of the 33 articles included and the thematic categories in which they were coded.

Table 1. Research synthesis: distribution of articles per thematic category, key concept, research method, participants, and OTT services.

Thematic Category	Study	Year	Key Concept	Method	Participants	OTT Service
Data management as a strategic practice in the media industry	Fernández-Manzano et al. (2016)	2016	Business intelligence	Cross-sectional (bibliographic reviews, analysis of the data published by the firm itself, information provided by its staff in discussion forums, and analysis of data provided by specialized press)	N/A	Netflix
	Kelly (2019)	2019	Data divide; big data	General literature review	N/A	Netflix
	Burroughs (2019)	2019	Streaming lore	Cross-sectional (general literature review and media content analysis)	N/A	Netflix
	Fernández-Manzano and González-Vasco (2018)	2018	Privacy; security risks	General literature review	N/A	Netflix; Movistar+; HBO; Amazon Prime; Sky; Hulu; Disney; ESPN; Apple TV
	Shapiro (2020)	2020	Data behavioralism; streaming prestige television; datalogic turn; algorithmic television; Netflixism; algorithmic turn	General literature review	N/A	Netflix
	Fleischer (2020)	2020	Spotification	Media content analysis	N/A	N/A
	Zhao (2021)	2021	Data-driven fandom	General literature review	N/A	iQiyi

Table 1. *Cont.*

Thematic Category	Study	Year	Key Concept	Method	Participants	OTT Service
	Heredia-Ruiz et al. (2021)	2021	Flow TV	Content analysis	N/A	Netflix
	McKenzie et al. (2022)	2022	Viewing metrics	Descriptive analysis of the three distinct datasets released by Netflix	N/A	Netflix
	Klatt (2022)	2022	Conglomeration, flywheel economics, disruption	Case study	N/A	Amazon Prime Video
	van Es (2022)	2022	The myth of big data; data-driven organization; data-driven mindset; data–human divide	Discourse analysis	N/A	Netflix
The impact of recommender systems on viewers' experience	Siles et al. (2019)	2019	Mutual domestication	Interviews; inductive analysis of practices and profiles on the platform	25 interviewees	Netflix
	Pilipets (2019)	2019	Binge-watching; attachment	General literature review; network analysis	N/A	Netflix
	Kwon et al. (2020)	2020	Perceived diagnosticity; perceived serendipity	Online survey	212 survey respondents	Netflix
	Zarouali et al. (2021)	2021	Algorithmic awareness	Scale development and validation	5 experts; 26 respondents	YouTube; Netflix
	Benavides Almarza and García-Béjar (2021)	2021	Engagement	Survey	574 respondents	Netflix
	Shin et al. (2021)	2021	Algorithmic literacy; algorithmic divide	Online survey	775 survey respondents	Amazon; Netflix
	Eklund (2022)	2022	Personalization tactics, thumbnails as paratext	Pilot survey	6 participants	Netflix
	Ortega (2022)	2022	Planned differentiation	General literature review	N/A	Netflix
The impact of recommender systems in culture and cultural production	Hallinan and Striphas (Hallinan and Striphas [2014] 2016)	2014	Algorithmic culture	General literature review	N/A	Netflix
	McKelvey and Hunt (2019)	2019	Discoverability	General literature review	N/A	Netflix; YouTube; HBO; Amazon Prime

Table 1. *Cont.*

Thematic Category	Study	Year	Key Concept	Method	Participants	OTT Service
The impact of recommender systems in culture and cultural production	Navar-Gill (2020)	2020	Platformization of creativity	Cross-sectional (fieldwork, interviews, and discourse analysis)	13 TV screenwriters	Netflix; Amazon Prime; Hulu
	Borrajo et al. (2020)	2020	Taste communities; global niches	Case study	N/A	Netflix
	Pajkovic (2022)	2022	Taste-making	Reverse engineering (taste personas)	N/A	Netflix
	Gaw (2022)	2022	Algorithmic logics	Cross-sectional (reverse engineering: analysis of 60 documents and 100 media reports; and phenomenological approach: coding of 990 tweets)	N/A	Netflix
	Kim (2022)	2022	Global SVoD players	Cross-sectional (semi-structured, in-depth interviews)	15 bureaucrats, 10 industry insiders	Netflix
Algorithmic bias, inclusion, diversity, and digital divides	Meyerend (2023)	2023	Algorithmic representations of race	General literature review	N/A	Netflix
	Kennedy and Holcombe-James (2022)	2022	Digital divide; digital inclusion; digital exclusion	Cross-sectional (survey, and semi-structured interviews)	46 households (evaluation). 3 households as examples in the paper	Netflix, Disney Plus
	Hildén (2021)	2021	Exposure diversity; personalization; selective exposure; nudging	Thematic semi-structured interviews	10 interviewees	Public service media in Europe
	Khoo (2022)	2022	Inclusion strategy; algorithmic cultures	Case study	N/A	Netflix
Globalization, power, and the political economy of OTT services	Elkins (2019)	2019	Globalization; cosmopolitanism	Discourse analysis	N/A	Netflix
	Colbjørnsen (2021)	2020	Streaming network	General literature review; financial and other available information regarding four streaming services	N/A	Spotify; Apple Music; Netflix; Kindle
	Bonini and Mazzoli (2022)	2022	Agonistic pluralism; conviviality	General literature review	N/A	N/A

