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ARTICLE

The Spread of News Deserts in Chile

The Case of the Aysén Region

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News deserts are areas where the local community lacks reliable media outlets such as newspapers in the context of a global crisis in the press that weakens local civil society through its effect on democracy, social cohesion, and identity. This study focuses on the remote Aysén region of Chile which despite being territorially the third largest region in the country has the smallest population (108,306). This research employs a triangular methodology, incorporating a quantitative dimension using public data with systematic searches, a regional news desert media map and a social network metrics analysis, alongside qualitative methods such as a case study on the territory with semi-structured interviews and non-participant observation conducted between January and February 2023. The findings indicate that 20% of Aysén is at significant risk of becoming a news desert while 40% is already classified as such. The limited availability of diverse sources of information, the lack of adequate digital infra-structure, and the economic challenges faced by small media outlets are among the key contributing factors. Furthermore, the study posits potential solutions, including the establishment of collaborative networks and the advancement of

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mobile journalism, with the aim of reinforcing local identity and public institution strategies. Although the insights presented are primarily focused on the Aysén region, they could be extended to other Latin American and global regions facing comparable media vulnerabilities.

Keywords: Chile, news deserts, local journalism, hyperlocal journalism, regional journalism

Introduction

The study of news deserts is emerging globally as a necessary endeavour for both academia and the journalistic industry to understand the repercussions of the retreat and absence of media in regional, local, and hyperlocal areas. An increasing number of researchers have been addressing the issue with geographic, temporal, or media content approaches (Gulyas et al., 2023; Negreira-Rey et al., 2023; Lins da Silva & Pimenta, 2020; Napoli et al., 2019).

Local journalism faces ongoing challenges due to economic pressures, local politics (Nielsen, 2015), and territorial dynamics such as population shifts from rural to urban areas (Negreira-Rey et al., 2023; Galletero-Campos et al., 2024). Technological advancements have disrupted the traditional economic model of the media industry, creating a constant state of flux (Ferrucci & Alaimo, 2020). Changes in digital advertising strategies (Harte et al., 2018) have aggravated the crisis in the press, causing staff cuts and reducing the infrastructure to operate at minimum capacity (Rackaway, 2024). This crisis has been further aggravated by fragmenting audiences and declining trust in the media (Adornato, 2022; Newman et al., 2023; López-García et al., 2024) within an increasingly complex platform environment (Newman et al., 2023, p. 11). Abernathy (2020, p. 56) describes recent years as a "pivotal moment" for local news organisations struggling to adapt to new economic and digital realities. The global news industry has faced recurring economic crises (Suenzo et al., 2020), intensified by the Covid–19 pandemic, which accelerated cost-cutting, layoffs, and the downsizing or closure of print editions due to rising costs and declining advertising revenues (Newman et al., 2023, p. 17).

As a direct consequence of this weakening and withdrawal of the media, there are now media-free zones at local levels, a phenomenon referred to as *news desert.* Gulyas et al. (2023) argue that the definition of news desert varies according to setting and context, but that it "is a powerful concept that can speak to academic and non-academic audiences" (p. 287). There are a variety of approaches to studying news deserts. Abernathy (2016) has been a pioneer in their study, focusing on the identification of areas without local newspapers in the United States and warning of the consequences for the quality of the nation's democracy. For Smethers et al. (2021), newspapers are also essential to the local economies of communities, and thus affect social practices. Downman and Murray (2020) argue that the decline of local media is part of the broader crisis in journalism and has led to communities with an increased demand for local news (p. 255). It is crucial to recognise the role of formal media outlets as a reliable source of information, particularly given the spread of misinformation on digital platforms and the impact that has at a local level

(López-García et al., 2024) within a highly polarised context (Mellado & Cruz, 2024; Newman et al., 2023), exacerbated by pseudo-media that imitate mainstream outlets while disregarding journalistic standards and employing charged language (Garde-Eransus & Salaverría, 2024).

Rodríguez-Urra et al. (2024) have explored the links between hyperlocal journalism and news deserts in local journalism, highlighting challenges in audience engagement, citizen journalism, and business models. According to Abernathy (2020), strong local journalism generates trust in democratic institutions and builds strong communities. However, this is precisely the challenge in a multi-screen context and online informational spaces because "the digital deluge hardly spills over into local news" (2016, p. 38) and national content overshadows local content with *infotainment* or hard news.

Structural issues like low population density and high distribution costs hinder hyperlocal media, exacerbating the growth of news deserts (Downman & Murray, 2020), especially when governments do not implement reforms to improve independent local media ecologies to enhance social cohesion, as they did in Castilla-La Mancha, Spain (Galletero-Campos et al., 2024). Ferrucci and Alaimo (2020) highlight the need for a collaborative dynamic between communities and journalism to support democracy.

The lack of pluralism is a significant issue (Rodríguez-Urra et al., 2024), as Nielsen (2015) illustrates, local information is devalued when it is constructed solely from sources tied to political parties, local governments, or businesses. This situation exacerbates the issue of news deserts, which undermine civic coexistence and foster environments ripe for manipulation, populism, and polarisation (Trillo-Domínguez, 2023). The media has a crucial role in promoting civic participation, particularly at the local level, where it is essential for building and protecting public spheres (Nah & Chung, 2020). The importance of information pluralism in combating news deserts is further emphasised by other scholars (Rodríguez-Urra et al., 2024).

These deserts affect "different types of communities to varying degrees" (Napoli et al., 2019, p. 1028) with groups composed of historically marginalised minorities (Trillo-Domínguez, 2023) and those lacking digital skills being the most vulnerable. It is crucial to remember that the relationship between local media and local residents is indivisible because it strengthens local identity and interprets national and global realities within the scales of proximity (Hess & Waller, 2017).

The emergence of Covid–19 has brought about a re-evaluation of local journalism and demonstrated the vital role of community cohesion, a situation fostered by journalistic innovation in practice, and closer engagement with audiences (Amigo, 2023; Wahl-Jorgensen et al., 2022). This is reinforced when journalistic practice is linked to place, taking into account the construction of an identity that operates in local affairs (Hess & Waller, 2017). Consequently, audience knowledge is key to generating quality content to build trust (Adornato, 2022, p. 63) from reciprocity with communities, an aspect that is very much present in hyperlocal producers (Harte et al., 2018, p. 125).

The digital sphere has enabled transnational journalistic collaborations, especially in data-driven investigations in high-profile multinational projects, as Jenkins and Graves (2022) point out, they also identify three collaboration models in Europe: a *cooperative model* for regional newspapers on non-competitive issues; a *contractor model* with specialised organisations for specific projects; and an *NGO model* where a non-profit coordinate shares data-driven research. In Latin America, collaborations also establish networks among journalists in remote areas to promote investigative and professional journalism (Mesquita, 2023, p. 37). Citizen collaboration strengthens journalism in regions at risk of becoming news deserts, as exemplified by *The Colorado Sun* in the USA, which fosters *two-way conversations* that extend beyond traditional and social media journalism practice (Ferrucci & Alaimo, 2020, p. 501).

The significance of regional, local, and hyperlocal journalism has been reinforced by financial support initiatives in countries such as the United Kingdom (Heawood, 2022; Cheverton, 2022) and Sweden (Newman et al., 2023). Public funding can bolster even smaller media outlets (Tenor, 2018). The tension between conventional and digital media highlights the impact of technology on journalism, particularly the internet's role in expanding the sources for journalists (Hess & Waller, 2017, p. 96). The rise of digital media has been seen as a solution to news deserts (Nygren, 2019; Smethers et al., 2021), and is driven by low operational costs (Nielsen, 2015, p. 7), but even their survival remains challenging in regions that are struggling economically, seemingly hitting everyone equally because areas with no news presence have been expanding unstoppably, even in densely populated areas (Rackaway, 2024), prompting the formation of associations like the Lions International in the USA to support long-term financial sustainability or initiatives such as the GNI Startups Lab Argentina for the creation of media in news desert areas.

Digital formats have thus not yet managed to strengthen fully, often resulting in *ephemeral journalism* with a short lifespan (Salaverría et al., 2022, p. 10) at least in Latin America, a territory also marked by restructuring and the closure of press offices (Suenzo et al., 2020).

In this geographic context, local journalism faces challenges due to the "hegemony of large commercial media conglomerates" (Giovani-Vieira, 2021, p. 175), while *hyperlocal journalism* remains under-recognised (Rodríguez-Urra et al., 2023b).

Despite these challenges, *digital natives* have been considered in studies of news deserts (Kizilkaya, 2021; Lins da Silva & Pimenta, 2020), and these virtual spaces, including social platforms, were mentioned previously by Ferrier et al. (2016) in their proposal regarding media deserts and their layered media infrastructure.

Online spaces are increasingly central to proximity journalism, with "young journalists skilled in mobile and social media" (Adornato, 2022, p. 59) reflecting a new youth-oriented digital layer focused on internet access. This trend has led to a "suburbanization of the sphere" (Midões, 2021, p. 9), where easier and faster access to media is demanded and achieved.

Concrete precedents in the analysis of news deserts include the work of Lins da Silva and Pimenta (2020) in Latin American academia, and studies driven by private initiatives (FOPEA, 2021; IPYS, 2023) that reflect the growing concern in this emerging field. Additionally, studies have warned that one third of the newspapers functioning in the United States in 2005 will disappear by 2024 (Abernathy & Stonebely, 2023). In Spain, an initial map of news deserts (Negreira-Rey et al., 2023) already exists from the perspective of depopulation (*España vaciada* [Spain emptied]). However, according to Rodríguez-Urra et al., (2024) the Anglo-Saxon sphere currently leads global research in this area.

Context

In this study, we focus on the Aysén region of Chile, often considered remote, underdeveloped (Núñez-González & Aliste-Almuna, 2014), and poorly integrated (Pressacco et al., 2017) due to Chile's historically centralised technocratic administrative structure (Reyes-Herrera & Rodríguez-Torrent, 2015). The region's low population density, harsh climate and rugged terrain create a challenging geographical space that is difficult to traverse, inhabit, and connect (Durston et al., 2016, p. 225).

In the past decade, Aysén has witnessed significant social protests rooted in long-standing infrastructure and social service deficiencies (Contreras, 2022, p. 4). These protests reflect the grievances of *neglected citizens* demanding lower living costs, resource regionalisation, and infrastructure improvements (Pressacco et al., 2017, p. 168). In terms of the media, community radio stations played a crucial role in the region facing its imperfect democracy (Rodríguez-Ortiz, 2016, p. 146), with *Radio Santa María* acting as an important unifier and, inadvertently, as a spokesperson for the community in sharing news overlooked by the national media during the conflict (Observatorio Cultural, 2022). The *Patagonia sin Represas* protests opposed the extractivist export model exemplified by the HidroAysén dam project in defence of environmental causes (Reyes-Herrera & Rodríguez-Torrent, 2015).

In this context, the region also holds interest for social researchers, as "horizontal networks that reinforced community collective actions" have been established (Durston et al., 2016, p. 229). *Radio Madipro* (Madre de la Divina Providencia of Vicariate Apostolic of Aysén), founded in the last century with the mission of Catholic evangelisation, continues to promote community cohesion in remote areas (Osorio, 2020). Additionally, a part of the region's idiosyncrasy lies in cultural traits shared with Argentine Patagonia due to historical migration (Carrasco-Urrutia, 2021; Pressacco et al., 2017).

While Chile has historically excelled in Latin America in terms of digital connectivity and innovation (Rodríguez-Urra et al., 2023a), the Aysén region lags behind other territories, as evidenced by nPerf[1] data exploration across the country. It should be noted, however, that the government's current Fibra Optica Austral[2] project aims to improve Internet coverage and access in the area.

Chile's media lacks audience engagement, even in urban community radio, due to the Eurocentric homogenisation of university education in journalism known as *reporterística* (Araya, 2014). The national media landscape is dominated by a *press duopoly* in *El Mercurio* and *COPESA* (Dodds, 2017; Newman et al., 2023; Rodríguez-Urra et al., 2023b) with 90% of newspapers leaning to the right (Mellado & Scherman, 2020, p. 5). This duopoly controls most regional titles through extensive newspaper acquisitions, and it absorbs the bulk of advertising revenue (Mönckeberg, 2011).

Chile's media system is one of the most concentrated in Latin America, characterised by private ownership and commercially driven content (Mellado & Cruz, 2024, p. 5). This centralisation has limited public regional representation (Arriagada et al., 2015)

1 *Mapa de cobertura 3G / 4G / 5G de Entel Movil en Puerto-Aisen, Chile.* Nperf.com.
2 Fibra Optica Austral: fibraopticaaustral.cl.

and restricted coverage of local social movements in the national media (Bonifaz, 2016), although community media have managed to overcome these barriers (Rodríguez-Ortiz, 2016). This concentration of media ownership has marginalised regional, local, and hyperlocal media studies among Chilean researchers (Rodríguez-Urra et al., 2023b).

Regional and local television in Chile faces sustainability threats, despite a variety of ownership models (Sáez, 2024, p. 109). Community radio stations, essential for Chilean democracy, struggle against commercial dominance and regulatory obstacles (Rodríguez-Ortiz, 2016). Journalism outside Chile's capital city, Santiago, is recognised for its *degrees of prowess* (Bonifaz, 2016), yet there is a call for "proactive construction to reconnect citizens with professional journalism" (Labrín, 2023, p. 121). Criticisms of State planning highlight the barriers to media diversity and pluralism that constrain local voices (Bonifaz, 2016).

Research objectives

Aysén deserves a closer look, along with the Magallanes region, as a unique case in Chile in the absence of the national press duopoly. Given the region's particularities, which result from its social idiosyncrasy and remoteness and the growing concern about news deserts, we find the development of a pilot research project in the area pertinent that can be replicated at other geographical locations and social scales. As a starting point, we formulated the following research questions as the foundation for our investigation into the Aysén region, allowing us to explore the dynamics of information accessibility and the role of media in addressing this critical issue:

RQ1. Is the construction of a regional media map using open data feasible?
RQ2. What economic, technological, and sociocultural situations can we identify as triggering factors for news deserts in the region?
RQ3. Can media outlets mitigate the expansion of news deserts?

Our main objective is the construction of a media map of the Aysén region reflecting the growth of news deserts. Derived from this, our secondary objectives include:

a) establishing a methodology for identifying news deserts that can be extrapolated to other Latin American and global contexts
b) analysing the specific economic, technological, and sociocultural factors that contribute to media abandonment in the Aysén region
c) understanding the routines, singularities, motivations, and constraints of journalistic activity through contributions from professionals working in this unique Chilean region
d) proposing a constructive roadmap of possible actions and measures to help curb and reverse the situation

Materials and methods

We propose a triangular methodological approach that begins with an initial quantitative phase based on constructing a dataset[3] (Rodríguez-Urra, 2024) of media organisations in the territory, considering their impact on social networks. Additionally, we construct a media map to identify news deserts, in agreement with Gulyas et al. (2023), in order to approach the representation of the situation of a territory. To achieve this, we conducted an extensive search for Chilean media organisations, aggregating them in different formats:

a) Regional Association of Open Signal Television Channels in Chile (ARCATEL): Comprising 22 regional television channels, ARCATEL represents them at the central and national political level.
b) National Press Association (ANP): An organisation that brings together major Chilean print media, both nationally and regionally.

During this process, we encountered some inconsistencies. We were unable to obtain a list of radio stations affiliated with the Association of Chilean Broadcasters (ARCHI), nor could we communicate with the institution. Regarding digital media, there were limitations due to the absence of an entity that aggregates them or provides open reports on digital audiences, a scenario previously highlighted by Rodríguez-Urra (2023b).

Due to these limitations, we expanded our search to other data sources belonging to the State, including regulatory bodies and archives:

a) National Library (Biblioteca Nacional, BN) and Transparency Portal (Portal de Transparencia): Both institutions use the same registry of regional media. The BN receives voluntary registration requests, which are then forwarded to the Transparency Portal and consolidated at the Registry of Regional Media.
b) Sub-secretariat of Telecommunications (Subsecretaría de Telecomunicaciones de Chile, SUBTEL): This entity contains records of registered and approved media for operating sound broadcasting services, community radios, and open television services.
c) Ministry General Secretariat of the Presidency (Secretaría de Comunicaciones del Gobierno de Chile, SECOM): Administers the *Fondo de Medios de Comunicación Social* with calls for journalistic projects from regional media. It falls under Article 20 of the Budget Law, which requires Ministries and Services to allocate at least 40% of the item to media that are not part of conglomerates, holdings, or media chains.
d) National Cultural Heritage Service (Servicio Nacional de Patrimonio Cultural): The *Bajo la Lupa* project repository contains research conducted to study cultural collections and local identities.
e) Electoral Service (SERVEL): This institution monitors, supervises, and manages electoral processes. It is possible to identify the media outlets that are authorised to broadcast electoral propaganda from its reports.

3 Dataset Región de Aysén medios (septiembre 2022).

To expand our search, we turned to Google to identify local and hyperlocal news spaces with periodic publication. Here, we used a systematic search proposed by Negreira-Rey et al. (2020), a method replicated by Rodríguez-Urra (2023a) to create a Hispanic-American media map, considering scientific production hosted in major global reference databases. In this case, we adapted and executed the following equations: “news OR media AND (locality); newspaper OR digital newspaper AND (locality); diario AND (locality); radio AND (locality); television OR TV AND (locality); Canal AND (locality)”.[4]

While Negreira-Rey et al. (2020) only considered territories with over 20,000 inhabitants for the Spanish context, we did not set population limits due to the low population density of the territory. We excluded media whose addresses or radio/television transmission stations were located in regions outside Aysén. For social media spaces, we considered those with digital presence and a website. We excluded media with non-journalistic focuses, such as exclusively religious, sports, educational, tourist, or environmental media.

The dataset is openly available for download on Zenodo[5] and includes a total of 63 identified media outlets distributed across the ten municipalities that make up the Aysén region.

The media outlets on the final map were subjected to the social impact criterion which corresponds to September 2022. This indicator from Rodríguez-Urra (2023b) is composed of data from Twitter (now X), due to its widespread informative use in its early years (Herrero-Solana & Trillo-Domínguez, 2014), and whose followers were counted, also Facebook from its fan pages. In particular, this social network has a “more consolidated and broader presence in age groups and with greater transversality in all countries” (Rodríguez-Urra et al., 2023b).

The data are visualised using the open-source software SCImago Graphica, a tool that allows us to create graphs that combine information “with a high level of expressiveness and a user-friendly interface” (Hassan-Montero et al., 2022, p. 2). This exercise allows us to identify the news spaces that receive the most attention from their audiences on social platforms.