4. Results

Descriptive statistical treatment of the sampled literature was used to identify the main scientific trends, in particular, the frequency of publication in the observed time

interval (2010–2022), the most significant scientific journals, the patterns of methodological approaches, and the digital platforms that were most analyzed. Significantly, over the last decade, OTT recommender systems have received increasing research attention in the field of communication; this trend is particularly accentuated from 2019 onwards (Figure 2).

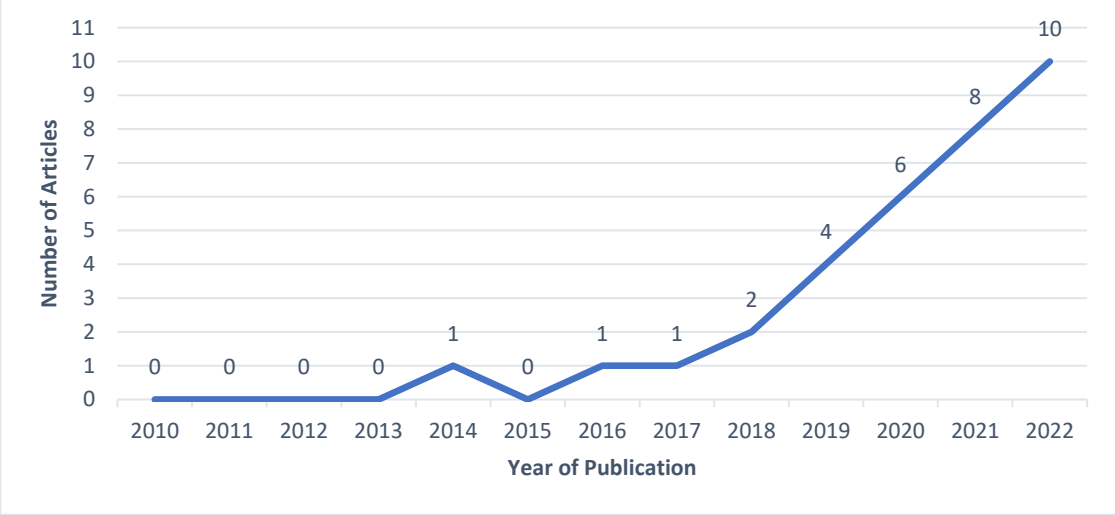

Figure 2. Frequency of articles by year (2010–2022).

Figure 3 summarizes the most significant scientific journals in the study interval. In the communication domain, research on recommender systems and OTT has been concentrated in sixteen academic publications.