This data is also useful in the qualitative methodology, as we know which media are better positioned in the region. We assume that these are relevant institutions in terms of information, so it is a priority to approach them to understand their views and actions in order to understand the factors that cause the emergence of deserts and potentially fight against them.

To conclude the quantitative aspect, we have constructed figures that show the distribution of media formats in cities, as well as the map of the situation of deserts. In doing so, we rely on the *media ecology and content-focused* approach proposed by Gulyas et al. (2023) that examines the availability of media supply in a subnational territory. This is added to the population projected according to the Library of the National Congress of Chile (BCN).

4 For each space (locality), the toponym of the commune of the Aysén Region was entered.

5 Dataset Región de Aysén medios (septiembre 2022).

Table 1:
Data for the Aysén region

Commune	Projected population 2023 (BCN)	Number of media outlets	Sources by population (1,000 per capita)
Cisnes	5,865	8	1.36
Guaitecas	1,608	4	2.49
Aysén	25,180	13	0.52
Cochrane	3,731	3	0.80
O'Higgins	672	2	2.98
Tortel	582	1	1.71
Coyhaique	61,885	19	0.30
Lago Verde	915	3	1.09
Chile Chico	5,157	6	1.16
Río Ibáñez	2,711	4	1.48

Source: Compiled by the authors.

Table 1 presents data on the projected 2023 population and the number of identified media outlets across communes in the Aysén region of Chile. It can be observed that the number of media outlets correlates with population size, allowing us to infer a higher potential social metric in more densely populated areas. We use this background to focus our attention on the areas with the most journalistic activity for the qualitative aspect of our research. To better understand news deserts, it is crucial to further analyse these data by disaggregating media ownership – whether municipal or independent – to assess the plurality of information in the region.

We also consider news deserts to be territories in which only media outlets dependent on local municipalities operate (Nielsen, 2015; Abernathy, 2020; Rodríguez-Urra et al., 2024). In such cases, institutional dependence prevails, and a minimum level of informational plurality is not guaranteed. Considering the Aysén reality, we examine the media landscape, taking into account the absence of newspapers (Abernathy, 2016), as well as radio stations, television stations, and digital media, following the frameworks proposed by Ferrier et al. (2016), Lins da Silva and Pimenta (2020) and Kizilkaya (2021).

The number of identified media outlets correlates with the population, with a predominance of traditional formats. These outlets are part of a complex and unique scenario shaped by geographical characteristics. Consequently, we propose a new framework for categorising news deserts:

- *Low Risk:* Assured pluralism, diverse formats, and a medium to high number of media outlets
- *Moderate Risk:* Assured pluralism, but lacking format diversity, with a medium to high number of media outlets
- *High Risk:* Unassured pluralism and minimal media diversity
- *Desert:* Non-existent pluralism and/or an extremely low number of media outlets

Table 2:
List of media outlets in the region and metrics

Media outlet	Type	Facebook	Twitter(X)	Social impact	Commune
Santa María	Radio	49,000	28,000	High	Coyhaique
Ventisqueros	Radio	2,998	6,765	Medium	Coyhaique
Santa María	TV	34,000	6,588	High	Coyhaique
El Divisadero	Printed	34,662	13,700	High	Coyhaique
Vía Austral	Digital native	114,775	5,483	High	Coyhaique
Tehuelche Noticias	Digital native	10,341	2,554	Medium	Coyhaique
Milenaria	Radio	8,900	550	Medium	Coyhaique
Las Nieves	Radio	20,804	7,324	Medium	Aysén
Aysén TV	TV	6,763	128	Medium	Aysén
Panorámica Informativa	Digital native	10,000	70	Medium	Aysén
ComunicAysén	Digital native	4,283	60	Medium	Aysén

Source: Compiled by the authors.

Subsequently, we incorporated qualitative research, including non-participant observation in the region and conducting semi-structured interviews and case studies. We selected a series of media outlets from Puerto Aysén and Coyhaique, including those with high social impact (over 25,000 followers combined on Facebook and Twitter) across print, radio, television, and digital platforms, as well as medium-sized outlets (between 5,000 and 25,000 followers). Based on these parameters, we contacted and collaborated with willing media outlets for the research.

After analysing the metrics and assessing their interest in participating, eleven media outlets ultimately took part in the investigation:

Radio and Television Santa María, El Divisadero, and *Vía Austral* identified as media outlets with high social impact, and were approached through non-participant observation and semi-structured interviews. For other media outlets only interviews were conducted.

Fieldwork was carried out with the flexibility inherent to such initiatives (Jensen, 2014; Taylor & Bogdan, 2009), adjusting timelines to the dynamics and characteristics of each newsroom. The individuals participating in the research are listed and completed the requisite participation form model for the investigation.

Results

Characteristics of the media in the Aysén region

As an initial approach to the phenomenon of news deserts, we present the following map of Aysén and a graph depicting the distribution of audiences based on media types and geographical zones.

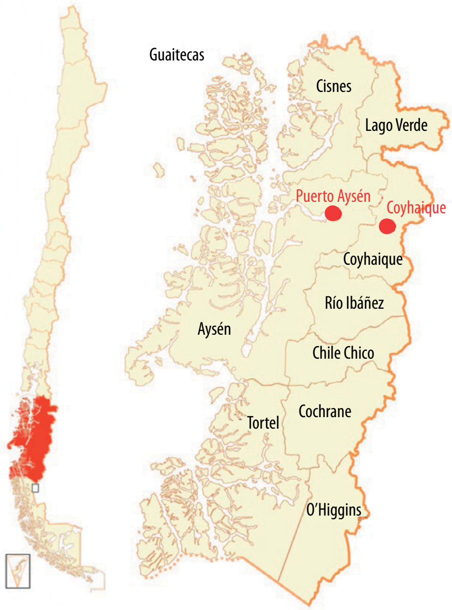

Figure 1:
The Aysén Region in Chile and administrative division by communes
Note: Triangular qualitative methodology applied to red dots on the map, the main cities of the territory.
Source: Compiled by the authors based on Mapa loc Aisén.svg, Wikipedia.

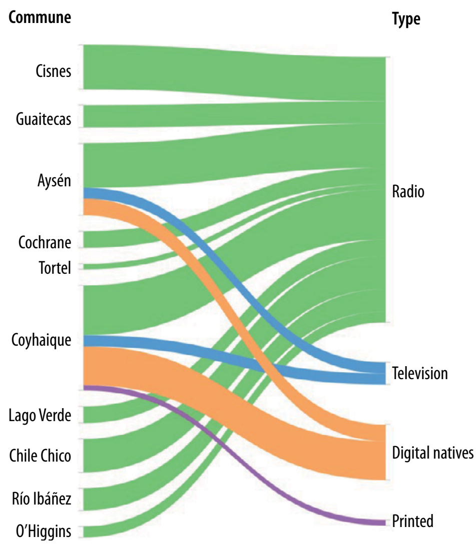

Figure 2:
Typology of media in the various communes of the Aysén region
Source: Compiled by the authors.

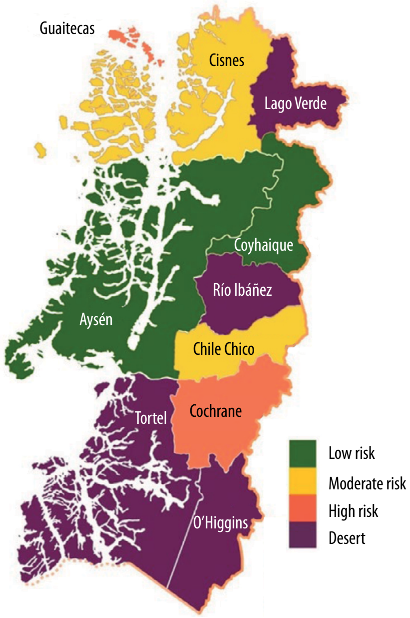

Figure 3:
Risk of expansion of news deserts in the Aysén region
Source: Compiled by the authors.

The 63 catalogued media outlets are primarily concentrated in the cities of Coyhaique (the regional capital) and Puerto Aysén. Radio dominates the region (48 outlets) and is present in all communes, including remote areas with low population density. Radio stations constitute 76% of the total, followed by digital natives (10 outlets, 16%), four television channels (6%), and one print outlet (2%).

The analysis of the media presence in the Aysén Region in Figure 3 shows that two out of ten communes (20%) are at low risk of being declared news deserts, and these are located in the main cities. Additionally, 20% of the territory is at moderate risk, another 20% at high risk, and 40% can already be identified as a news desert.

Lago Verde, Río Ibáñez, Tortel, and O'Higgins are classified as news deserts[6] due to the presence of municipally administered radio stations. In cases of high risk, there is a slight increase in media outlets lacking diversity (Cochrane), and while there is a certain degree of equilibrium between municipal and independent radio stations in Guaitecas, the situation in this commune was historically precarious,[7] along with not having other types of media.

6 In the southern municipalities, there has been a history of high volatility in ownership, subject to changes in local government, as well as informal and autonomous administrations, resulting in the intermittent functioning of local media.

7 Two decades ago, the former mayor of the municipality terminated the electricity supply to the *Estrella del Mar* radio station due to differences in ideological outlook. The case was subsequently referred to the Inter-American Commission on Human Rights (IACHR), which delivered a ruling in favour of the affected director of the radio station. See more at www.oas.org/es/cidh/decisiones/2016/CHPU12799ES.pdf.

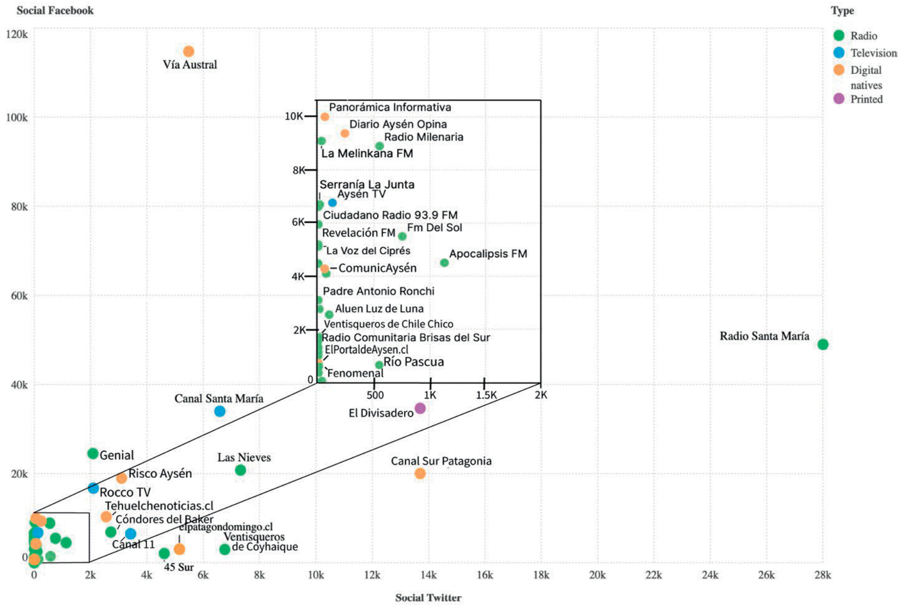

Figure 4:
Metrics analysis between Facebook and Twitter
Source: Compiled by the authors.

In Figure 4, we present a graph that illustrates the metrics comparison between Facebook and Twitter (X). Key observations are that the best-positioned medium in the region is the digital outlet *Vía Austral* which stands out in terms of followers on Facebook. Another well-situated media outlet is *Radio Santa María* with outstanding activity on Twitter. Following closely, the newspaper *El Divisadero* exhibits notable metrics on both social networks. The *Televisíon Santa María* channel, an affiliate of the aforementioned radio station, also holds a prominent position. We attribute Vía Austral's leadership on Facebook to its consistent activity on the platform since its foundation in 2015, during the widespread adoption of Facebook. Meanwhile, *Santa María* has strengthened its presence on Twitter, positioning itself as the region's primary conventional media outlet. This boost is also due to its involvement in social causes in the region over the last decade, as well as a network of stations under agreement within Madipro radio stations. These leading media outlets are based in Coyhaique, the capital city with the highest population in the region.

Reference media profiles from non-participant observation

Non-participant observation was conducted between January and February 2023. During this period, our research focused on the media outlets *El Divisadero, Radio Santa María,* *Televisión Santa María,* and *Vía Austral* – representatives of each typology due to their high social impact indices and availability for observation.

The non-participant observation aimed to explore media profiles based on the following topics:

- team sizes and profiles
- professional routines and journalistic innovation
- business models
- relationship with audiences on social networks and geolocation

Traditional media have small teams (5–6 members), while native digital media often work with a single person (in this case the founder, a young amateur communicator who used to work for a local broadcaster). Traditional media employ university-trained professional journalists with defined roles within a hierarchical structure, with journalists supported by audiovisual specialists. In contrast, digital media do not have dedicated staff and rely on occasional collaborators, resulting in inconsistent and amateur journalistic activity, with irregular participation in the city's press events.

Routines vary based on the type of media. Radio and television follow a traditional dynamic, responding to the immediacy of information for producing three daily news broadcasts. However, investigative journalism is limited, and there are no editorial meetings to decide on topics during the day.

Newspapers, conversely, engage in long-form journalism and multimedia content. Without audiovisual communicators, journalists explore possibilities for storytelling. For example, during a virtual press briefing, the team discussed mobile apps and recording for social networks.

Mobile journalism is now a widely adopted practice. At *Televisíon Santa María,* journalists have replaced traditional live TV camera links with the Zoom app on their mobile phones. One observed example was the inauguration of the Coyhaique bus station, where the section chief personally recorded videos using her mobile phone. However, conventional cameras are still used on specific occasions to obtain cleaner shots. This practice eliminates the need for bulky transmission equipment and enhances mobility. Furthermore, Zoom is also used to monitor court cases from the newsroom, saving time and resources.

Unlike *Santa María, El Divisadero* fosters a telematic organisational culture, prioritising multimedia content such as photographic reports, Facebook livestreams of Coyhaique press briefings, and audiovisual recordings of editorial columns and interview programs such as "Café Diario". *Vía Austral,* meanwhile, aligns with social media logic and viral content, focusing on Patagonian culture and dynamic livestreams about Coyhaique, which have garnered a significant following. Its communicator replicates television formats, blending studio and outdoor livestreams with real-time audience interaction via Facebook Live. Production remains sporadic, relying on software for scheduling and Canva for editing.

Advertising dominates as a business model, reflecting a traditional Chilean media approach. While conventional outlets maintain viability without alternative funding, *Vía Austral's* pursuit of advertising revenue has heightened its engagement with small businesses and civil organisations, as well as sponsorship of cultural and sports initiatives. Commercial logic thus drives its primary activities.

Audience engagement can be examined from two angles: their integration into social networks and the production of geolocated news content, viewed through the lens of news deserts.

Santa María maintains its own sources of information, but does not incorporate user comments. The director minimally updates social networks with Canva designs. Conversely, *El Divisadero* integrates user comments into its news coverage, as seen during an attempted jailbreak in Coyhaique, where netizens shared initial information that journalists reported. The press director also analyses livestreaming statistics to identify popular topics for further investigation. Notably, the paper's youngest journalist is the only one who regularly uses emoticons to communicate with the public, while *Vía Austral* often uses colloquial, youthful language.

The centralisation of information in Coyhaique is a complex issue, and challenging to avoid. From *Santa María's* perspective, during a typical day, only two out of ten news stories concern territories at risk of, or already in a news desert condition. A similar situation is true for *El Divisadero* which concentrates its activity in Coyhaique, primarily due to the extensive presence of public and private organisations during press briefings.

Non-participant observation has highlighted key local realities that are essential in understanding the challenges faced by regions that are increasingly becoming news deserts. The teams are small, and conventional media differ from digital native in terms of regularity of news production and solid organisational structures. *Santa María* prefers internal sources in contrast to *El Divisadero.* Print media have innovated with multimedia, attracting cybernauts, while radio and television focus on traditional journalistic products, although they use some hybrid technologies. Digital media rely heavily on social networks and often cover non-news topics. In Coyhaique, journalistic activity is strong, but news from other communities is scarce, exacerbating the news desert problem.

The problem of news deserts viewed from the main cities

As a complement to non-participant observation, our investigation into news deserts is enriched by 16 semi-structured interviews conducted with professionals and communicators from Coyhaique and Puerto Aysén. These cases allow us to delve into the routines and dynamics of journalism from regional, local, and hyperlocal perspectives.

The interviews address the following key topics, aiming to comprehend the factors contributing to the news desert phenomenon in the Aysén region:

- limited news production in remote areas
- criteria of information relevance
- business models
- influence of audience and regional media concentration
- financial weakness of media enterprises
- tensions between the media and local authorities

A shared reflection from the interviewees highlights the challenge of providing news coverage in areas where current events are extremely limited. The director of El Divisadero acknowledges that the news reaching the editorial team does not meet minimum standards of periodicity: "Of course, you can't ask for news every day because not every day significant events occur in a small commune." Similarly, the head of *Santa María* notes that despite their agreements with various community radios, the news reaching the editorial office remains scarce.

Regarding journalistic practices, *Milenaria* in Puerto Aysén often reports on nearby areas when events disrupt productivity, industry or connectivity. Aysén TV's founder highlights their focus on significant local news, such as the opening of a gas station in the news desert of Villa Cerro Castillo. *El Divisadero's* director notes that in remote areas, political topics, elections, tourism, and culture are more prominent and generate interest.

The mainly Coyhaique resident audience shapes proximity-based coverage, with *El Divisadero's* web administrator noting that readers from other communes are less engaged. The founders of *Aysén TV* and *Panorámica Informativa* criticise the concentration of administrative and informational activities in Coyhaique, despite Puerto Aysén's economic importance. *Panorámica Informativa* (whose owner had previously worked as an audiovisual correspondent for a major television station in Chile, *Televisión Nacional de Chile, TVN*) also notes that Coyhaique's dominance skews public perception, causing confusion.

Economic constraints hinder staff expansion, broader geographical coverage, and the development of investigative journalism. The former director of *Tehuelche Noticias* highlighted the structural challenge for hyperlocal and local independent media to produce quality journalism due to insufficient sponsorship, suggesting new media laws to grant small outlets access to State funds, similarly to the press duopoly. Additionally, funding limitations prevent *Panorámica Informativa* from establishing correspondents in other municipalities, mirroring *ComunicAysén's* struggle to deliver its monthly printed magazine across the region.

Conventional outlets like *Santa María* and *Milenaria* halved the number of journalistic staff due to the Covid–19 pandemic, and *Ventisqueros* reduced from three journalists to one. In contrast, *Las Nieves* has maintained its staff, and the collaborator and journalistic team at *El Divisadero* has even grown. In this latter case, the manager explains that the discontinuing of their print version was due to high production costs.