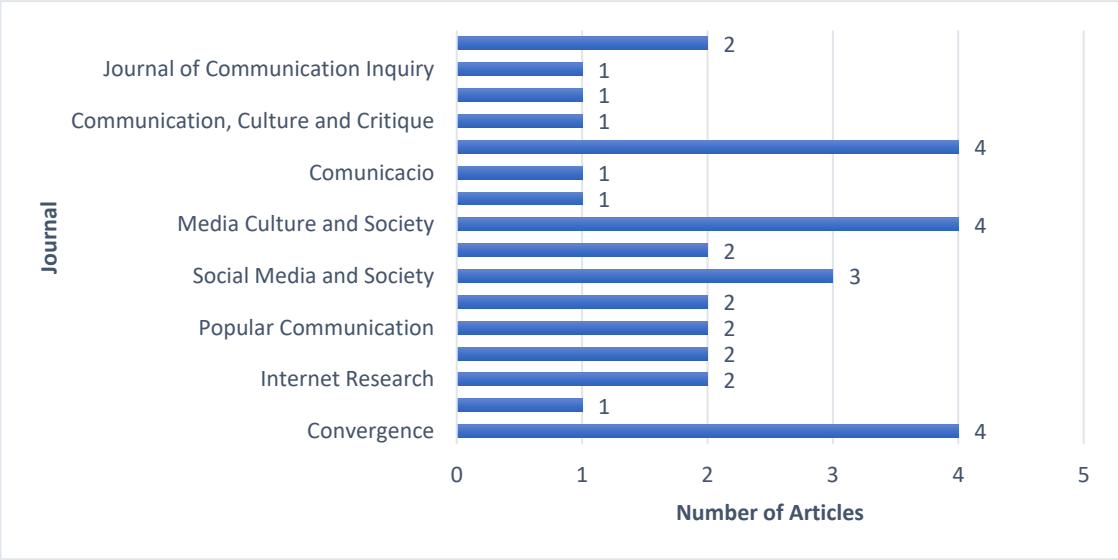

Figure 3. Frequency of publication of scientific articles by journal (2010–2022).

4.1. What Research Objectives Have Been Pursued?

Based on the review of the studies, we identified five major thematic categories: (1) Data management as a strategic practice in the media industry, aggregating articles focused on data-driven decision-making, platform politics, business intelligence, and their risks; (2) The impact of recommender systems on viewers' experience, focused on the reception of algorithm-mediated audiovisual content; (3) The impact of recommender systems on culture and cultural production, dedicated to specific emerging phenomena that are transforming the traditional notion of culture and how it is currently prone to

datafication and automation through algorithmic action; (4) Algorithmic bias, inclusion, diversity, and digital divides, aggregating articles focused on the analysis of algorithmic representation of race and emerging social issues related to pluralism and equity of access and uses; and, finally, (5) Globalization, power, and the political economy of OTT services, which includes articles dedicated to analyzing the intricate economic, commercial, and technological networks associated with the platformization of online distribution of audiovisual content.

4.1.1. Data Management as a Strategic Practice in the Media Industry

The cross-cutting objective of the articles coded under this thematic category is to analyze the logics of streaming as an instance of disruption or reformulation of previous audiovisual transmission logics. Of note are the economic and institutional dimensions of this shift—the 'datalogic turn' (Shapiro 2020)—as well as the discursive formulations through which they materialize.

With the aim of resituating the idea of 'disruption' caused by streaming services within the history of the moving image, Klatt (2022) develops a media industries analysis of the Amazon Prime Video phenomenon. According to the author, 'disruption' cannot be seen only as a buzzword of the moment, as it is necessary to consider the shared evolutionary history of the moving image, cinema, and television markets in the face of transformation. The entry of Big Tech companies in the film and television industries brought new strategies such as the use of artificial intelligence and big data and changes in business practices. In the case of Amazon, the tactics used are not all new and many are based on the synergies of their own technologies and infrastructures, materializing an internal capitalization of assets in a flywheel effect logic.

From a media business management perspective, the operational concept of big data integrates a strategic axis for the on-demand audiovisual content distribution industry. This line of work is particularly represented by Fernández-Manzano et al. (2016), who focus on the extractive nature of data mining, analysis, and data-driven decision-making as a competitive business advantage, as well as by Heredia-Ruiz et al. (2021), with an analysis of Netflix's strategies around the notion of flow TV. This competitive advantage centers around user preferences, where the offering follows the segmentation into personalized content and the adoption of corporate strategies tailored to regional consumption patterns (e.g., Netflix Originals). The adoption of these datafied practices has stirred concern among researchers about the growing risks around security and the violation of privacy, conceptualized under the notion of 'analytical surveillance' (Fernández-Manzano and González-Vasco 2018).

Along with data management, the articles in this thematic category also focus on the discursive power of streaming corporations (van Es 2022). In this regard, the work of Burroughs (2019) is illustrative, calling attention to the recovery of industry lore—reformulated in terms of a *streaming lore*—and how it is intentionally used to constrain the markets and reinvent audience-viewing practices. Furthermore, Fleischer (2020) suggested that jargon is an active part of OTT services' business model and advanced 'spotification' as a business metaphor for the normalization of subscription-based models as well as for curation through algorithmic recommender systems.

Owing to the centrality of digital data in OTT services, a subset of studies is dedicated to examining the emergence of a new paradigm of audience measurements that directly rely on social media platforms and real-time analysis. The investment in 'live' or event-dependent audiovisual content, as well as the new generation of digital divides—*data divide*—characterized by access asymmetries between the companies, which collect and use data as raw material for their business, and the individual viewers, are attributable to the adoption of social metrics (Kelly 2019). This push towards social data analysis is inseparable from the configuration of a turn to data-driven fandom, based on the measurability of the value of fans and their commodification (Zhao 2021). McKenzie et al. (2022) explore the importance of data presentation by streaming platforms for a better

understanding of the SVoD market in its relationship with audiences and media dynamics, particularly by researchers, through the direct analysis of three datasets released by Netflix in November 2021.