Another factor contributing to news deserts is the tension between media and local authorities. Aysén TV's director notes that many conventional media outlets were initially founded by political figures, and political or corporate sponsors often discourage local media from scrutinising those in power, fearing financial repercussions. *El Divisadero's* director suggests that antagonising local institutions can result in missed opportunities and support.

One specific case exemplifying this dynamic is the closure of *Radio Madipro* in Villa O'Higgins, which had formerly broadcast *Santa María's* content. According to the director of *El Divisadero,* ideological pressure from a former mayor led to its closure, exploiting the lack of broadcasting rights regulation. Consequently, the station became "another arm of the municipality" during that authority's tenure.

Reflecting on municipal radio stations, the former director of *Tehuelche Noticias* notes the limited diversity of their perspectives and the reliance on the same news sources. This is in line with the webmaster of *El Divisadero* who stresses that information from remote areas is not impartial, which is why the newspaper itself prefers contacts close to the media.

From the findings of non-participant observation and interview analysis, we can identify several causes of weaknesses in the media landscape as news deserts spread:

- information trickle from remote areas and challenges in journalistic coverage due to geographical and connectivity limitations
- concentration of informational activity resulting from the dominance of institutions and corporations in populated areas
- inability to develop comprehensive geographical coverage and diversify formats and audience connections due to economic weaknesses of media companies in the region
- influence and pressure from institutions restricting informational activity in local media ecosystems

Constructive proposals to avoid news deserts forming

By combining non-participant observation and semi-structured interviews conducted in the region, we can propose a roadmap for combatting news deserts that we believe to be fully applicable to other territories, both in the Latin American context and globally. As a counterbalance, we identify a practice historically not inherent to journalistic enterprises: collaboration. Establishing a network of alliances and synergies allows for content dynamism and complementarity.

Even among competing media outlets, there are bonds – a characteristic observed in Puerto Aysén. For instance, *Aysén TV* collaborates with *Panorámica Informativa* due to their limited journalistic staff. They share content when one outlet cannot attend a press event. Similarly, *ComunicAysén,* a digital native media, has found value in its alliance with conventional *Canal 11,* a partnership which has facilitated content creation and supported the publication of their monthly print version. Milenaria's presenter and director also maintains partnerships with *Auténtica* and *Voz del Mar,* radio stations in Cisnes and *La Voz del Ciprés* in Guaitecas, allowing for content exchange and audience reach. Another example is the collaborative reporting by the author of the fan page *ViveElDeporte* for *Las Nieves* in Puerto Aysén.

In Coyhaique, collaborators have distinct roles at *El Divisadero* and *Santa María.* At *El Divisadero* they act as informants from communication offices, linking remote sources with the outlet. In contrast, *Santa María* connects with community radios across the region, a network rooted in the infrastructure set up by a Catholic missionary decades ago, which continues through *Madipro* and municipal stations. *Ventisqueros* also runs a radio network with local coordinators feeding information to Coyhaique-based journalists and collaborating with *Radio Fenomenal.*

Vía Austral gains credibility through occasional citizen reports. Its founder gathers audiovisual content, photos, and audio messages from across the Aysén region via WhatsApp, travelling to communes as needed. This mobile journalism allows for live reporting on connectivity issues, infrastructure problems or traditional fairs – a practical approach for a self-managed outlet. The founder's main goal is to highlight both the positive and negative aspects of the region, setting it apart from national media portrayals. El Divisadero's director, criticising Chile's concentrated press industry, advocates for purely local journalism free from national content. He points out that "the content of El Mercurio's regional newspapers is sent to Santiago, where they decide what is published and what is not [...] the conditioning is brutal". This view aligns with one of the *El Divisadero* journalists who noted that "the region is often skipped over by the national media [...] leading to a lack of knowledge about the territory" among Chileans.

Mobile journalism is a constructive practice for professionals, amateur communicators, and citizens. Its significance grew during the Covid pandemic, making it an indispensable element in journalistic routines enabling the creation of content and spaces for local and hyperlocal community engagement. At *Milenaria* the director frequently reports using mobile applications, a practice also adopted by *Las Nieves* for remote interviews via Zoom. These practices allow connections to distant news sources and save time for media outlets, as observed in *Santa María.* Additionally, new formats emerged during the pandemic, exemplified by El Divisadero's transition from print to digital, resulting in more human-interest news and deeper engagement on social media to navigate the challenges posed by the Covid pandemic.

The pandemic boosted digital natives in audience reach, innovation, and local engagement. After *El Divisadero* ceased its print edition, the digital outlet *ComunicAysén* wanted to position itself as the sole source with the print publication as a motivator. *Panorámica Informativa's* director observed that during the Covid–19 lockdown, their news segment and morning show in Puerto Aysén gained followers via Facebook livestreaming, attributed to people seeking ways to pass the time. In response, *Panorámica Informativa* incorporated regional music and local interviews to strengthen their identity, also attracting attention from Argentinean Patagonia due to familial ties in the Aysén region.

Vía Austral intensified its activity due to audience demand for information. The pandemic prompted a proliferation of livestreams and real-time updates on Covid from *Tehuelche Noticias,* covering infection rates and measures to combat the emergency. This heightened journalistic activity had already been evident during the coverage of Chile's 2019 social protests. The former director of *Tehuelche Noticias* emphasises that their left-leaning and counter-hegemonic press positioning has cultivated a niche viewership, promoting pluralism and diverse perspectives within their community.

Conventional media outlets also deepened their connection with local audiences during the pandemic. The director of *Las Nieves* highlights how the radio served as a bridge, channelling the community's sense of unity during the emergency. By conveying public concerns to local authorities, the radio became an authentic utility for the community.

In summary, we propose focusing on the following practices from these media outlets as models to implement in other contexts threatened by news deserts:

- Collaboration networks among media outlets: collaborative practices are widespread, as seen in Puerto Aysén due to the small size of media teams.
- Reliable collaborators in remote areas: some media outlets have trusted collaborators in distant regions, facilitating access to contacts and necessary information. Additionally, partnerships with community radios, as exemplified by *Santa María,* enhance coverage.
- Vital role of mobile journalism: mobile journalism is now integral to journalistic work, allowing hybridisation of professional profiles and improved audience connections.
- Impact of the Covid pandemic on media: the pandemic prompted digital media outlets to strengthen audience relationships and grow through Facebook livestreaming. *El Divisadero,* a prominent print medium, shifted its agenda to focus on more human-interest stories and new formats.

Discussion and conclusions

This research highlights the current state of the Aysén region's media system and related journalistic practices, in the context of the news deserts problem, as a pioneering approach in understanding and combating this new media crisis, taking advantage of the experiences analysed in this Chilean reality. Based on our experience in the region, we propose to reconcile the weaknesses of the local media reality with the opportunities identified through the analysis of the work dynamics and the experiences of professionals working in the field.

From this perspective, the value of audiences and their collaboration are relevant points for the media, as practiced by *Vía Austral* and citizen content (Harte et al., 2018), or the search for and deepening of news content in the digital sphere (Hess & Waller, 2017), as practiced by *El Divisadero.*

In this field, collaborative alliances between media are a finding registered in this area, corresponding to an extension of the state-of-the-art in terms of the study of subnational media systems (Ferrucci & Alaimo, 2020) where there is no competition between the media, but rather a spirit of cooperation (Jenkins & Graves, 2022). This interrelationship takes place between intercommunal media to obtain news content in a context of small journalistic teams and limited resources. In order to reverse news deserts, the proposal is to expand alliances between traditional media and native digital media, taking into consideration the way that these digital spaces can help to reach places where traditional media do not (Abernathy, 2020). The creation of new information spaces that allow diversification of sources act as a counterweight to municipal media to ensure information plurality (Nielsen, 2015; Abernathy, 2020; Rodríguez-Urra et al., 2024) with a focus on areas at risk or that have been declared news deserts in our study, or the concentration of actions to create more information spaces outside the most populated areas, as was the case with the Puerto Aysén – Coyhaique axis. Audiences are at the heart of most media.

Research highlights the central role of audience engagement in building mutual trust between the media and the public (Adornato, 2022; Hess & Waller, 2017; Nielsen, 2015). This dynamic is also evident in this Chilean region, where community cohesion (Carrasco-Urrutia, 2021; Durston et al., 2016; Contreras, 2022) has long been a defining feature. In line with findings from other contexts (Amigo, 2023; Wahl-Jorgensen et al., 2022), media–citizen engagement intensified during Covid–19, underscoring the importance of geographically focused media. This period saw the reinvention of news to emphasise human stories rooted in the locality (Hess & Waller, 2017) and the consolidation of information spaces on social platforms like Facebook, which resonate strongly with younger communicators and journalists (Adornato, 2022). The digital media *Tehuelche Noticias* exemplifies alternative press in the local context (Dodds, 2017), enhancing local pluralism by addressing social causes aligned with the region's protest history. While Observatorio Cultural (2022) notes *Santa Maria's* key role in past social mobilisations, it now focuses on conventional journalism, lacking audience engagement. This shift may reflect the uniformity in Chile's journalism education guidelines (Araya, 2014). We also see how Suenzo et al. (2020) comments on the journalistic ventures of people who have previously worked in the conventional media: here we can highlight the cases of *Vía Austral* and *Panorámica Informativa*.

Journalists and communicators in the Aysén region are motivated to distance themselves from national media, perceived it as marginalising the region and as benefiting from significant economic advantages through the press duopoly (Mellado & Scherman, 2020; Mellado & Cruz, 2024; Dodds, 2017; Rodríguez-Urra et al., 2023b). This aligns with the economic challenges of practicing journalism outside Santiago (Bonifaz, 2016; Sáez, 2024; Rodríguez-Ortíz, 2016), particularly in Aysén, where independent journalism faces significant hurdles. Labrín (2023) advocates for public policies in Chile that reduce barriers to new media serving diverse communities, which would encourage people to approach the media in a Chilean (Mellado & Cruz, 2024) and global context of distrust (Newman et al., 2023; López-García et al., 2024).

Such state support is crucial for strengthening local and hyperlocal media (Tenor, 2018), especially in a context where digital media face low survival rates in Latin America (Salaverría et al., 2022), and traditional media outlets in Aysén continue to struggle post-Covid–19 pandemic. To combat news deserts, the State must take a more active role by increasing funding or expanding access to State advertising, echoing models elsewhere (Heawood, 2022; Cheverton, 2022; Newman et al., 2023) and excluding fees to media (Ferrucci & Alaimo, 2020).

The collaboration between media professionals and local communicators has proven beneficial, as seen in the United States, where it has spurred training and union activities within digital media (Abernathy, 2020) and fostered strong dialogue-based communication with audiences (Ferrucci & Alaimo, 2020). In Spain, Galletero-Campos et al. (2024) suggest that local governments should strengthen independent local media as an agent capable of energising community life in depopulated areas. This is also a key issue in Aysén due to its low population density. It is crucial to expand journalistic efforts to other communes and promote collaboration and specialised journalism (Jenkins & Graves, 2022) in remote areas (Mesquita, 2023), as current journalistic activities are concentrated in densely populated areas. Journalism in the region remains conventional, although mobile journalism is on the rise despite the disadvantageous development of technological connectivity.

It is plausible that professional organisations, such as the Chilean Journalists' Association (Colegio de Periodistas de Chile), could join the effort to lead these changes. By examining the experiences of other cases (Ferrucci & Alaimo, 2020; Jenkins & Graves, 2022; Galletero-Campos et al., 2024), it is possible to examine the potential for efforts among the various stakeholders to strengthen local journalism in order to combat news deserts, thereby assisting in mitigating the potential problem of misinformation at the local level (López-García et al., 2024; Garde-Eransus & Salaverría, 2024) and manipulation caused by the lack of media (Trillo-Domínguez, 2023).

We believe that these actions will lead to greater civic participation and representation in the media, promoting democratic values and the control of power based on the relevance of the local sphere to the lives of individuals (Hess & Waller, 2017; Nah & Chung, 2020).

Methodologically, we have demonstrated the feasibility of constructing a regional media map using open data by integrating multiple complementary sources and conducting a systematic search. Given the absence of an initial list of radio stations and digital media from journalistic organisations, we turned to alternative public databases and search methods (Negreira-Rey et al., 2020). Although searching on social platforms can be included, caution is warranted due to the risk of pseudo-media, even at the local level (Garde-Eransus & Salaverría, 2024). Developing a matrix to differentiate news spaces is crucial for future research, as it would allow the consideration of *local media transparency* (López-García et al., 2024, p. 137) levels as a criterion.

Our map shows that large cities concentrate the largest number of media with a diverse typology. There is a certain plurality of information in them, encouraged by the new digital media.

In the case of the region studied, the territory's remoteness (Reyes-Herrera & Rodríguez-Torrent, 2015) is particularly significant, compounded by adverse weather, challenging terrain and depopulated zones (Durston et al., 2016). These factors contribute to the underdevelopment of internet infrastructure and the limited presence of digital native media. Notably, there is a strong presence of radio stations which serve as effective communication channels in a region characterised by fragmented physical geography and vast distances. However, the predominance of municipally owned stations raises concerns about information plurality. Despite this limitation, the proliferation of radio stations, supported by the local population, represents a valuable opportunity for combatting news deserts. It also offers new research avenues through which to explore local and hyperlocal media in regional contexts (Rodríguez-Urra et al., 2023b).

Looking ahead, this research paves the way for developing regional media maps that can elucidate on the realities faced by local and hyperlocal media organisations, both in terms of companies and professionals working under highly challenging conditions. Such efforts are crucial in proposing constructive strategies to counter the threat of news deserts – a growing area of global research – and for ensuring the continued presence of professional journalism as a cornerstone of democracy.

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ARTICLE

Perceptions of Self-Efficacy with Misinformation

Evolution towards Resilience Among European Citizens (2018–2022)

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Resilience to misinformation has been conceptualised and defined as an intangible resource belonging to a country, a measure of the capacity of its citizens to deploy discerning and cognitive skills to determine the veracity or falsehood of information, as well as be aware of the degree of the problem. This conceptualisation allows for value to emerge from cross-country and cross-time analyses of data on perceptions of self-efficacy in curbing misinformation. Using data from Eurobarometer, this research conducts analyses at whole-country level, and 1. identifies key components of individuals' perceptions about their resilience to misinformation; 2. produces a factor with which cross-time observations can be operationalised; 3. shows evolution over time (2018–2022) for European citizens from 27 countries. Overall, results disclose a growing trend, and this is so for both specific individual attitudes and skills, as well as the resulting factor as a whole. The causes and implications of the findings are discussed to provide hints on how to improve public policies, such as taking into account self-perceptions

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of efficacy in fighting misinformation alongside media literacy strategies that engage citizens in curbing misinformation.

Keywords: misinformation, resilience to misinformation, self-efficacy beliefs, European Union, intangible resource

Introduction

How are the beliefs of European citizens evolving with regard to their self-efficacy and resilience to misinformation? This is the key question addressed by this research because a better understanding of how citizens react to misinformation will help achieve better policymaking to fight the damage associated to this phenomenon. *Misinformation* is used here as an umbrella term to describe *information disorder,* including both intentionally and unintentionally disseminated incorrect or misleading information.

The question of how to curb information disorder has gained much attention globally. The European Commission states in its *Action Plan against Disinformation* (2018) that the scope of the misinformation problem is challenging European values and freedoms, eroding institutional trust, increasing polarisation and interfering in public policy decision-making processes. For their part, national governments are trying to strengthen their regulatory policies to combat hate speech and online misinformation, including regulatory initiatives to impose accountability obligations on social platforms (Helberger, 2020). As Tenove (2020) explains, policy responses against misinformation are aimed at protecting three normative democratic benefits: self-determination, accountable representation and public deliberation.

This research is founded on the assumption that these attempts could be reinforced with better knowledge about how individuals perceive their reactions and behaviours in relation to misinformation. Coping with misinformation is certainly not only about policies and barriers to physically stop the dissemination and monetisation of misinformation content production, but it is also about fostering the skills and knowledge of citizens in developing adaptive behaviours to face the challenges generated by misleading and fake information (Golob et al., 2021; Hopp, 2022).

The literature offers clues on how to explore the way citizens curb misinformation. European cultural dimensions (Arrese, 2024) and sociodemographic characteristics are relevant for a better understanding of how citizens struggle with misinformation. Previous research looks at a number of variables in analysing what is associated with curbing misinformation, including age – *youth* (Baptista et al., 2021; Golob et al., 2021; Rodríguez-Pérez & Canel, 2023), education – *the higher educated* (Baptista et al., 2021; Humprecht et al., 2023; Rodríguez-Pérez & Canel, 2023; Staender et al., 2022), gender – *women* (Golob et al., 2021; Humprecht et al., 2023) and political ideology (Baptista et al., 2021; Rodríguez-Pérez & Canel, 2023; Roozenbeek et al., 2020), with findings indicating, for example, that left leaning people tend to cope better with misinformation.

These findings are clearly illustrative for better policymaking, but they derive mainly from explorations of sociodemographic variables. What is missing is knowledge about self-perceptions of skills and attitudes, and also on how these self-perceptions can help in conceptualising resilience to misinformation in such a way that cross-country and cross-time comparisons can be established. Certainly, one ever-challenging issue in analysing misinformation is capturing information on the actual performance of individuals: there are always gaps between perceptions of self-efficacy in curbing misinformation and actual behaviours in curbing it.

This paper builds upon previous research that conceptualises *resilience to misinformation* as an intangible resource (Rodríguez-Pérez & Canel, 2022; 2023) and, by doing so, a) value is attributed to data on self-perceptions; b) factors are identified as composing said resilience to misinformation; c) relations between the latter and other intangible resources such as trust, engagement and legitimacy can be established; and d) suggestions are provided to operationalise observations of this intangible resource for comparisons across countries and over time. Such conceptualised resilience to misinformation is a construct that allows for analyses that assume a positive value may emerge regarding the curb of misinformation from interactions between citizens and public sector organisations.

Research question

RQ: *How has the resilience of European citizens to misinformation evolved over time?*

This paper is founded on data on self-perceptions of attitudes and behaviours towards misinformation. Based on the available data at Eurobarometer (not all barometers include items on misinformation), the timeframe covers 2018 to 2022. It is hoped that this research can inspire the efforts of European and member states in combatting misinformation by enhancing public awareness of and literacy in discerning between accurate and false information.

The paper is structured as follows: first, theoretical fundamentals are presented, including preliminary clarifications to frame the analysis of resilience to misinformation; second, specific items (media literacy and attitudes toward dealing with misinformation) that compose resilience to misinformation are then detailed; third, the data and methods, including details of the sample, measures and statistical techniques are described; fourth the results section presents verification of the hypotheses. Finally, we discuss the theoretical and practical implications.

Preliminary clarifications on the approach

This research is founded on previous research that conceptualises resilience to misinformation as an *intangible resource* (Rodríguez-Pérez & Canel, 2022; 2023). This is supported by Canel & Luoma-aho's (2019, p. 77) definition of an intangible asset for the public sector, the key point of which is the idea that value may derive from communicative interactions between organisations and stakeholders, and it is in this kind of interaction that misinformation develops. Based on the literature review, the cited research proposes that the concept of the citizenry's resilience to misinformation be understood based on attitudes and behaviours that allow citizens to develop the capacity to be aware of and address the problem themselves, that is, to identify the risks and effects that misinformation causes for them, and to develop abilities (for instance, skills and knowledge) that allow them to overcome the threat. Using the construct of resilience to misinformation, the mentioned research refers to an array of citizen attitudes and behaviours in coping with misinformation content.

With data from Spain, previous research also explores whether factor analysis could help in synthesising information on citizens' attitudes towards misinformation (Rodríguez-Pérez & Canel, 2022). A factor analysis showed that resilience to misinformation is composed of different *attitudes and behaviours,* and from those resilience to misinformation was conceptualised and operationalised as an intangible resource and defined as "an intangible resource belonging to a country that measures the capacity of its citizens to deploy discerning and cognitive skills about the veracity and falsehood of a piece of information, as also to be aware of the scope of the problem" (Rodríguez-Pérez & Canel, 2022, p. 862).

Exploration of relationships between this intangible resource and the citizens' assessments of public sector organisations (more specifically, how they assess legitimacy and trust) turned up helpful insights about how governments can fight misinformation. Subsequent research (Rodríguez-Pérez & Canel, 2023) expanded the exploration from Spain to other European Union countries, and focused on the analysis of the relationships between this intangible resource and other intangibles that may derive from people's assessments of media performance.

Conceptualising resilience to misinformation as an intangible resource provides hints on how to identify whether intangible value can be derived from people's reactions to misinformation; and if it can, that could also allow the exploration of other intangible resources that could potentially increase it. It might open avenues to developing something positive setting out from misinformation. For instance, if it were the case that citizens from a specific country are more resilient to misinformation the more highly they assess the legitimacy of public organisations to be, country governments would find clues there to foster such resilience.

While the analysis of this intangible resource has been operationalised in-country and cross-country, thus far there is no cross-time comparison to ascertain the evolution of resilience to misinformation. This is the goal of the present research with the RQ: *How has resilience to misinformation evolved over time in European citizens?*

Conceptualised as an intangible resource, resilience to misinformation is composed of different attitudes, skills and competencies, and research exploring the latter is helpful in identifying what should be brought into the analysis. The literature describes the attitudes of individuals to dealing with misinformation (Holland et al., 2024); it explores media literacy interventions to identify accurate information (Lee et al., 2024); and delves into attitudes to increase the likelihood of verifying content (Golob et al., 2021). Additionally, self-perceived measurements of exposure awareness to misinformation tend to be used to determine country-specific factors related to political and information environments (Boulianne et al., 2022; Humprecht et al., 2023; Rodríguez-Pérez & García-Vargas, 2021; Stubenvoll et al., 2021). The following sections detail the skills and attitudes associated with this intangible resource.

Media literacy to cope with misinformation

In this study, we consider individuals to be the core of any program, public policy, or effort in curbing misinformation. As a concern, misinformation must be addressed by individuals who are the principal participants in the struggle with, or in overcoming the risks around, problematic information. In the eyes of the European Commission (2018), coping with misinformation requires the active participation of civil society. *The Strengthened Code of Practice on Disinformation* (European Commission, 2022b) acknowledges the importance of empowering citizens who can distinguish and flag misinformation to mitigate its impact. Additionally, this code emphasises the necessity of promoting media literacy and critical thinking to equip citizens with the knowledge and skills needed to curb misinformation. In this sense, Sádaba and Salaverría (2022) indicate that these strategies are intended to foster a sense of responsibility among citizens, enabling them to assess autonomously the information they receive. Audiences, as prosumers of information, need to acquire an array of literacies to be aware of the scope of the misinformation problem.

Media literacy comprehends a wide range of definitions and approaches with the foundation of various kinds of skills, knowledge, or beliefs, among other things (Potter & Thai, 2019). Media literacy interventions have several potential benefits: in activating corrective action against misinformation (Xiao & Yang, 2024), in the rejection of misinformation and conspiracy theories (Ashley et al., 2023), in improving accuracy discernment of news headlines (Sirlin et al., 2021), and in people understanding better how news media works (Murrock et al., 2018).

Furthermore, the citizens' societal awareness against misinformation is related to, as Tully et al. (2022) state, individual media literacy behaviours that favour the capacity to discern accurate and reliable information from misinformation. Hence, Cunliffe-Jones et al. (2021) propose a definition of misinformation literacy that refers to understanding the possible formats for both misinformation and accurate information, how they are created, spread and consumed, as well as the ability to distinguish between them. Serrano-Puche (2021) indicates that the misinformation problem derives precisely from insufficient media literacy skills among citizens. Tully et al. (2022) explain that media literacy – in all its dimensions: news literacy, information literacy, digital literacy and misinformation literacy – is an approach toward citizens acquiring the knowledge and skills with which to navigate the current information ecosystem, being aware of and able to struggle with the misinformation problem. In fact, Vraga et al. (2021) explain that literacy development promotes the critical and thoughtful engagement of citizens with news content, allowing them to differentiate truthful content from falsehoods and other non-informative content, to identify misinformation and evaluate news quality through verification techniques. Pennycook and Rand (2019) conclude that the lack of analytic thinking contributes to an increase in the vulnerability of citizens to misinformation.

To further explore media literacy in detail, Vraga et al.'s (2022) association of this concept with an array of knowledge and skills that enables individuals to discern the accuracy of information is of help. These authors posit that individuals have to feel their ability to discern, which is what the authors call *self-perceived media literacy,* which refers to individuals' perceptions of their abilities and confidence in their news media literacy skills. In this regard, differentiation must be made between individual self-perception of knowledge and skills from true knowledge and skill performance. For this reason, from a critical standpoint, Potter and Thai (2019) argue that several studies do not measure media literacy performance but rather the beliefs or attitudes of individuals regarding the individuals' self-perception. Additionally, these authors also indicate that when individuals have robust self-efficacy beliefs, they are more likely to learn more and to use that learning. Complementary, cognitive models affirm that individuals need to feel both in control of their media consumption and the media's influence on them in order to become media literate. This has been the case in studies (Vraga et al., 2022; Xiao and Yang, 2023) that asked participants about their confidence in their ability to interpret media messages.

Despite the subjectivism of self-perception data, this paper places value on how individuals report their attitudes towards misinformation and, by delving into self-attitude beliefs, examines whether or not European citizens are better equipped nowadays to curb misinformation.

Attitudes to coping with misinformation

The study of misinformation incorporates the theoretical framework of beliefs of self-efficacy in coping with misinformation. Self-efficacy beliefs promote cognitive processing and critical thinking that support the ability to assess and discern factually accurate information and misinformation (Hopp, 2022). According to Bandura (2006), perceived self-efficacy is a judgment of citizens' beliefs in their capabilities to produce given attainments. Borah (2022) points out that self-efficacy perceptions address the individual's feelings, motivations and behaviours, and based on social cognitive theory, this scholar proposes the concept of *misinformation efficacy* to refer to the perception that individuals have that they can distinguish false from accurate information.

Previous studies have provided hints about the extent to which the approach of self-efficacy beliefs contributes to success in facing problematic information, considering identifying fake and accurate information (Hopp, 2022; van Zoonen et al., 2024), avoiding sharing news that appears to be inaccurate (Paciello et al., 2023), disengaging with false news (Corbelli et al., 2023), reducing the belief in political misinformation (Daunt et al., 2023), and Covid–19 pandemic misperceptions (Borah, 2022).

The way in which this literature review has helped to frame the present approach is as follows. This article studies the evolution of European citizens' self-efficacy beliefs about overcoming misinformation risks and, thus, being less vulnerable to misinformation. We rely on self-reported data that gathers skills and attitudes (self-efficacy beliefs) that citizens think they possess to detect and deal with misinformation. These items (more details in the methodology section) encompass self-attitude beliefs regarding skills perceptions to distinguish accurate from fake information, and interpretations of how problematic misinformation is. As mentioned above, previous findings pointed out that those citizens with higher confidence in their ability to identify misinformation performed increasingly well on misinformation detection.

Definitively, to cope with misinformation, citizens need to be aware of their exposure to misleading or false content in order to disregard it and avoid spreading it (Boulianne et al., 2022; Humprecht et al., 2023), to develop new knowledge and skills – literacies – (Jones-Jang et al., 2021; Tully et al., 2022), and to be informed about the scope of the misinformation problem for the country and the democracy to function well (Bennett & Livingston, 2018; Tenove, 2020). Hence, these earlier studies state how relevant coping with misinformation is in setting literacy goals to distinguish accurate from false and misleading information, while highlighting the citizenry's concern of misinformation as a significant problem. Complementarily, several scholars (Acerbi et al., 2022) emphasise that, given the low prevalence of misinformation in the citizenry's news diet, efforts should focus on helping them to better recognise accurate information. Interventions aimed at increasing citizens' acceptance of reliable information, such as those related to literacy, may not only engage them with accurate content but also raise awareness of misinformation exposure, improve attitudes toward disregarding false information, and heighten concerns about susceptibility to misinformation.

These adaptive attitudes and behaviours – which are triggered to counteract misinformation – address self-efficacy beliefs that are important because they are relevant to human functioning and influence behaviour directly, but also by shaping other factors such as goals, expectations of outcomes, affective tendencies, and perceptions of challenges and opportunities within the social environment (Bandura, 2006). They are also relevant because individuals consequently set their challenges and goals along with the level of effort that is needed to pursue them (Bandura, 2006).

Considering the efforts made by the EU and member states to boost attitudes and behaviours in engaging citizens to face the problem, and assuming that these efforts had a certain measure of success, it can be anticipated that the evolution of resilience to misinformation will be positive. Therefore, we worded Hypothesis 1 as follows:

> **H1:** *European citizens' beliefs about self-efficacy in coping with misinformation with regard to their exposure awareness for misinformation* (H1a), *their perception of their ability to identify misinformation* (H1b), *and their acknowledgement of the scope of the misinformation problem* (H1c) *increase over time.*

This hypothesis is founded on the following assumptions: We assume self-attitude beliefs favour individuals being resilient to misinformation, which implies an adaptive behavioural pattern to achieve optimistic conditions when faced with a threat. In other words, as Barua et al. (2020) explain, resilience not only alludes to positive developmental adaptations of individuals when facing threats or adversity, but also involves the ability to overcome challenges and achieve success even in high-risk situations.

This research operationalises the observation of resilience to misinformation via a factor analysis composed by the self-perceptions mentioned above. Since the hypotheses regarding the evolution of these self-perceptions are of a positive evolution, the second hypothesis is worded as follows:

> **H2:** *European citizens' resilience to misinformation evolves positively.*

Data and method

This article analyses secondary published data from five Standard Eurobarometers, polling instruments that have collected citizens' perceptions about their attitudes and behaviours in coping with misinformation. The Standard Eurobarometer is the official and flagship polling instrument of the European Commission, monitoring European public opinion twice a year about several issues regarding political, societal and economic activity. In using Eurobarometer's data sets, we are following a large research tradition (see references in GESIS, 2024) to hopefully better understand the social trends of European citizenry.

Fieldwork was carried out in a range from 2018 to 2022: Eurobarometer 90.3 (European Commission, 2019a) from 11.08.2018 to 11.22.2018, Eurobarometer 91.5 (European Commission, 2019b) from 06.07.2019 to 07.01.2019, Eurobarometer 92.3 (European Commission, 2020) from 11.14.2019 to 12.13.2019, Eurobarometer 94.3 (European Commission, 2021) from 02.12.2021 to 03.18.2021, and Eurobarometer 96.3 (European Commission, 2022a) from 01.18.2022 to 02.14.2022. These dates indicate that the data under analysis span periods before, during and after the Covid–19 outbreak, as well as preceding Russia's invasion of Ukraine.

Data sample

This research processes five Standard Eurobarometer cross-sectional datasets, which include data from 27 countries, have an N of 26,000 (approx.).[1] These polling instruments cover a time range that goes from 2018 to 2022 (2020 is not covered as Eurobarometer did not carry out fieldwork surveying citizens about items regarding misinformation in 2020).

Eurobarometer employed a stratified sampling procedure, which means, as the survey technical details show, that the target population is subdivided into separate and mutually exclusive segments (strata) covering the entire population. Subsequently, independent random samples are drawn from within each segment. As the mode of data collection, face-to-face interviews were carried out by polling companies hired to collect data for the Eurobarometer.

Data collection and measures

These five Standard Eurobarometers included specific items about how citizens perceive their efficacy in developmental adaptations for coping with misinformation. More specifically, items are oriented to ascertain the extent to which they (dis)agree with four statements regarding critical steps of problematic information evaluation (see Table 1).

1 List of countries: AT (Austria), BE (Belgium), BG (Bulgaria), CY (Cyprus), CZ (the Czech Republic), DE (Germany), DK (Denmark), EE (Estonia), ES (Spain), FI (Finland), FR (France), GR (Greece), HR (Croatia), HU (Hungary), IE (Ireland), IT (Italy), LT (Lithuania), LU (Luxembourg), LV (Latvia), MT (Malta), NL (the Netherlands), PL (Poland), PT (Portugal), RO (Romania), SE (Sweden), SI (Slovenia) and SK (Slovakia).

Table 1
Items and names of variables

Item from Eurobarometer's survey	Name of variable
You often come across news or information that you believe misrepresent reality or are even false	Exposure awareness
It is easy for you to identify news or information that you believe misrepresent reality or are even false	Media literacy
The existence of news or information that misrepresent reality or is even false is a problem in the country	Problem for country
The existence of news or information that misrepresent reality or is even false is a problem for democracy in general	Problem for democracy

Source: Compiled by the authors.

The original scale consisted of five levels in which 1 = "totally agree"; 2 = "agree"; 3 = "disagree"; 4 = "totally disagree"; and 5 = "don't know". We inverted the scale so that the higher the value, the higher the positivity and used "don't know" answers as a midpoint position of neutrality in a symmetric way in both directions (Joshi et al., 2015).

Data analysis

The data were analysed using SPSS (v.25) software. We downloaded the five datasets from the GESIS website. After converting the scales, we proceeded with the statistical analysis, first of descriptive statistical information (M and SD) of each specific item. Then, we applied an analysis of the variance (ANOVA) with a post-hoc test to find out the differences between variables across years. A t-test was used to compare data sets from the two extreme years (EB 90.3, fieldwork in 2018 and EB 96.3, fieldwork in 2022). Once tested, the increase for each variable, a factor analysis was run to explore whether these different variables could compose a single factor termed *resilience to misinformation.* The method used was principal component analysis with varimax rotation. With the final emerging factor for each data set, an ANOVA test was conducted to test the differences across years.

Results

Descriptive statistical data provides insights for an initial picture of the evolution over time of the self-reported attitudes and behaviours of citizens towards misinformation. Table 2 presents basic data on the four items from each dataset (the source of all tables is the Eurobarometer). The second column indicates the year for fieldwork, and data have been arranged to show the evolution in time.

Table 2
Descriptive statistic for statements measuring self-efficacy beliefs toward misinformation

		Exposure awareness		**Media literacy**		**Problem for country**		**Problem for democracy**	
Dataset number	Fieldwork year	M	SD	M	SD	M	SD	M	SD
EB 90.3	2018	3.49	1.16	3.36	1.18	3.59	1.18	3.88	1.09
EB 91.5	2019	3.69	1.17	3.43	1.22	3.72	1.17	3.98	1.07
EB 92.3	2019	3.52	1.17	3.33	1.2	3.65	1.18	3.94	1.08
EB 94.3	2021	3.67	1.16	3.60	1.19	3.78	1.16	4.13	1.02
EB 96.3	2022	3.66	1.15	3.50	1.18	3.85	1.13	4.09	1.04

Source: Compiled by the authors.

From Table 2 the following basic initial considerations can be made. In general terms, an increasing trend emerges for the four variables: reported data in 2022 are higher than in 2018. Looking at the detail, "Exposure Awareness" had its peak in 2019 reaching a similar mean in 2021 and 2022. Regarding "Media Literacy" there is a positive trend, but we observed an up and down trend, which may also be identified in association with "Problem for Country". "Problem for Democracy" reports a positive trend over time.

To determine whether these data report statistical significance, first, we carried out a Levene test for each variable which revealed that the series of data did not have equal variances, and a Welch test that indicated unequal means. The Levene test for each variable revealed that the series of data did not have equal variances "Exposure Awareness" ($F_{(4\text{-}133,298)} = 59.64$; $p < .001$), "Media Literacy" ($F_{(4\text{-}133,298)} = 336.28$; $p < .001$), "Problem in Country" ($F_{(4\text{-}133,298)} = 174.13$; $p < .001$) and "Problem for Democracy" ($F_{(4\text{-}133,298)} = 42.76$; $p < .001$). Also, the Welch test revealed that the means regarding "Exposure Awareness" ($F_{\text{Welch }(4\text{-}66622.40)} = 162.45$; $p < .001$), "Media Literacy" ($F_{\text{Welch }(4\text{-}66576.33)} = 233.31$; $p < .001$), "Problem in Country" ($F_{\text{Welch }(4\text{-}66615.51)} = 208.89$; $p < .001$), and "Problem for Democracy" ($F_{\text{Welch }(4\text{-}66588.47)} = 268.50$; $p < .001$) are unequal. Analyses of variance (ANOVA) reported statistically significant differences: "Exposure Awareness" ($F_{(4\text{-}133298)} = 162.91$; $p < .001$; $\eta^2 = .005$); "Media Literacy" ($F_{(4\text{-}133298)} = 223.638$; $p < .001$; $\eta^2 = .007$); "Problem in Country" ($F_{(4\text{-}133298)} = 206.461$; $p < .001$; $\eta^2 = .006$); and "Problem for Democracy" ($F_{(4\text{-}133298)} = 265.013$; $p < .001$; $\eta^2 = .008$). Eta squared (η^2) indicates a small effect for "Exposure Awareness", "Media Literacy", "Problem in Country" and "Problem for Democracy".

As a post hoc test for multiple comparisons, we applied the Games-Howell test which is used with unequal sample sizes and unequal variances. Overall, this process helps in understanding how large or small the differences are between the years of each Eurobarometer dataset in terms of each variable. The following subsections present data for evolution over time for each specific variable.