4.1.2. The Impact of Recommender Systems on Viewers' Experience

The second thematic category focuses on the interactive dimension between OTT recommendation agents and human users, in a process described as a 'mutual domestication' (Siles et al. 2019). An emerging concern is to understand how the values encoded in these automation systems and 'networked experiential environments' (Pilipets 2019) influence engagement (Benavides Almarza and García-Béjar 2021) and the search experience, particularly, *perceived diagnosticity* and *perceived serendipity*, which, in turn, affects decision satisfaction and continuance intention (Kwon et al. 2020). In this line of thought, Eklund (2022) explores the paratexts of SVoD platforms, such as Netflix's personalized thumbnails, to discuss the segmentation and customization strategies proposed by the algorithmic culture. These processes of personalizing the experience correspond to a 'planned differentiation' (Ortega 2022), responsible for the characteristics of deceptive limitlessness, customization, and the automation of content flow and ubiquity, currently recognized in streaming platforms' service/spectator relationship.

Owing to the importance of exploring whether people are mindful of algorithmic content recommendations, Zarouali et al. (2021) developed and validated the algorithmic media content awareness scale, which was tested for three different media platforms (Netflix, Facebook, and YouTube) and is aimed at making available a standardized instrument to assess users' awareness of content filtering, automated decision-making, human–algorithm interplay, and ethical considerations. In this line of work, the notion of *algorithmic literacy*, defined as the critical understanding of algorithm-based processes in terms of fairness, accountability, transparency, and explainability, begins to consolidate and is emphasized by Shin et al. (2021) through an analysis of how users engage with OTT services and how algorithmic literacy influences the sense of trust in automatic recommender systems.

4.1.3. The Impact of Recommender Systems on Culture and Cultural Production

A third thematic category of studies is structured around the concept of algorithmic culture and how information processing and automation systems are now not only technological artefacts but also emerging forms of cultural decision-making. Central to a culturological research route is the seminal article of Hallinan and Striphas ([2014] 2016) that focuses on how technology design and development competitions (e.g., The Netflix Prize) function as instances of service optimization and serve as examples for the progressive legitimization of knowledge engineering via opaque mathematical formulae and complex socio-technical systems.

This seminal perspective informs a set of later studies aimed at examining how algorithms affect the processes of taste-making in the film and television industry (Borrajo et al. 2020) and how mathematical abstraction infiltrates the cultural sphere today. To that extent, the works of Gaw (2022) and Pajkovic (2022) share a common focus and methodological approach (reverse engineering; i.e., the process of dissecting and analyzing a system to understand its design, functionality, and components) to the inner workings of the Netflix recommender system, which is a socio-technical assemblage of algorithmic logics at work as contemporary intermediaries. This dimension constitutes one of the vertices of McKelvey and Hunt (2019, p. 1) around the concept of *discoverability*, interpreted as 'a kind of media power constituted by content discovery platforms that coordinate users, content creators, and software to make content more or less engaging'. Navar-Gill (2020) examined the evolving paradoxes between being creatively free and being data-driven in the culture of professional Hollywood television screenwriters and how these integrate (or not) datafication into their creative work, stimulating tensions between the control of user data by companies and the possibilities of the narrativization of content by creators.

Kim (2022), in turn, puts into perspective the relationship between global streaming platforms and local cultural producers, through the study of the entrance of Netflix in Korea and the consequent constraints and opportunities for domestic media industries. Although co-production strategies are appealing to enable local projects with a higher quality and projection, the author identifies the risk of Korean producers becoming subcontractors of the SVoD global giants, suggesting the need to critically analyze the impacts of these power relations on cultural production and local cultural producers.

4.1.4. Algorithmic Bias, Inclusion, Diversity, and Digital Divides

A fourth thematic category consists of a subset of more recently published research articles that contribute to the field of communication studies with the introduction of a strongly sociological and critical focus. Kennedy and Holcombe-James (2022) investigate how 'smart' and automated technologies are being experienced in low-income households. This line of research makes it possible to frame automated technologies, especially services based on recommender systems, through the intersection of social and economic infrastructures. The study exposes how the recent policies of streaming platforms to restrict the possibilities of sharing usage accounts neglect the dynamics of low-income households and the costs associated with digital inclusion.

On the other hand, Meyerend's article (2023) places centrality on how algorithmic technologies mediate identity, power, and the politics of racial identities. Through the analysis of Netflix's recommendation system, the author concretizes the analysis of algorithmic cultures and representations of race, examining the identity of users and how their agency is delimited within algorithmic systems. One of the most recent lines of study of recommendation systems is related to the questioning around the policies of safeguarding exposure to the diversity of audiovisual content (Hildén 2021), potentially contrary to the personalization logics of the platforms' algorithms, as well as, in the case of public media services in the European context, to the dynamics of the mercantile supply of the private actors of the sector (Khoo 2022).

4.1.5. Globalization, Power, and the Political Economy of OTT Services

Finally, and although still residual in communication studies dedicated to analyzing the relationship between OTT services and recommender systems, questioning is beginning to emerge around the role of streaming platforms as agents of globalization, particularly the discursive, technological, and business practices that propitiate their legitimization (Elkins 2019). Colbjørnsen's work (2020) proposes that OTT services are embedded in a broader 'streaming network' deeply characterized by the circulation of flows not only of audiovisual content, but of data, money, and power, and the asymmetries arising from this. In this sense, Bonini and Mazzoli (2022) recognize that public service media risk losing their distinctive character, by not having yet developed an alternative model to envision, develop, and govern their online services and their data-driven systems.

4.2. What Concepts Have Been Developed and/or Applied?

Figure 4 represents the chronological evolution of the thematic categories and the emergence of the main concepts operationalized in the research. It is evident that the theme of *data management as a strategic practice in the media industry*, present since 2016, is the one that remains the most consistent over time (with the exception of 2019) and is accompanied by substantial conceptual development. In the opposite direction, it becomes equally evident that the thematic category encompassing *algorithmic bias, inclusion, diversity, and digital divides* has only very recently (2022) begun to emerge on the communication research agenda, following the most recent discussion about the need to regulate AI applications, considering their social impacts.