The evolution of "Exposure Awareness"

Regarding "Exposure Awareness", we conducted a multiple comparisons test to assess differences across years and to evaluate whether a significant change from 2018 to 2022 was found. This is how we tested H1a: *European citizens' beliefs about self-efficacy in coping with misinformation with regard to their exposure awareness for misinformation increases over time.*

In other words, the five data sets were contrasted with each other in pairs. The results are presented in Table 3: the first column indicates the reference of the year and first data set; the second column, shows the year and reference of the other data set to which the mean is compared. Each row includes one comparison, and the sequence goes along with the increase in time. The third column indicates the mean difference, and the fourth and fifth the information for statistical significance. This information is graphically illustrated in Figure 1 using a 95% family-wise confidence level (when the central vertical zero line is crossed, the mean difference between samples is not statistically significant).

The results indicate an increase in "Exposure Awareness" over time. The higher positive evolution was reported from 2018 to 2019 and from 2019 to 2021. There is a negative difference (a decrease in exposure awareness) when comparing the two datasets coming from 2019 (mean difference is –.169). Negative differences associated between 2019 and 2021 and 2021 and 2022 were not significant.

Overall, evolution of citizens' awareness of exposure to misinformation from 2018 to 2022 indicates a positive trend. A t-test for independent samples to compare both years (2018 with 2022) was conducted, and it indicates statistical significance: $F = 120.416$; $p < .001$; $t_{(53,070.162)} = 16.106$; $p < .001$; $d = .14$. Statistical Cohen's d size effect revealed a small effect accomplished after five years.

Table 3
Multiple comparisons for "Exposure Awareness"

Games-Howell test		Mean Difference	Std. Error	Sig.
2018 (EB 90.3)	2019 (EB 91.5)	.191	.010	.000
2018 (EB 90.3)	2019 (EB 92.3)	0.022	.010	.198
2018 (EB 90.3)	2021 (EB 94.3)	.174	.010	.000
2018 (EB 90.3)	2022 (EB 96.3)	.161	.010	.000
2019 (EB 91.5)	2019 (EB 92.3)	–.169	.010	.000
2019 (EB 91.5)	2021 (EB 94.3)	–0.017	.010	.439
2019 (EB 91.5)	2022 (EB 96.3)	–.029	.010	.029
2019 (EB 92.3)	2021 (EB 94.3)	.152	.010	.000
2019 (EB 92.3)	2022 (EB 96.3)	.140	.010	.000
2021 (EB 94.3)	2022 (EB 96.3)	–0.012	.010	.722

Source: Compiled by the authors.

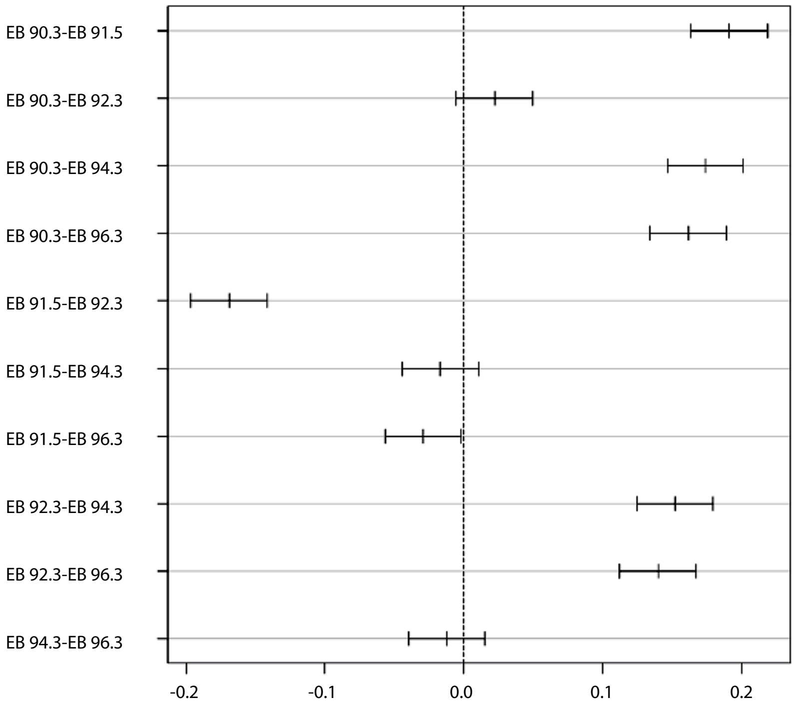

Figure 1
Graphic representation of multiple comparisons for "Exposure Awareness"
Source: Compiled by the authors.

Therefore, H1a which states that *European citizens' beliefs about self-efficacy in coping with misinformation with regard to their exposure awareness for misinformation increases over time* is accepted, having to mention, though, that there are some points with (not statistically significant) negative means differences. Whether this increase in exposure awareness to misinformation indicates just being overconcerned with the problem, or whether it can be conceptually interpreted as being better equipped to struggle misinformation is discussed below.

The evolution of "Media Literacy"

As in the previous analysis regarding "Media Literacy" to test H1b *(European citizens' beliefs about self-efficacy in coping with misinformation with regard to their perception of their ability to identify misinformation),* we performed multiple comparisons across years. Results are presented in Table 4, which displays the mean differences in between two points in time. Figure 2 provides a visual representation of these data.

The results show an increase in "Media Literacy" over time. The higher positive evolution was identified from 2019 to 2021 (mean difference is .266). Some negative differences emerged, for instance the decrease in 2022 in comparison to 2021 (mean difference is –.096).

Table 4
Multiple comparisons for "Media Literacy"

Games-Howell test		Mean Difference	Std. Error	Sig.
2018 (EB 90.3)	2019 (EB 91.5)	.068	.010	.000
2018 (EB 90.3)	2019 (EB 92.3)	–.031	.010	.024
2018 (EB 90.3)	2021 (EB 94.3)	.235	.010	.000
2018 (EB 90.3)	2022 (EB 96.3)	.138	.010	.000
2019 (EB 91.5)	2019 (EB 92.3)	.098	.011	.000
2019 (EB 91.5)	2021 (EB 94.3)	.167	.010	.000
2019 (EB 91.5)	2022 (EB 96.3)	.071	.010	.000
2019 (EB 92.3)	2021 (EB 94.3)	.266	.010	.000
2019 (EB 92.3)	2022 (EB 96.3)	.169	.010	.000
2021 (EB 94.3)	2022 (EB 96.3)	–.096	.010	.000

Source: Compiled by the authors.

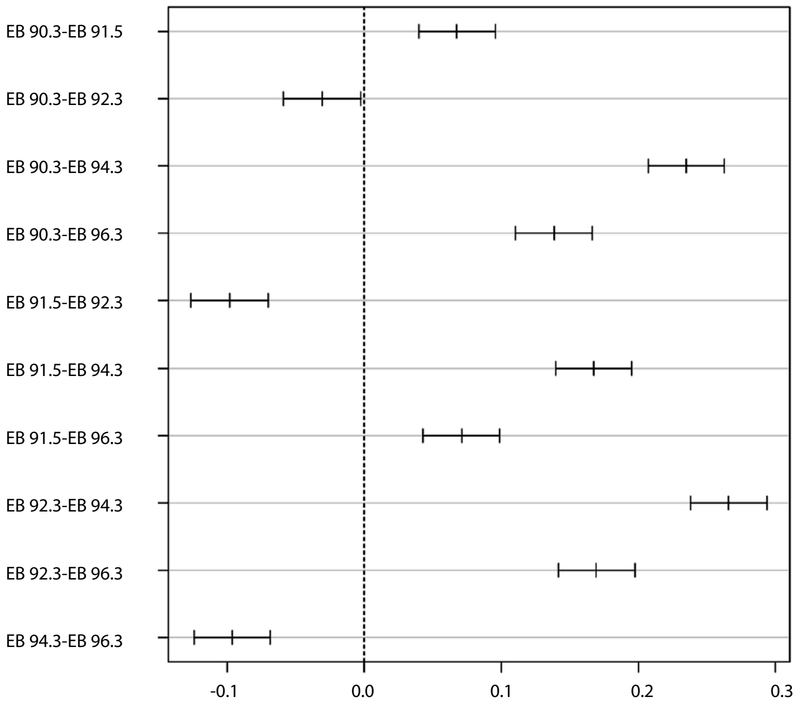

Figure 2
Graphic representation of multiple comparisons for "Media Literacy"
Source: Compiled by the authors.

Nevertheless, a positive evolution occurred when comparing the initial period (2018) and the final period under analysis (2022) which reports a positive mean difference of .138.

We carried out a t-test for independent samples to compare the initial period under analysis (2018) with the latest (2022) and determine how big the change is. The result of the effect is positive, but small (d = .12) ($F = 39.981$; $p < .001$; $t_{(53,083.098)} = 13.565$; $p < .001$).

Therefore, H1b, which states that *European citizens' beliefs about self-efficacy in coping with misinformation with regard to their perception of their ability to identify misinformation increases over time* can also be accepted, having to mention, though, that at some intermediate points in time, a significant decrease was found.

To make sense of this finding, it has to be recalled that what is being measured here is how respondents perceive their self-efficacy to curb misinformation (the item is *"It is easy for you to identify news or information that you believe misrepresent reality or are even false"*). Whether it is true that respondents are identifying misinformation more easily than before is something we cannot judge; major data for this paper lay on self-perceptions and not on actual performance. What can certainly be stated is that this self-perception concerning the capacity to identify misinformation ("Media Literacy") has slightly increased over time. More will be discussed about this in the corresponding section.

The evolution of "Problem for Country" and "Problem for Democracy"

H1c states that *European citizens' beliefs about self-efficacy in coping with misinformation and their acknowledgment of the scope of the misinformation problem increases over time.* It is here understood that self-efficacy is related with being more aware of the problem misinformation entails for the country and for democracy. Aiming to test the hypothesis, we analysed statistical differences and present results in Table 5 and Table 6. Figures 3 and 4 provide visual representations of the data.

Table 5
Multiple comparisons for "Problem for Country"

Games-Howell test		**Mean Difference**	**Std. Error**	**Sig.**
2018 (EB 90.3)	2019 (EB 91.5)	.132	.010	.000
2018 (EB 90.3)	2019 (EB 92.3)	.057	.010	.000
2018 (EB 90.3)	2021 (EB 94.3)	.191	.010	.000
2018 (EB 90.3)	2022 (EB 96.3)	.257	.010	.000
2019 (EB 91.5)	2019 (EB 92.3)	–.075	.010	.000
2019 (EB 91.5)	2021 (EB 94.3)	.060	.010	.000
2019 (EB 91.5)	2022 (EB 96.3)	.125	.010	.000
2019 (EB 92.3)	2021 (EB 94.3)	.135	.010	.000
2019 (EB 92.3)	2022 (EB 96.3)	.200	.010	.000
2021 (EB 94.3)	2022 (EB 96.3)	.066	.010	.000

Source: Compiled by the authors.

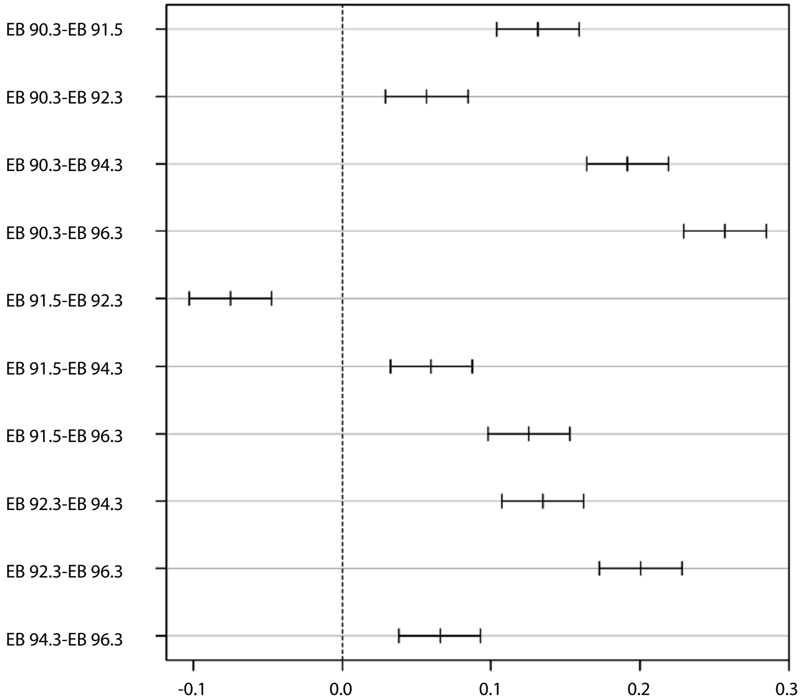

Figure 3
Graphic representation of multiple comparisons for "Problem for Country"
Source: Compiled by the authors.

Considering misinformation as a "Problem for Country", the test (Table 5) reveals that, except for one (which is very low between the two 2019 periods), all mean differences between points in time are positive, and all of them are statistically significant. The concern regarding the problem for the country associated with misinformation was greater when comparing 2018 and 2019, 2019 and 2021, and 2021 and 2022.

Particularly, a highest increase emerges in between 2018 and 2022, our two extreme periods, with a mean difference of .257. To understand how big this evolution was in the period under study, we carried out a t-test for independent samples to compare 2018 and 2022. The result is statistically significant ($F = 525.408$; $p < .001$; $t_{(52,938.089)} = 26.626$; $p < .001$; $d = .22$, statistical Cohen's d size effect revealed a small effect reached after five years).

Considering the misinformation a "Problem for Democracy", the test (Table 6) ascertains significant differences between the time samples. A positive evolution was found when comparing 2018 to 2019 (mean differences are .191 and .059) and 2019 to 2021 (mean differences are .153 and .196), but a significant decrease was reported from 2021 to 2022 (mean difference is –.047). However, from 2018 to 2022, the concern regarding the misinformation problem towards democracy is significantly higher (mean difference is .208).

Table 6
Graphic representation of multiple comparisons for "Problem for Democracy"

Games-Howell test		**Mean Difference**	**Std. Error**	**Sig.**
2018 (EB 90.3)	2019 (EB 91.5)	.101	.009	.000
2018 (EB 90.3)	2019 (EB 92.3)	.059	.009	.000
2018 (EB 90.3)	2021 (EB 94.3)	.255	.009	.000
2018 (EB 90.3)	2022 (EB 96.3)	.208	.009	.000
2019 (EB 91.5)	2019 (EB 92.3)	–.043	.009	.000
2019 (EB 91.5)	2021 (EB 94.3)	.153	.009	.000
2019 (EB 91.5)	2022 (EB 96.3)	.107	.009	.000
2019 (EB 92.3)	2021 (EB 94.3)	.196	.009	.000
2019 (EB 92.3)	2022 (EB 96.3)	.149	.009	.000
2021 (EB 94.3)	2022 (EB 96.3)	–.047	.009	.000

Source: Compiled by the authors.

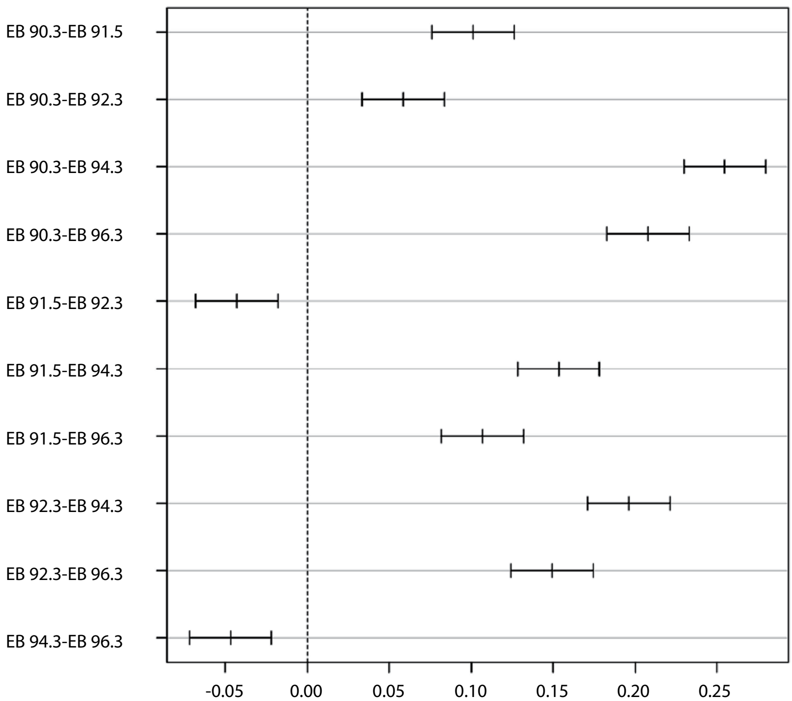

Figure 4
Graphic representation of multiple comparisons for "Problem for Democracy"
Source: Compiled by the authors.

Also, after five years, the evolution of the consideration of misinformation as a problem for democracy is beneficial: F = 106.311; $p < .001$; $t_{(52,949.715)} = 22.524$; $p < .001$; d = .19. Statistical Cohen's d size effect revealed a small effect reached after five years. Hence, as the years go by, respondents are more concerned about the negative effects that misinformation has on democracy.

H1c stated that citizens would acknowledge the scope of the misinformation problem more, which is accepted regarding the country and considering functioning democracy.

Overall, European Citizens seem to have increased awareness of misinformation as a problem for the country and democracy. The fact that the highest increase emerged between 2021 and 2022 leads us to look for explanations in the pandemic when misinformation flourished regarding health issues such as vaccines and public policies. Some more interpretations will be given to this finding in the discussion section.

The evolution of resilience to misinformation

It has been mentioned for several times in this paper that this research lays on previous research that conceptualises resilience to misinformation as an intangible resource, and with it, a) it identifies factors that compose the resilience to misinformation; and b) it operationalises observations of this intangible resource for comparisons across country and over time.

In this section, a factor representing resilience to misinformation is looked for to respond to the following research question: *How has the resilience of European citizens to misinformation evolved over time?*

We started by applying factor analysis in which we included the four items with statements regarding self-efficacy beliefs about attitudes and behaviours facing misinformation for each Standard Eurobarometer. The study determined a factor termed "Resilience to Misinformation".

Table 7 indicates that is statistically adequate to consider "Resilience to Misinformation" as a factor that emerges from the four variables under study: "Exposure Awareness", "Media Literacy", "Problem for Country" and "Problem for Democracy". Hence, we proceeded with a mean index to obtain the measurement of "Resilience to Misinformation" (means are the following: EB 90.3 (M = 3.58; SD = 0.82), EB 91.5 (M = 3.70; SD = .85), EB 92.3 (M = 3.61; SD = .83), EB 94.3 (M = 3.79; SD = .77); EB 96.3 (M = 3.77; SD = .79).