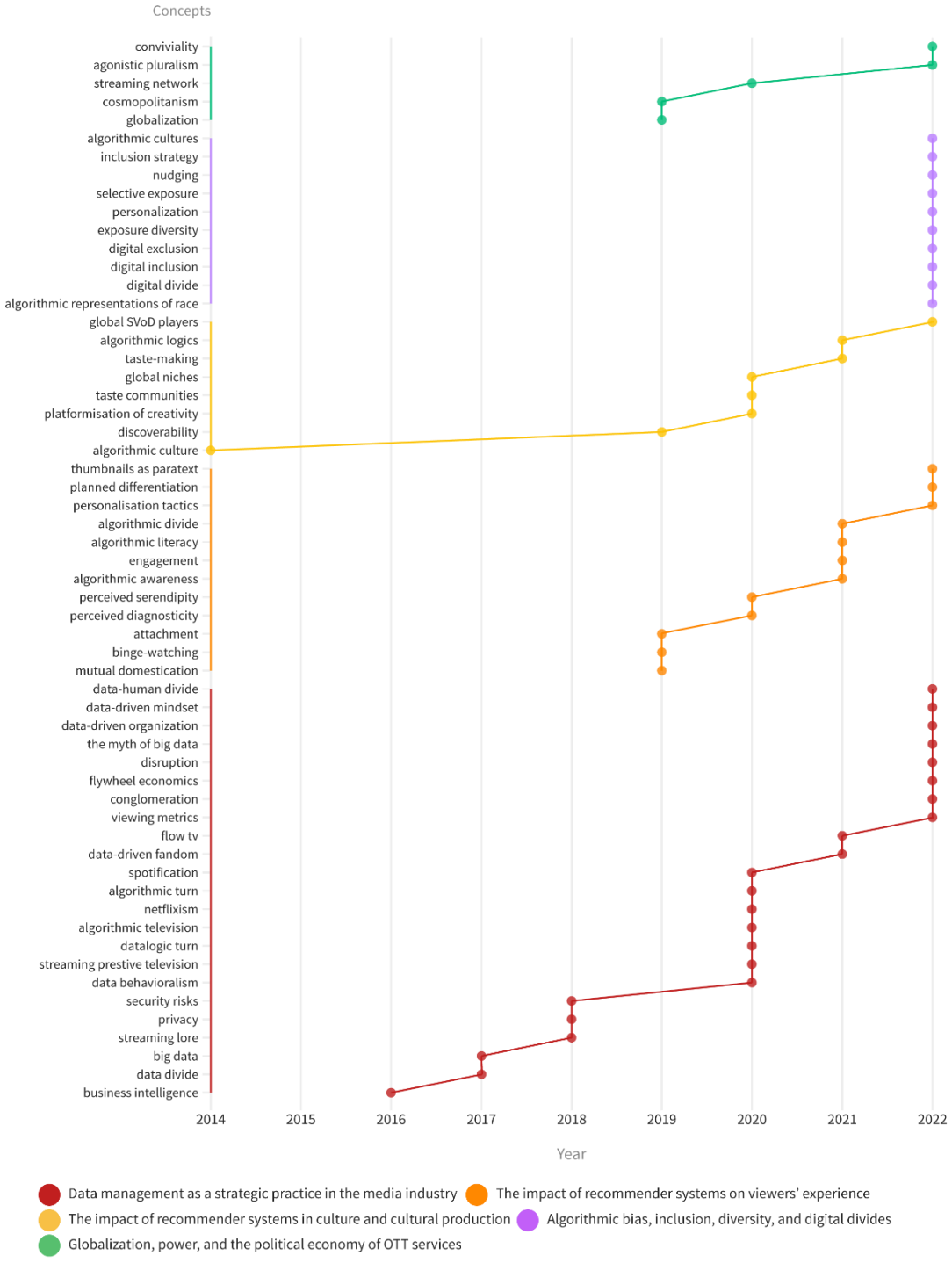

Figure 4. Frequency of the thematic categories and key concepts (2010–2022).

Although an article had been identified already in 2014, whose slant early on shows a culturological concern, it is only later (2019) that the need to better understand how recommendation systems shape the practices and tastes of receivers (e.g., engagement and binge watching) begins to be consolidated. In this sequence, the issues associated with literacy have aroused the interest of the scientific community from 2021.

4.3. What Methodologies Have Been Privileged?

The nature of the sampled articles is primarily speculative and/or theoretical/conceptual: twelve studies are based on a *general literature review* (non-systematic) (Hallinan and Striphas [2014] 2016; Kelly 2019; Fernández-Manzano and González-Vasco 2018; Burroughs 2019; McKelvey and Hunt 2019; Pilipets 2019; Shapiro 2020; Colbjørnsen 2021; Zhao 2021; Bonini and Mazzoli 2022; Meyerend 2023; Ortega 2022), seven resort to *content/discourse analysis* (Burroughs 2019; Elkins 2019; Fleischer 2020; Navar-Gill 2020; Heredia-Ruiz et al. 2021; Meyerend 2023; van Es 2022), five use *surveys* (Kwon et al. 2020; Benavides Almarza and García-Béjar 2021; Shin et al. 2021; Eklund 2022; Kennedy and Holcombe-James 2022), four analyze *case studies* (Fernández-Manzano and González-Vasco 2018; Borrajo et al. 2020; Klatt 2022; Khoo 2022), four implement original *interviews* (Siles et al. 2019; Navar-Gill 2020; Hildén 2021; Kim 2022), two employ *reverse engineering* (Gaw 2022; Pajkovic 2022), one uses *scale development and validation* (Zarouali et al. 2021), and, finally, one proceeds to use *dataset analysis* (McKenzie et al. 2022).

Facing a complex socio-technical object, characterized by access shielding (*blackboxing*), there is a predominance of long-established research methods in the domain of the social sciences and humanities to the detriment of innovative methodological and epistemological approaches that integrate the digital materiality of the medium and its articulation with the field of human–machine communication, and establish its connection to new research questions.

4.4. Which OTT Platforms Have Received the Most Research Attention?

In the analyzed sample, the most studied OTT service is Netflix; of the 33 studies, 27 (81.8%) analyze this streaming platform, and, in 21 cases (63.6%), Netflix is the sole focus of the article. This finding is suggestive of a research 'hot zone' with the flip side of leaving in the shade other digital realities demanding further academic attention; in our sample, this is represented by the study of the Chinese context by focusing on the iQiyi platform (Zhao 2021).

5. Future Directions

Of the 33 articles analyzed, 21 leave recommendations for future research based on circumstantial limitations or new questions that emerged in the course of the work. Most articles focus on the relationship between recommender systems and action on human and cultural contexts (Fernández-Manzano et al. 2016; Hallinan and Striphas [2014] 2016; Kwon et al. 2020; McKelvey and Hunt 2019; Borrajo et al. 2020; Shin et al. 2021; Pajkovic 2022; Zarouali et al. 2021; Zhao 2021; Benavides Almarza and García-Béjar 2021; Hildén 2021; Eklund 2022; Khoo 2022), whereas others present a market perspective, highlighting the business implications of using big data, platform strategies, and the development of streaming as an industry in a global environment (Kelly 2019; Burroughs 2019; Colbjørnsen 2021; Heredia-Ruiz et al. 2021; Klatt 2022; McKenzie et al. 2022; Kim 2022; van Es 2022).