To ascertain how "Resilience to Misinformation" has evolved across years, first, we applied the Levene test and Welch test. The Levene test revealed unequal variances ($F_{(4\text{-}133,298)} = 101.69$; $p < .001$). The Welch test, as a robust test of equality of means, revealed significant differences ($F_{\text{Welch }(4\text{-}66,573.40)} = 378.09$; $p < .001$).

ANOVA was significant ($F_{(4\text{-}133,298)} = 370.05$; $p < .001$; $\eta^2 = .011$). Eta squared (η^2) indicates a small effect for "Resilience to Misinformation". Games-Howell post-hoc test confirmed statistical differences between the years (Table 8). Using this test allows us to compare each year and understand how "Resilience to Misinformation" evolved.

Table 7
Factor analysis to determine the factor "Resilience to Misinformation"

Fieldwork year	2018	2019	2019	2021	2022
EB reference numbers	EB 90.3	EB 91.5	EB 92.3	EB 94.3	EB 96.3
Exposure awareness	.749	.776	.761	.736	.724
Media literacy	.471	.505	.489	.456	.469
Problem in country	.835	.839	.835	.823	.823
Problem for democracy	.776	.795	.771	.740	.772
KMO	.663	.703	.673	.651	.644
Bartlett	.000	.000	.000	.000	.000
Eigenvalue	2.082	2.192	2.110	1.974	2.017
Explained variance	52.050	54.810	52.752	49.352	50.435
Cronbach's α	.68	.71	.69	.64	.65

Source: Compiled by the authors.

Table 8
Multiple comparisons for "Resilience to Misinformation"

Games-Howell test		Mean Difference	Std. Error	Sig.
2018 (EB 90.3)	2019 (EB 91.5)	.123	.007	.000
2018 (EB 90.3)	2019 (EB 92.3)	.027	.007	.002
2018 (EB 90.3)	2021 (EB 94.3)	.214	.007	.000
2018 (EB 90.3)	2022 (EB 96.3)	.191	.007	.000
2019 (EB 91.5)	2019 (EB 92.3)	–.096	.007	.000
2019 (EB 91.5)	2021 (EB 94.3)	.091	.007	.000
2019 (EB 91.5)	2022 (EB 96.3)	.068	.007	.000
2019 (EB 92.3)	2021 (EB 94.3)	.187	.007	.000
2019 (EB 92.3)	2022 (EB 96.3)	.165	.007	.000
2021 (EB 94.3)	2022 (EB 96.3)	–.022	.007	.007

Source: Compiled by the authors.

The results indicate that a positive trend was reported from 2018 to 2019 (mean differences are .123 and .027) and from 2019 to 2021 (mean differences are .091 and .187), but from 2021 to 2022 there was a small decrease (mean difference is – .022). Hence, 2021 was the year in which the "Resilience to Misinformation" was higher, which is statistically different from all the others. Nevertheless, "Resilience to Misinformation" increased with statistical significance when it compared 2018 with 2022 (mean difference is .191).

To determine what has been achieved in terms of the evolution of "Resilience to Misinformation", we applied a t-test for independent samples to compare the data sample from 2022 to the data sample gathered in 2018. Results obtained for the t-test were significant: $F = 83.807$; $p < .001$; $t_{(52,959.723)} = 27.382$; $p < .001$; $d = .24$. Statistical Cohen's d size effect revealed a small effect accomplished after five years. H2 states that the European citizens'

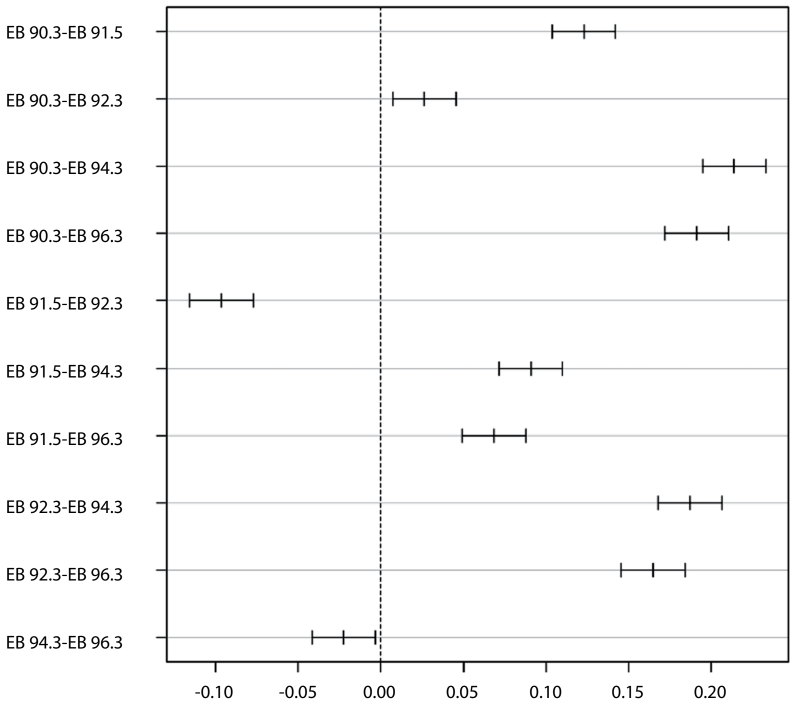

Figure 5
Graphic representation of multiple comparisons for "Resilience to Misinformation"
Source: Compiled by the authors.

self-efficacy beliefs are better, in terms of resilience, about coping with misinformation than in previous years, which is partially true. Self-efficacy beliefs prone to resilience to misinformation are better in 2022 than in 2018, but results in 2021 are, statistically, better than in 2022.

A small note on the values for each country

This research is not cross-country comparative, something that would require a different approach. However, it is deemed of interest to show what the situation is for each specific country regarding the evolution of "Resilience to Misinformation". For that purpose, as factor analysis had validated the theoretical construct, we calculated the mean of "Resilience to Misinformation" associated with each country for the barometers of the first year (2018) and the last one (2022). Results are shown in Figure 6. The list of countries is presented in descending order of the amount of increase in mean difference between 2018 and 2022.

Results show that the means of the factor "Resilience to Misinformation" increases in all countries except for Romania. The five top countries where "Resilience to Misinformation" evolved higher were the Czech Republic, the Netherlands, Estonia, Slovenia

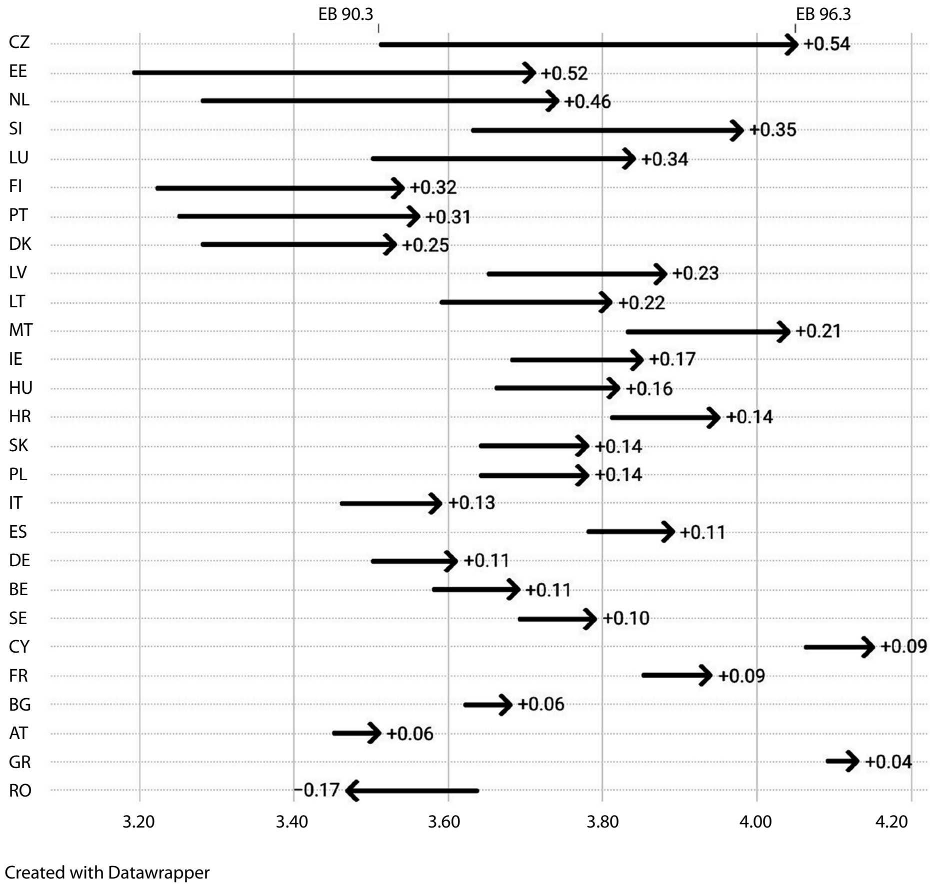

Figure 6
Evolution (2018–2022) of "Resilience to Misinformation" by country
Source: Compiled by the authors.

and Luxemburg; the four bottom countries in which the evolution was smallest were Greece, Austria, Bulgaria and France. Further research is needed to explore causes and consequences of this evolution of resilience to misinformation.

Discussion and conclusion

The intention of this article was to analyse the evolution (from 2018 to 2022) of resilience to misinformation among European citizens. It is founded on previous research that conceptualises this resilience as an intangible resource, and hence, the analysis is operationalised starting from specific attitudes and skills. Therefore, first, this article sought to study citizens' self-attitude beliefs about coping with misinformation regarding "Exposure Awareness", "Media Literacy", "Problem for Country" and "Problem for Democracy".

Secondly, it is confirmed that "Resilience to Misinformation" emerges as a factor in the five waves. Finally, how this "Resilience to Misinformation" evolves over the years is analysed.

European institutions and Member States have deployed various public policies to fight misinformation and promote citizenship less vulnerable and more resistant to information disorder. Success in improving societal resilience depends on raising public awareness. This requires developmental adaptations and behavioural changes to be able to distinguish information from misinformation which is tangible when citizens disregard the dissemination of fake content and are aware of the negative outputs of misinformation in society at large. Previous findings (e.g. Hopp, 2022; Paciello et al., 2023) suggest that self-efficacy beliefs help citizens to distinguish factually accurate information from misinformation.

The central finding of this paper is that in 26 of 27 European countries the citizenry's resilience to misinformation increased between 2018 and 2022; and this is the case both in terms of specific self-efficacy beliefs ("Exposure awareness", "Resilience to Misinformation", "Media Literacy", "Problem for Country" and "Problem for Democracy"), as it is in terms of "Resilience to Misinformation" measured as a whole.

Regarding the specific attitudes, all measurements are based on self-perceptions; first, about "Exposure Awareness", this item captures the attitude of citizens to coming across what they consider to be information misrepresenting reality. This research does not check whether individuals have actually been exposed to more misinformation, but it analyses whether they think they have. We believe the findings allow us to state that even if the case was that respondents are more worried (or even over-worried) about misinformation, an increased alertness to being uncertain about the accuracy of information implies something positive with regard to curbing misinformation.

In that which refers to concern about the problem (more specifically "Problem for Country" and "Problem for Democracy"), findings reveal a higher level of awareness of the misinformation problem that European citizens are facing nowadays. This cognitive behaviour presents a more significant evolution when regarding the awareness of European citizens considering the misinformation threat to the country, which has evolved positively over time. The awareness regarding the problem for democracy also improved from 2018 to 2022 but suffered a decrease in 2022 compared to 2021, from which may emerge an alert to be monitored by national governments and European institutions. Whether being more concerned about the problem and associating the problem with the development of democracy means an improvement in curbing misinformation is something that has been discussed in the literature (Bennett & Livingston, 2018; Tenove, 2020), and we agree that considering misinformation a problem entails being more aware of its implications, and therefore, of being closer to fighting it.

Findings lead to look for explanation of the increase of this awareness in the pandemic caused by Covid–19. The five Eurobarometer datasets used encompassed fieldwork conducted before, during and after the Covid–19 pandemic (before Russia invaded Ukraine, so no relationship to this can be established). Consequently, the findings could be interpreted acknowledging the Covid–19 pandemic as a factor marking widespread of misinformation, for instance, against vaccines, as evidenced by various studies (e.g. Navarro-Sierra et al., 2024). It could be the case that the pandemic caused citizens to become more aware of misinformation as a problem for the country and for democracy, and also to increase their concern about the trustworthiness of information, and add weight to the importance of citizens' literacy in coping with misinformation. This infodemic outbreak may have pushed citizens into developing new skills and knowledge to face the problem.

Regarding "Media Literacy", findings indicate, bluntly, that European citizens believe they are better equipped nowadays to identify information that misrepresent the reality. Whether this is so, once again, we would like to point out that this article relies on measurements of self-efficacy beliefs rather than on actual performance of individuals in coping with misinformation. This will be an everlasting research issue (see for instance Vraga et al., 2022; Xiao & Yang, 2023), for which the following considerations from cognitive social theory may be of help. Self-efficacy beliefs address feelings, motivations and behaviours of individuals; self-efficacy beliefs influence how citizens set their goals and outcomes (Bandura, 2006) and help citizens to learn more and to apply that new knowledge and skills against adversity. Greater concern, awareness, or even a more accurate self-perception of skills in distinguishing true from false information can help citizens become more resilient, as the literature suggests. Therefore, as long as the corresponding caveats are made about the scope of these data, information on self-perceptions of efficacy might be of great help to policymakers in fighting misinformation.

Throughout the analysed timeframe, institutions deployed efforts to raise awareness about misinformation while educating and sensitising citizens through various public policies. European institutions pinpoint media literacy as a central strategy in curbing misinformation. Being resilient implies not only an acknowledgment of problematic information but also gaining critical skills that allow citizens to autonomously recognise, disregard and refute misinformation, avoiding its dissemination.

In the European context, European public policies have been enhancing media literacy strategies to engage citizens and, therefore, to equip active citizenship to curb misinformation. Looking back at the findings of this research, European citizens' self-reported media literacy skills are better in 2022 than in 2018 (although slightly lower than in 2021). These findings should be relevant in strengthening the assessment of public policy literacy programs. The acquisition of a set of skills and knowledge oriented to critical thinking abilities to access, analyse, and evaluate pieces of information favours citizens flagging misinformation and discerning between factual and fake stories. However, the effect size resulting from the analysis reveals that while this increased belief in self-efficacy was positive, it was still small.

Based on the four abovementioned statements regarding misinformation, we measured how resilient to misinformation citizens perceive themselves, which revealed an increment from 2018 to more recently. According to the definition of an intangible asset (Canel & Luoma-aho, 2019), these adaptations give rise to resilience to misinformation that we expect will deliver a social value for both the society and the country in reducing misperceptions regarding public issues.

We live in a context where misinformation is a European concern; how well citizens judge their attitudes to the struggle with misinformation is remarkably noteworthy in the fight against it. Nevertheless, the statistical test for effect size also determined that the effect achieved after five years of implemented public policies – intended to promote resilience to misinformation – was small. As an intangible asset, the EU and its members should focus on the assessment of public policies to monitor how well they are functioning in terms of fostering adaptive changes that allow citizens to be more resistant and less vulnerable to the misinformation threat. As a virus, misinformation techniques are also evolving to incorporate new technologies to produce and spread misleading content. The promotion of resilience to misinformation requires the challenge of emerging deceit techniques in audio, video, and text formats.

Further research lines for the study of resilience to misinformation should compare judgments of self-efficacy beliefs with experimental designs to test performance. The research on media literacy's actual performance in misinformation cases remains limited, as do findings on self-efficacy beliefs related to the issue of misinformation. Comparing and interconnecting both frameworks will help better understand how self-efficacy beliefs correlate with media literacy performance curbing misinformation and to what extent self-efficacy beliefs can hinder individuals' ability to effectively deal with misinformation.

Moreover, a focus on detailed analysis considering sociodemographic groups and country-specific environments should be carried out. Our literature review gathers how age, gender, education level and political leaning help explain the way citizens (dis) regard misinformation. Also, resilience to misinformation is associated with country-specific characteristics (Humprecht et al., 2020; 2023). An emerging future research line focusing on cross-national studies will help enlarge the analysis of the development of self-efficacy beliefs that favour resilience to misinformation regarding media intangible assets (e.g. trust or legitimacy) and public sector intangible assets (e.g. engagement or trust). These above-mentioned research lines will broaden the study of the evolution of resilience to misinformation when considering citizens' relations (e.g. use or consumption) with social network sites, which are related to behaviours prone to reducing resilience to misinformation (Boulianne et al., 2022).

In conclusion, this article contributes to the existing literature on misinformation, providing a process for cross-time analysis, and analysing how self-efficacy beliefs favouring resilience are evolving in European countries over a five-year period (2018–2022). These results provide clues in determining the impact of how self-efficacy judgments contribute to conform resilience to misinformation. Being resilient implies not only the acceptance of the existence of problematic information but also in gaining critical skills that allow citizens to autonomously recognise, disregard and refute misinformation to avoid its dissemination. Self-efficacy beliefs favour human capabilities in confronting challenges (Bandura, 2006). In the European context, European public policies have enhanced societal resilience to engage citizens and, therefore, to equip active citizenship in curbing misinformation. Although the data shows that the situation is better now than in 2018, a certain decrease in 2022 should be monitored by national governments and European institutions to nurture and protect resilience to misinformation as an intangible resource for the European sphere.

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The authors report there are no competing interests to declare.

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ARTICLE

Building Political Identity through Visual Affective Polarisation on Instagram

A Comparison of Six European Far-Right Parties

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This article compares the power of visual affective polarisation on Instagram among six European far-right political parties with the aim of enhancing academic knowledge about the manner in which these parties construct their political identity through visual symbols, rhetoric, and imagery to appeal to their target audiences and convey their ideologies. Through quantitative content analysis of Instagram visuals posted on Instagram by the six main European far-right parties during a two-month period, we focused on content-related and format-related variables, as well as technical features, to analyse those visuals as denotative, connotative and ideological systems from the visual framing model perspective. Findings revealed significant differences in the visual framing strategies among these European far-right political parties, pointing to the complexity in identifying

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a common pattern in their strategic visual communication regarding affective polarisation. This study contributes to the existing literature on visual communication and affective polarisation strategies in politics.

Keywords: visual framing, affective polarisation, far-right parties, Instagram, political identity

Introduction

Researchers argue that political polarisation is increasing globally, particularly in the United States and those European countries where populist and far-right parties are more prevalent on the political stage. These scholars claim that polarisation stems from the merging of partisan, racial, religious, geographic, ideological, and cultural identities over the past fifty years, causing significant political breakdown and the tearing apart of national bonds (Klein, 2020; Wilson et al., 2020; Wazzan & Aldamen, 2023). The increasing polarisation of politics online presents a significant challenge for democracies globally. The rise of recent research on political polarisation is attributed to the fragmentation of news media and the spread of misinformation on social media (Kubin & von Sikorski, 2021). Researchers distinguish between issue polarisation, or attitudes toward specific political issues and *affective polarisation,* and people's negative feelings and attitudes toward their own party (Iyengar et al., 2019, 2012). In that sense, affective political polarisation is about the deep emotional and psychological divisions between political groups characterised by strong feelings of personal loyalty to a party and animosity towards the opposing party. This emotional divide is a central aspect of what scholars describe as *partisan hostility* (Druckman & Levendusky, 2019; Knudsen, 2021).

The story of polarisation is older than social media, which arrived into an already polarised world. The change of design in social media and the addition of the like and share buttons created a supernormal stimulus, adding fuel to the fire of social media (Adamek, 2011, p. 21). Social media platforms, however, are fuelling polarisation and profiting from online anger. Inflammatory language is used to attack political opponents grabbing audience attention and giving everyone the ability to attack, criticise and share. In the context of a social media environment characterised by multiple platforms, some studies have shown how different social media platforms may shape distinct polarisation dynamics over time (Kligler-Vilenchik et al., 2020), indicating that political polarisation on social media cannot be conceptualised as a unified phenomenon since there are significant cross-platform differences (Yarchi et al., 2021). While scholars have addressed this issue to some extent, there is a need to conduct further research on affective political polarisation in digital contexts, measuring the emotions and attitudes expressed, not only in the political discourse but more specifically in the visuals used to attract and mobilise supporters that present a bold and alternative image compared to established political parties.

In the context of a more pictorial political environment, political actors have become aware of visual political communication (Veneti et al. 2019; Lilleker & Veneti, 2023) and have increasingly exploited visual-centric social media platforms, such as Instagram

(Lalancette & Raynauld, 2017; Mendonça & Caetano, 2021; Muñoz & Towner, 2017) or even *image-based* ones (Dimitrova & Matthes, 2018) focusing on images and video clips.

Consequently, there has been growing scholarly attention on exploring Instagram as a visual communication tool in politics. Compared to other social media, Instagram is a visual platform that enhances visual messages over text-based messages (Filimonov et al., 2016). Even when text is added, visuals still dominate the posts; in this way, Instagram has created a solidly *visual-oriented culture* (Kanaouti, 2018). Besides this, Instagram has been valuable in trust and reputation strategies for politicians, as the platform allows them to control the image of their candidate by uploading polished content at scheduled times (Bosetta, 2018). Compared to other social media, Instagram's unique features and the ways users interact on the platform significantly contribute to affective polarisation. First, they show users content that aligns with their interests and beliefs through algorithmic curation, thus providing them with selective exposure that can intensify in-group favouritism and out-group hostility (Lee & Wei, 2022). Second, Hawdon et al. (2020) argue that the emotionally charged visual content of this platform, as well as its interactive features that allow people to comment, like, and share posts for rapid dissemination of political content, may contribute to heightening feelings of support for an individual's own group and animosity towards groups perceived as opposition. The negative consequence of this is that such networks become battlegrounds for polarised political debate that simply reinforces hostile attitudes between opposing groups.

The main intention of this article is to explore the relationship between the strategic use of visual social platforms, Instagram in particular, from a comparative perspective to better understand how far-right political actors construct polarised political images. A comparative quantitative content analysis of 260 Instagram visuals posted by the six main European far-right political parties on Instagram over two months (from 12 January to 12 March 2023) is presented. In this way the research compares the strength of the visual affective polarisation on Instagram among European far-right parties. The initial assumption of this analysis is that strategic visual communication among far-right political parties in Europe differs, and that each party responds to its characteristics of the state in which it operates. Despite Instagram's wide usage, there is a significant absence in similar studies in the context of far-right parties in Europe, a gap in the literature that this paper will attempt to fill to provide researchers with valuable insights regarding Instagram. The research contributes to the field of visual political communication in several ways, offering theoretical insights into how visual social media are used by main European far-right political parties as a part of their strategic communication in building their political image.

Methodologically, this study presents the *visual framing* model from Rodriguez and Dimitrova (2011) with its definitions of denotative, connotative, stylistic–semiotic and ideological levels, and the addition of specific key variables to measure the degree of affective political polarisation on visuals, which may be useful for future studies. Overall, by analysing the visual symbols, rhetoric, and imagery used by these parties to convey their ideologies and appeal to their target audiences, this work expands the existing literature on visual communication in politics and enhances our understanding of social media and polarisation strategies. Framing theory suggests that people's decisions about how to absorb information are influenced by the way it is presented to them. Frames are theoretical concepts and perspectives within framing theory that organise experiences and guide individuals or arrange the meaning of messages (Goffman, 1974), which may cause the distortion of the truth by showing only one side of a given story. Compared to Goffman's analysis, which primarily focuses on framing of public life and textual messages, Messaris and Abraham (2001) look at framing from a visual perspective, arguing that viewers might be less aware of the framing process when it occurs visually than in written and oral text. That is why framing, because it creates a gap between the truth and public awareness, can be viewed as a new form of media ultimately offering a distinct perspective separate from them.

In the context of public speaking, visual framing is another aspect that encompasses the way in which what an audience sees is framed, as well as how the surrounding visual environment is adapted to the posture and gestures of the speaker (Lucas & Stob, 2023, p. 356). Authors like Rodriguez and Dimitrova (2011) have defined the concept of visual framing through a four-tiered model, characterising visuals as 1. *denotative systems;* 2. *stylistic–semiotic systems;* 3. *connotative systems;* and 4. *ideological representations.* In the first level, the authors describe visual elements as essential features related to the main meaning. This level corresponds with the initial level of interpretation when examining visual messages in which images are analysed for their literal, fundamental substance (i.e. for what they truly portray). Put in different terms, this encompasses the recognition and counting of distinct visual aspects like people, locations, and items. Without exploring the implications or interpretations of these aspects, the analysis concentrates on the observable components. The stylistic and semiotic elements of images are analysed in the second level in which the meanings of various design components (e.g. colour, form and composition) are examined. Understanding the signs and symbols contained in the images and how they communicate in ways other than their literal portrayal is necessary for semiotic analysis. The third level is where the emphasis moves to connotative meanings or the emotional and cultural connections that images arouse. This level looks at how viewers' experiences and cultural circumstances might affect the way in which images communicate more abstract concepts, values or feelings. It investigates the ways pictures hint at meanings separate from their denotative content. The final, most advanced stage of this model studies how images symbolise worldviews or ideological stances, and how they are used to support or contradict social standards, political beliefs and power systems. The methods by which images shape attitudes and perceptions of social and political issues are primarily studied at this level.

The fact that there is much disagreement about how visual frames are intended to be detected in the first place is one of the primary reasons why there is comparatively little research using visual framing compared to textual framing. In a similar fashion to text, images may serve as framing devices which encompass the integration of rhetorical methods – such as metaphors to come to the same page, illustrations created through emotions and relationships and symbols or concepts – to visually convey the core of a topic or events through abstract concepts. These levels of visual framing are linked to *credibility* (determined mainly by competence and character), which can be seen as the degree to which the audience believes a speaker is qualified to discuss a particular subject, *reasoning* as the process of making decisions based on available data and *emotional appeal* as a more engaging aspect that tends to make messages more compelling (Lucas & Stob, 2023, pp. 314–331).

Social media use among far-right parties

Social media is an essential tool for political communication in the current hybrid media system. The opportunity structure of social media seems particularly adapted to the dissemination of populist messaging from far-right parties (Ernst et al., 2019; Krzyżanowski, 2018; Gerbaudo, 2018; Shahini-Hoxhaj, 2018).

This paper focuses on political parties that promote extreme or radical right-wing views, often termed as *far-right* or *radical-right* parties. The extreme-right parties entered the fourth stage of growth during the last decade (Mudde, 2007; Mudde, 2019), which included mainstreaming and normalisation in domestic political systems. As a result, far-right parties have governed or have been part of governments in several European countries, including Hungary, Austria, Spain, Italy and elsewhere. Some of them are still governing.

These parties usually support authoritarian, nationalistic, anti-immigrant and socially conservative agendas (Tillman, 2021). Targeted messaging is a crucial tactic used by far-right parties on social media. These parties tend to target demographics with their material and messages by using data analytics and micro-targeting strategies, which makes it more likely that their messages will be seen by those who will be sympathetic to their cause. Their accuracy enables them to establish echo chambers, reinforcing pre-existing beliefs and polarising public discourse. Various studies have concluded that social media algorithms will often give higher visibility to the topics and messages of far-right parties, such as immigration, for example during the 2016 U.S. Presidential election cycle (Faris et al., 2017); and in Germany, when the radical right party, *Alternative für Deutschland* (AfD) [Alternative for Germany] achieved higher interactivity than any other party between September 2015 and April 2016 (Dittrich, 2017). Their messages were also shown to the users that did not actively seek that kind of information and, according to earlier studies, exposure to such messages might strengthen sentiments that are populist or exclusionary, as well as support for populist far-right parties (Hameleers et al., 2018; Müller et al., 2017).

Political parties that have been in opposition have generally adjusted to social media more quickly (Gërguri, 2019). This was the case for some of the far-right parties in Europe. These parties have even backed violent action to accomplish their aims (Norris, 2005). In most cases around Europe, the populism of those parties is constructed on the idea of the existence of two distinct forces: *the people* and *the elites* (Mudde & Rovira Kaltwasser, 2017). Besides the governing position and ideological line, studies have highlighted another factor: the *structure* of social media networks, which makes platforms available for populist parties to communicate their ideas (Engesser et al., 2017a). Moreover, social media has made it possible for populist parties to disseminate unfiltered messages. The Instagram networks of the six parties included in this study are quite different. VOX has more followers (643,000) than the five other parties combined (see Table 1 for the number of followers for each party). This Spanish party has achieved this by becoming active on social media less than one month after its creation in December 2013.

Visual framing on Instagram among far-right political parties

When comparing candidates, political parties seem to campaign differently on Instagram. As some studies have shown, candidates have preferred *pure* image posts in connection with the platform's *image first* logic (Ekman & Widholm, 2017, p. 18), while political parties have tended to use text-integrated images, thus trying to convey hard-to-visualise campaigns or complex political messages to voters (Muñoz & Towner, 2017; Haßler et al., 2023).

Among all the different functions of social media content that can be considered in political contexts (Russmann et al., 2019), Instagram use among political parties has evolved from broadcasting information to the stakeholders of parties to establishing itself as a tool for mobilising intention (Gamir-Ríos et al., 2022). Furthermore, the increasing use of Instagram for mobilisation has been connected to the use of negative emotional appeals detected in previous studies (Quevedo-Redondo & Portalés-Oliva, 2017; López-Rabadán & Doménech-Fabregat, 2021) indicating that the Instagram platform is not completely unrelated to populist style and polarisation, whose messages are characterised by simplification, emotionality and negativity (Engesser et al., 2017b). An exceptional discursive strategy employed by far-right parties in their Instagram communication involves the use of contrast and association (Bernardez-Rodal et al., 2022). Euphoric terms, signifying strong positivity and widespread social acceptance, are linked with the party's political positions. Conversely, dysphoric terms, carrying negative charges and inciting hatred, are associated with common arguments such as classic gender nationalism, anti-Muslim gender nationalism, de-legitimisation and ridicule of feminism, among others.

Given the electoral success of right-wing populist parties in Europe, understanding their communication strategies is crucial for political communication research. Visuals play a significant role in shaping the political image of parties, potentially contributing to the success of right-wing populism. Despite this, there is a dearth of cross-national studies on populist communication. Examining the Instagram profiles of European leaders from right-wing populist parties, Bast (2021b) conducted one of the few comparative studies on political communication incorporating image management theory, right-wing populism and visual communication. The study revealed the importance for these political leaders of projecting a professional image and demonstrating proximity to citizens. Interestingly, only a few categories relevant to right-wing populist communication were identified.

One of the key research questions that has been analysed on the use of Instagram among political actors is the extent to which personalised content succeeds in gaining traction among online followers. Results indicate that party leaders emerge as more successful than parties in gaining attention through likes and comments, and that they offer personalised content to a greater degree than the parties they represent (Larsson, 2019). Similarly, although the review of the use of Instagram among political parties (Bast, 2021a) showed that the personalisation hypothesis based on individualisation (Adam & Maier, 2010) is confirmed by their top candidate being emphasised as statesmanlike, or their professional image dominating in terms of privatisation, a recurring strategy seems to be the combination of political information with private aspects (Rodina & Dligach, 2019). It is relevant to underline here that members of center-right or far-right parties posted more non-political content than others, including images of their families (Ekman & Widholm, 2017; O'Connell, 2018). In other studies, variations were found in the emphasised messages among leaders from right-wing populist parties, with two distinct types of politicians: those who present a statesmanlike demeanour through gestures like handshakes, commemorations and speeches, and those who share both personal and more radical content, such as anti-Islamic images (Bast, 2021b).

Given the aforementioned, we try to fill those research gaps and systematically comparatively analyse the way in which the main European far-right political parties use Instagram to visually frame their particular identity. The study adopts the visual framing model proposed by Rodriguez and Dimitrova (2011) by considering visuals as a powerful framing tool because they mirror reality and evoke strong emotional reactions. As mentioned above, these scholars propose a four-level visual framing analysis: 1. visuals as denotative systems, where frames are analysed by identifying the objects and elements present in the image; 2. visuals as stylistic systems, where attention is given to the artistic and technical aspects of representation; 3. visuals as connotative systems, where frames are identified by examining the presence of symbols within the visual context; and 4. the ideological level of analysis, where there is an attempt to offer an explanation of the underlying reasons behind the analysed representations.

In our study, we provide measures of these levels to compare the power of the visual affective polarisation on Instagram for European far-right parties. However, the connotative and the ideological levels seem to be more relevant in explaining the extent to which there is some coincidence in how far-right political parties in Europe build their own visual political communication strategy.

RQ1: To what extent is there a common affective polarisation strategy in relation to how European far-right parties frame their visuals on Instagram, based on Rodriguez and Dimitrova's (2011) model?

H1: Based on previous literature on image management and visual communication among far-right European parties from a comparative perspective (Bast, 2021b), our study assumes that there is no common pattern in their strategic visual communication. On the contrary, the strategic visual communication among far-right political parties in Europe will be different according to the situation for each party in the state in which it operates. Thus, significant differences will be found in their visual framing strategies depending on whether the party in question is in government or opposition.

Affective political polarisation from a visual perspective

Affective polarisation refers to emotions, such as fear and revulsion, which have increasingly undermined the principles of political communication. It is a process that creates outputs that have driven the two opposing camps of conservatives and liberals further apart from each other and is fuelling a vicious circle. Political communication scholars generally tend to agree that affective political polarisation is partisan hostility. Druckman and Levendusky (2019, pp. 114–115) define it as the tendency "to dislike, distrust, and avoid interaction with *'those from another [political] party'"*. Other scholars have noted that affective political polarisation is tied more closely to social identity than ideological stances and that it serves to divide citizens into distinct *in-groups* and *out-groups* (see e.g. Knudsen, 2021). Perhaps more alarmingly, scholars have also argued that affective political polarisation works to undermine support for democratic norms and found that affective political polarisation politicises democratic norms, pushing partisans to support restricting the rights of those perceived as part of the out-group when their own chosen party is in power (Kingzette et al., 2021).

While scholars may agree on a general definition of affective political polarisation, few have specifically attempted to understand the relationship between the global rise in affective political polarisation and the use of social media. One study across the media in Poland found three general categories for the populist strategies of right-wing parties. These categories included *the people, the elite* and *others.* According to the Rodriguez and Dimitrova (2011) model, *the people* can be defined by content related aspects such as voters, nation and citizenship. *The elite* can be presented through the stylistic visual frame, which includes individual politicians serving as symbols. The others can be depicted through connotative visual framing as out-groups devoid of good character or ability to make good decisions, and as being worthy of hatred (Stępińska et al., 2020, pp. 120–125).

Yarchi et al. (2021) conducted one of the most ambitious recent studies to investigate political polarisation across three online platforms: Twitter, Facebook and WhatsApp. In analysing previous research on political polarisation, they identified three aspects that contribute to increased or decreased polarisation in online interactions: 1. *homophilic* vs. *heterophilic* interactions (how similar were those interacting with regard to age, race/ethnicity, religion, socio-economic status, etc.); 2. positional polarisation (i.e. intensity of views expressed); and 3. affective polarisation (i.e. intensity of emotions and attitudes expressed). The researchers conclude that political polarisation on social media is not a *unified phenomenon* in that their findings differed across the various platforms.

While the study of Yarchi et al. (2021) offers some indication of the state of research on affective political polarisation and social media, it is based on one case study in one country: Israel. As Knudsen (2021) notes, this is a fairly standard practice in the field. In fact, most of the research has been U.S.-based. Knudsen additionally points out, affective political polarisation within a two-party system is "more straightforward" – a definite us vs. them. Whereas in multiparty systems, the *them* may refer to several others with varying degrees of intensity.

Moreover, few researchers have explored the relationship between visual images and escalation or de-escalation of affective political polarisation.

Far-right parties commonly use specific visual elements to evoke strong emotions, foster a sense of identity and create a visual distinction from other political groups. These elements include colour schemes such as black, red and white, as well as nationalist and historical symbols associated with ideologies like nationalism, ethno-nationalism and anti-immigration sentiments. Flags, national emblems and other symbols are often utilised to convey these messages (Svraka, 2023). The use of these visual cues is intended to appeal to the emotions of the target audience and create a sense of belonging and unity among their supporters (Rivas-de-Roca et al., 2022). These strategies are part of the communication practices of far-right populist parties in Europe, which frequently rely on simple and non-mediated messages on social media to promote distrust in public institutions (Bonikowski et al., 2022).

Given this review of previous research is related to online political communication in general and affective political polarisation specifically, we argue that there is a need for further studies that address differences in political communication, particularly regarding escalating or de-escalating affective political polarisation. Further, investigation of visual images may prove fruitful in furthering our understanding of affective political polarisation. This study is a step toward that understanding. As such, we offer the following further research questions:

> **RQ2a:** What specific features of the visuals that define affective polarisation are more relevant to far-right European parties?
> **RQ2b:** Are there significant differences in the features of affective polarisation between political parties?
> **H2:** Based on previous literature on the affective political polarisation from a visual perspective, we assume that, by comparing visuals on Instagram from European far-right parties in different countries, there would be a common pattern in containing some of the more relevant visual features that scholars empirically used to measure affective polarisation (Bonikowski et al., 2022; Svraka, 2023; Yarchi et al., 2021).