Hallinan and Striphas ([2014] 2016), when discussing the implications of the Netflix Prize in constructing the meaning of the idea of culture and cultural practice, showed concern about the optimization of technological resources to operate as arbiters and decision-makers of taste and consumption. In the same vein, Zhao (2021) aimed to understand the new forms of audience measurement in the context of platformization and metricization, leaving as a future research avenue the necessary understanding of the sustainability of datafication, both for the industry and for the consumers, as well as of the cultural consequences of platformization logics. McKenzie et al. (2022) make a descriptive analysis of the three datasets released by Netflix in November 2021—a novelty in the market, since platforms do not make this kind of information public—and leave several clues for future research, namely, trying to understand if the demand for content on SVoD platforms differs from the demand for films and TV shows released in a traditional way or trying to understand if criticism and user reviews have lost importance in the era of algorithmic recommendation; "What is the influence of cultural affinity in the choice of content?", or,

even, "What is the prevalence of non-English-speaking content in international catalogues?" are other future research proposal examples.

As McKelvey and Hunt (2019) advanced by studying the concept of 'discoverability' as media power, platforms have an increasing influence on global cultural flows through the coordination of users, creators, and software in the pursuit of engagement. This process of engagement through recommender systems was explored by Kwon et al. (2020) to understand, in a specific cultural context, the values of recommendation agents that influence ongoing subscription behaviors. However, as noted by the authors, the study and findings cannot be blindly replicated in other markets owing to cultural differences; it would, therefore, be interesting to develop localized studies as well as the use of other analysis variables, such as content characteristics or reviews left by other users, to better understand the subscriber loyalty process.

Fernández-Manzano et al. (2016) observed the use of data mining by Netflix to build user clusters with the exact aim of reducing the number of cancellations, proposing to conduct studies that explore the use of big data in other audiovisual platforms and understanding the relationship between new technologies, users, and content producers. Zarouali et al. (2021) and Shin et al. (2021) adopted a broad perspective in their approaches to recommender systems in relation to their users and their cultural contexts, drawing attention to the need to study subscribers' levels of knowledge of recommender systems, digital literacy, and algorithmic literacy. Zarouali et al. (2021) developed the algorithmic media content awareness scale (AMCA), and Shin et al. (2021) applied the fairness, accountability, transparency, and explainability guidelines (FATE). They proposed the application of these mechanisms across different geographical and cultural contexts as well as the fine-tuning of the measurement processes with the main goal of contributing to the increase in users' literacy levels, circumventing the effects of a divided society ill-prepared to use AI. It is in this line that Khoo (2022), when exploring the relationship of algorithmic recommendation systems with diversity and inclusion issues, makes clear the need to conduct audience research, allowing for a better understanding of whether the technology is perpetuating a similar product consumption, causing the illusion of diversity or whether, in fact, it is transforming consumption habits. Moving away from the Netflix–consumer axis, and still within this line of concern, Hildén (2021) observes the work of public service media (PSM) in the use of news' recommendation systems and leaves as a proposal the importance of understanding how personalization may conflict with the basic objectives of a public service such as universality and diversity.

Benavides Almarza and García-Béjar (2021), working on the engagement of Mexican millennials with Netflix content, show the importance of better understanding the beliefs, thoughts, and ideas that emerge from this engagement to recognize people's ties to the platforms and the content. In their view, these studies would be strengthened if qualitative analyses were developed involving not only consumers, but also producers and creatives, as well as content analysis, to promote a greater awareness of the establishment of social links with the platforms. Burroughs (2019) discussed the emergence of a streaming industry having its own rules and characteristics and proposed to develop holistic works on the changes and not the prevailing economic and institutional approaches. It is also in this sense that Colbjørnsen (2021) seeks to understand the power relations between the constituent parts of a streaming network, not settling on just one view and proposing that further studies show the relevance of the approach beyond the four platforms analyzed.

Through a case study about the Korean market, Kim (2022) emphasizes the need for works that critically analyze the influence of international platforms in local markets, aiming at finding a balance between the advantages of collaborating and making contents travel, and the danger of the local market becoming extinct. Heredia-Ruiz et al. (2021), in an analysis of the concept of television flow on Netflix (strategies and origin of content), shows how there is a constructed flow, supported by recommendation systems, and how there is a predominance of US titles. Through a study situated in time (2019), the author attests that there is still a way to go in the studies on the catalogues from the perspective of

cultural diversity in terms of imperialism, on the one hand, and, on the other hand, from the perspective of Netflix's business model to enter certain territories. In a connection with these ideas, we find Borrajo et al. (2020): at the intersection of market imperatives and content, the author proposes to conduct studies on Netflix's business model, such as the creation of hubs in European cities, to understand the possible impacts on the homogenization of products, challenging concepts such as creativity and originality. Moreover, Klatt (2022), through a case study on Amazon Prime Video, shows the relevance of watching other platforms beyond Netflix and tries to build knowledge and tools that can help us understand not only the strategies of large conglomerates in the streaming industry, but the individual performance of certain platforms in certain geographical and cultural contexts.

In the line of studies on audience behavior, Kelly (2019), who examined audience measurement from the perspective of television operators in the era of big data, and Pajkovic (2022), who analyzed reception, explore the use of recommender systems in the construction of taste and the definition of television culture. Kelly (2019), thus, suggests, as a challenge for other researchers, the analysis of the ethical issues of information use, particularly in view of the General Data Protection Regulation (GDPR) approval by the European Union, as well as the impacts on the democratic potential of large-scale information use. Pajkovic (2022) underscored the importance of understanding the ways in which commercial and corporate interests have taken as their own the effects of algorithm use on cultural contexts rather than understanding the inner working of algorithms themselves. It is also in this scope that Eklund (2022), by studying Netflix's personalization processes, identifies the need for further studies on the platform, as well as the examination of different SVoD platforms.

van Es (2022), through a study on Netflix as a technological company, but also as an entertainment company, explores the context of big data use and its relationship with human action. In his view, it is crucial to open the discussion to the when, how, and why of the use of information and algorithms, questioning the socio-technical systems, and stop working with concepts in the abstract.

6. Final Remarks

Our review aimed at the systematization of scientific knowledge regarding algorithmic recommender systems and automation in OTT services within the domain of communication. We intended to present a synthesis and balance instrument that would allow the research community to concretize new starting points based on the research contributions made over the last decade. One limitation of this study is the exclusion of potentially relevant sources due to the predefined search criteria, which might have led to the omission of pertinent literature (e.g., books, thesis, and dissertations). Despite this, the study provides a comprehensive foundation for future research, highlighting key trends and gaps that can guide subsequent investigations in the field of algorithmic recommender systems and digital platforms.

When synthesizing the proposals for future research suggested in previous studies, we identified three major lines of need. The first, well-expressed by the predominance of observations dedicated to the Netflix phenomenon, is constituted by the necessity to diversify the digital platforms under study and the respective algorithmic recommender systems. This inquiry path may certainly contribute to the ascertainment of socio-technical mimicry phenomena, by identifying and understanding how social behaviors and interactions are replicated or influenced by technological systems and algorithms; it also allows an investigation on the local, regional, and national micro spheres, avoiding the aprioristic assumption of a global 'Netflixization'. From here derives a concern to also 'de-westernize' the study of OTT services: from a cross-cultural and comparative perspectives, a much-needed inquiry path is that on the situated contexts of data and algorithms' use, the differences and similarities in automation systems' adoption, their influence on viewing decisions, the impacts on the construction of cultural tastes, and the consequences (direct and indirect) across distinct audiovisual sectors.

The second line we identified is related to the relevance of an empirical turn: over the last twelve years, most of the inspected studies have focused on the construction of critical analyses, which still lack solid empirical 'fieldwork'. Faced with a phenomenon tending towards the rarefaction of methodological approaches owing to various technological and corporate shields, researchers experience the pressing need to develop creative approaches aimed at knowledge production. To date, only few studies have directly dealt with users to better understand their behaviors in the use of recommender systems. Frey (2021) recently discussed this issue when studying how the personal choice of movies and series has, in many cases, other sources of influence than the automation systems. Accordingly, it will be pertinent to develop geographically localized analyses that consider their own idiosyncrasies (economic, social, cultural, and political) and allow the understanding of the forms of use and the influence of recommender systems in the choice of content as well as in the levels of engagement and loyalty (to content and platforms).

Legal and regulatory issues related to recommendation platforms and systems also require further research, particularly as, for example in the European context, new regulatory initiatives are underway with a potential impact on the sector. Accordingly, we propose three complementary lines of action: (1) the study of trends in recommender systems' regulation; (2) the study of content production by artificial intelligence services and copyright frameworks, and, (3) in association, we identified a near absence of discussions around literacy as a parallel path, showing itself to be a key area of work in articulation with regulatory issues.

Over the past decade, recommender systems have emerged in the digital ecosystem as key players in new mediated communication processes. As such, they need to be properly incorporated by research, academic and professional training agendas, desirably through increased collaboration between computer science, media, and communication studies. As our study signals a noticeable growth in the number of published articles addressing this topic in the last year observed (2022)—suggesting that the coming years will see an increase in knowledge production in this domain—continuous observation and analysis aimed at consolidating the production of sustained knowledge, enabling the advancement of science, industries, and markets, becomes central.

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