Method

Data collection and sampling

To gather information for this study, we selected the Instagram official accounts of far-right political parties in six different European countries:@rassemblementnational_fr *(Rassemblement National France);*@afd.bund *(Alternative für Deutschland);*@fideszhu *(Fidesz – Magyar Polgári Szövetség* [*Fidesz – Hungarian Civic Alliance*]);@fratelliditalia *(Fratelli d'Italia);*@pisorgpl *(Prawo i Sprawiedliwość);*@vox_es (*VOX* in Spain). These political parties were well known far-right parties in Europe and active on Instagram. In Germany, Spain and France, they are in the opposition but have significant parliamentary representation, whereas in Hungary, Italy and Poland they are either fully or partially part of the government. We decided to focus on these certain political parties, because it enables us to examine these parties' Instagram message, strategy and engagement approaches in greater detail. Researchers can examine the ways in which political parties that have substantial parliamentary representation or government engagement use social media to spread their ideology, rally followers and convey their policy goals. Furthermore, examining parties from different European countries sheds light on possible differences in social media usage in various political and cultural circumstances. The decision to focus

Table 1:
Sample distribution of Instagram posts
by European far-right political parties (N = 260 post)

Country	Political party	Instagram Profile	Instagram Followers	Number of Images N = 260
France	Rassemblement National (RN)	@rassemblementnational_fr	48,500	35
Germany	Alternative für Deutschland (AFD)	@afd.bund	139,000	20
Hungary	Fidesz – Hungarian Civic Alliance (Fidesz)	@fideszhu	15,600	9
Italy	Fratelli d'Italia (FdI)	@fratelliditalia	286,000	164
Poland	Prawo i Sprawied-liwość (PiS)	@pisorgpl	33,100	17
Spain	VOX	@vox_es	643,000	15

Source: Compiled by the authors.

on specific parties was also influenced by factors such as their prominence, electoral success or being one of the main political actors in their country. Our sample of parties also includes some of the largest and most impactful parties on the far-right political spectrum in Europe, increasing their importance to this research.

As studies are usually focused on election campaigns, we wanted to analyse political parties beyond the intense environment of an election cycle, which allows for a deeper understanding of their policy priorities and long-term strategies. We collected all the Instagram feeds during a two-month period: from 12 January to 12 March 2023. Thereafter, we filtered out Instagram stories. Only pictures were included in the data set; videos were not included because they would have required a different coding process. Almost all the images analysed had accompanying captions that shed light on the coding process, as needed. Instagram posts that contained multiple pictures for viewers to swipe through were coded using only the first image. This process yielded 260 images, as shown in Table 1, which provides an overview of the sample, including the accounts of political parties, with the number of analysed images for all countries. In the total sample, the most active political party on Instagram was *Fratelli d'Italia* (FdI) with 310 posts, followed by *Rassemblement National* (RN), with 43 units.

Coding process

All the 260 images were coded, with the unit of analysis being a single image. For this content analysis, with respect to quantitative and qualitative variables, a detailed set of categories was developed based on previous literature. The coding was based on the following sets of variables:

- The first group were descriptive variables that included the *date* of the post or the Instagram profile from which the post was taken. We also added the *engagement* metric information of each post. Following previous studies (Larsson, 2021), we created an engagement level variable based on the number of likes and also of comments for each post.
- The second group of variables focused on content-related variables that gave us the chance to measure visuals as a denotative system on the Rodriguez and Dimitrova (2011) visual framing model; our aim was to identify the objects and elements present on the visual. In that sense, we included the *main actor* on the image, to see the extent to which the party leader alone or with other company was the main figure in the visuals, and the *activity* that the main candidate was engaged in. We also measured the *context* of the image, which could be an institutional, public, private or media scenario; and the *type of content* that defined the visual, to discriminate between political or non-political content.
- We also considered format-related variables related to technical features to measure the visual as stylistic systems (Rodriguez & Dimitrova, 2011), so attention was given to the artistic and technical aspects of representation. In this sense, we used Fahmy (2004) criteria to analyse each unit based on the production techniques: a) *type of image,* b) *image with text,* c) *type of camera shot,* d) *image focus,* e) *use of movement,* f) *type of camera angle,* g) *degree of eye contact* and h) *use of colour.* We assume that by understanding these technical aspects, content creators can either exacerbate or mitigate affective polarisation among the audience. For example, text included in images, such as captions or quotes, can frame the image's meaning and influence viewer interpretation. As another key technical point, close-up shots which focus on individual faces or emotions can create a sense of intimacy or confrontation, intensifying emotional reactions and polarisation, while wide shots provide more context and can dilute the emotional impact, potentially reducing polarisation. Similarly, high-angle shots can make subjects appear vulnerable or subordinate, while low-angle shots can make them seem powerful or threatening. Images where subjects make direct eye contact with the camera can create a sense of personal connection or confrontation. Finally, the inclusion of a movement is also important, since static images provide a fixed point of view, often leading viewers to focus on the content more intensely, while the dynamic elements, such as GIFs or short videos, introduce movement that can either heighten emotional responses (through action).
- The fourth group of variables were linked to persuasion, which could give information about the framing of the visuals at the connotative level (Rodriguez & Dimitrova, 2011). For that purpose, by considering the caption to the visuals, we identified the *predominant visual rhetorical strategy* (Zamora-Medina et al., 2023) in each image: a) *credibility,* focusing on the politician's figure as a leader and the construction of their leadership; b) *reasoning,* focusing on knowledge,

facts and objective data and c) *emotional appeal,* which refers to the emphasis placed on the emotional side of the stories.

– Finally, the last group of variables consisted of *affective polarisation indicators,* which were used to measure the affective polarisation of the images, covering the ideological level of the visual framing analysis (Rodriguez & Dimitrova, 2011). This was done to explain the underlying reasons behind the analysed representations. Based on a thorough literature review of previous studies that tried to empirically measure affective polarisation (Bonikowski et al., 2022; Svraka, 2023; Yarchi et al., 2021), images were coded based on the presence of specific features: the *presence of a defiant attitude towards institutions* (e.g. European Union institutions, courts of justice, etc.); the *representation of military, religious, revolutionary, or patriotic symbols;* the *representation of stereotypes (e.g. use of the national flag in Spain, the cross as religious symbol in Poland);* the *inclusion or mention of violence/struggle (inflammatory signs);* the *inclusion of the party's ideological symbols* (i.e. logo, slogan, etc.); the *use of divisive visual language* (us vs. them, our people, our homeland, nativism, referencing homeland inhabitants, referencing nationality); the *predominant use of emotions (e.g. anger, fear)* the *identification of non-political enemy* (e.g. media, NGOs, etc.); the *inclusion of a call to social or political mobilisation*; and the *inclusion of negative references made to other opposition groups or political leaders,* which may include political groups from other countries as well.

Two coders independently completed the coding of the 260 Instagram images. To assess intercoder reliability, a randomly selected subsample of 10% of the entire sample was coded (N = 26 Instagram images). By using Scott's Pi (Scott, 1955) for calculating intercoder reliability, we found a satisfactory rate of agreement for all variables with a coding reliability set at Scott's Pi = 0.891.

Results and discussion

Our data sample consists of the six European far-right political parties mentioned in the analysis. Most of the observations from the data belong to *Fratelli d'Italia* (164 observations), whilst the *Fidesz – Magyar Polgári Szövetség* has the smallest representation in the sample with only 9 observations (see Table 2). All the observations in the data sample are valid. The descriptive statistics indicate the number of likes and comments for the sample of Instagram content we have gathered for each party. Differences in the number of followers among all these parties can obviously suppose different metrics in terms of number of likes and comments, in the sense that those parties with higher number of followers were also the ones with the highest engagement: *VOX,* which is one of the least represented parties in the sample (15 observations) but which has the highest rate of followers, had the highest average number of likes per post (17,042.47), while *Alternative für Deutschland* (20 observations), which came third in the number of followers, had the highest average of comments per post (611.4). *Fratelli d'Italia,* was the second party in its

Table 2:
Descriptive statistics of the images posted by political parties (N = 260)

		N	Minimum	Maximum	Mean	Standard Deviation
Alternative für Deutschland	No. of likes	20	2,651	9,074	5,833.50	2,034.97
	No. of comments	20	199	1,487	611.40	283.03
VOX	No. of likes	15	4,503	52,643	17,042.47	13,983.34
	No. of comments	15	66	1,701	466.20	510.41
Rassemblement National	No. of likes	35	489	4,525	1,321.71	848.71
	No. of comments	35	3	80	26.49	20.95
Fidesz – Magyar Polgári Szövetség	No. of likes	9	412	805	553.33	123.59
	No. of comments	9	1	23	9.78	6.24
Fratelli d'Italia	No. of likes	164	1252	39,811	5,021.61	3,589.57
	No. of comments	164	40	5,248	353.04	439.00
Prawo i Sprawiedliwość	No. of likes	17	216	665	405.35	132.31
	No. of comments	17	19	161	75.47	41.76
Total	No. of likes	260	216	52,643	4,823.01	5,603.65
	No. of comments	260	1	5,248	305.45	410.61

Source: Compiled by the authors.

number of followers, and also ranked second on its average number of likes, and third on the average number of comments. Despite these differences in the numbers of followers and the consequences this fact may have on the engagement level, we must clarify that they do not affect the research questions that form the basis of this work since the engagement variable is only mentioned for descriptive purposes.

> **RQ1:** Do far-right parties from different European countries significantly differ in their visual framing strategy on Instagram using the Rodriguez and Dimitrova (2011) model?

From a denotative point of view, when visual frames are analysed by identifying the objects and elements presented, our findings suggest that European far-right parties differ in some aspects, such as in the content they post, as well as the main actor and the manner in which they appear in the content. Concretely, *Alternative für Deutschland* (30%), *Rassemblement National* (14.3%), and *VOX* (26.7%) tend to include citizens in the majority of their posts. On the other hand, *Fratelli d'Italia* (45.1%), *Fidesz – Magyar Polgári Szövetség* (66.6%), and *Prawo i Sprawiedliwość* (47%) preferred to include their party leader either alone or with a large or small group of people (see Table 3). To test the variability with respect to each of the questions, we used Chi-Square tests. At a 1% level of significance (Chi-Square value = 92.15), our results indicated that there are indeed significant differences between far-right political parties in Europe with regard to image appearance. In addition, our findings show that the images of their respective leaders are mostly portrayed in a political/institutional space and that parties have significant

Table 3:
Distribution of main actors on the images by political parties (N = 260)

	Alternative für Deutschland (%)	VOX (%)	Rassemblement National (%)	Fidesz – Magyar Polgári Szövetség (%)	Fratelli d'Italia (%)	Prawo i Sprawiedliwość (%)	Total (%)
Candidate/ leader alone	15	6.7	2.9	22.2	32.3	23.5	24.6
Candidate/ leader with a small group	10	0.0	5.7	44.4	11.0	23.5	11.5
Candidate/ leader with large crowds	0	13.3	5.7	0.0	1.8	0.0	2.7
Party members	5	26.7	8.6	22.2	15.9	11.8	14.6
Citizens	30	26.7	14.3	0.0	22.0	5.9	20.0
Environment	20	13.3	14.3	0.0	6.1	0.0	8.1
Other politicians	10	0.0	5.7	0.0	4.9	17.6	5.8
N/A	10	13.3	42.9	11.1	6.1	17.6	12.7
Total	100	100.0	100.0	100.0	100.0	100.0	100.0

Source: Compiled by the authors.

differences in the types of image they use for their content. In the majority of their posts, *Alternative für Deutschland* (55%), *Fratelli d'Italia* (66.5%), and *VOX* (40%) have posted simple standard photographs, compared to *Fidesz – Magyar Polgári Szövetség* (55.6%) and *Prawo i Sprawiedliwość* (52.9%) which post carousels (that is, multiple dependent images). Most of *Rassemblement National*'s (54.3%) content belonged to another category, which included memes, brochures, flyers, etc.

When we analysed the artistic and technical aspects of representation included as the stylistic system, political parties certainly differed in how they portrayed their content. This level of visual framing encompasses elements such as text inclusion, colour palette, and the dynamic appearance of photos and videos. The statistical test results show significant differences at 1% level of significance (Chi-Square value = 65.28) in the type of camera shots used. For instance, *Alternative für Deutschland* (in 60% of their posts), *Fratelli d'Italia* (75.6%), *Fidesz – Magyar Polgári Szövetség* (88.9%), and *Prawo i Sprawiedliwość* (64.7%) have mainly used either close or medium camera shots (see Table 4).

Table 4:
Distribution of camera shot styles by political parties (N = 260)

	Alternative für Deutschland (%)	**VOX** (%)	**Rassemblement National** (%)	**Fidesz – Magyar Polgári Szövetség** (%)	**Fratelli d'Italia** (%)	**Prawo i Sprawiedliwość** (%)	**Total** (%)
Close-up (cropping subject[s] at head or shoulders)	25	6.7	11.4	22.2	31.1	5.9	24.6
Medium shot (cropping subject[s] at waist or knees)	35	20.0	8.6	66.7	44.5	58.8	39.2
Full shot (showing complete figure of subject[s])	10	40.0	20.0	0.0	6.1	17.6	10.8
Not applicable	30	33.3	60.0	11.1	18.3	17.6	25.4
Total	100	100.0	100.0	100.0	100.0	100.0	100.0

Source: Compiled by the authors.

Lastly, observed from a connotative visual framing perspective where frames are identified by examining the presence of symbols within the visual context, our findings in Table 5 underlined the fact that far-right European political parties employed different rhetorical strategies to capture their audience's attention and appeal to the masses. *Alternative für Deutschland* and *VOX,* who have similarities between them in other aspects as well, mainly used *'emotional appeal'. Fratelli d'Italia, Fidesz – Magyar Polgári Szövetség*, and *Prawo i Sprawiedliwość* generally preferred to use a combination of *'credibility'* and *'emotional appeal',* while *Rassemblement National* were usually associated with posts more linked to the aspect of *'reasoning'.* The results of the statistical tests indicate that these differences are indeed significant at a 1% level (Chi-Square value = 58.34).

Based on previous literature on image management and visual communication among far-right European parties from a comparative perspective (Bast, 2021b), H1 predicted there would be no common pattern in their visual communication strategies. The findings of our analysis support this claim. They showed a complex landscape with simultaneous interaction between political messaging and visual framing. Despite their being part of a shared political spectrum, our findings lead us to conclude that far-right political parties in Europe employ distinct visual framing methods. Furthermore,

Table 5:
Distribution of predominant rhetorical strategy on the images by political parties (N = 260)

	Alternative für Deutschland (%)	**VOX** (%)	**Rassemblement National** (%)	**Fidesz – Magyar Polgári Szövetség** (%)	**Fratelli d'Italia** (%)	**Prawo i Sprawiedliwość** (%)	**Total** (%)
Credibility	20	20.0	11.4	55.6	41.5	47.1	35.4
Reasoning	10	6.7	57.1	0.0	28.0	23.5	28.1
Emotional appeal	70	73.3	31.4	44.4	30.5	23.5	36.2
Not applicable	0	0.0	0.0	0.0	0.0	5.9	0.4
Total	100	100.0	100.0	100.0	100.0	100.0	100.0

Source: Compiled by the authors.

we concluded that the situation each far-right European political party finds itself in could have an impact on their strategic visual communication. In other words, significant differences in their visual framing strategies will depend on whether parties are in government or in opposition.

> **RQ2a:** What specific features of visuals defining affective polarisation are more relevant to far-right European parties?
> **RQ2b:** Are there significant differences in affective polarisation features among political parties?

To answer these questions, different cross tabs were conducted to measure the frequency of each affective polarisation indicator in each political party that were included in our sample. We found significant differences by using the statistic Chi-square in practically all the variables. As Table 6 shows, in the general sample, the relevancy of those indicators was quite discrete. Only the presence of the party's ideological symbols as an affective polarisation resource was more relevant, being present in 71.2% of the visuals. As example of the use of ideological symbols, we mention the case of@vox_es, showing a traditional balcony with a Spanish flag and the message: "Protect your own things. The homeland starts at the neighbours" (www.instagram.com/p/CoZJZw3tFi4/). Another example comes from a @rassemblementnational_fr picture showing a delegation of RN deputies with the French flag band around their chests, supporting angry farmers who were subject to both continual additions in standards and unfair competition from products that did not respect those same standards (www.instagram.com/p/CoZuVGkMV4P/).

There were two other resources that were detected in at least one third of the sample: the mentions of inclusive visual language, which was included in 38.5% of the units and the mention of violent struggle in the content, presented in 32.4% of the posts. One good example of the use of divisive visual language is the picture derived from@afd.bund showing the back of a scholar wearing hijab in front of a school blackboard with the text:

"Education shows brain. No veil at school!" (www.instagram.com/p/CoRfo-UtJaI/). As well, the case of@fideszhu showing a picture of the president with the text "We Hungarians will protect what is ours. Why do we fight? Why do we suffer? Why do we work?" (www.instagram.com/p/CnhHiYJp74V/). For the use of violent struggle in the content, we mention the example of@fratelliditalia that used a picture of a border patrol to add the text "In Europe the wind has changed. Now it has become fashionable to control external borders. The idea has spread in the Union that it is necessary to protect land and sea borders, including walls and patrols." (www.instagram.com/p/CohQiDMs8_2/) Also, the case of@afd.bund where some immigrants were shown inside a plane with the text: "Instead of EU lip service, secure the borders, start the deportation offensive!" (www.instagram.com/p/Coexj2aNBIC/).

When we focused on the differences between the political parties included in our sample, as Table 6 indicates, some specific results were found. In that sense, *Alternative für Deutschland* was the party with the highest score in the affective polarisation indicators, not just in relation to the use of the party's ideological symbols (100%) in their visuals, but also including mentions with inclusive visual language (85%) and to an identified non-political enemy (60%). Followed by the Spanish *VOX,* which got some relevant scores on three polarisation indicators: the use of the party's ideological symbols (66.7%), the representation of military, religious, revolutionary or patriotic symbols (60%) and the mentions of inclusive visual language (60%). The third party with higher scores in affective polarisation was *Fidesz – Magyar Polgári Szövetség,* which in more than half of their visuals included some kind of representation of military, religious, revolutionary or patriotic symbols (55.6%) or mentioned inclusive visual language (55.6%). In the case of *Rassemblement National,* the only indicator they displayed on their visuals was the use of the party's ideological symbols (94.3%). Neither the party *Fratelli d'Italia* nor *Prawo i Sprawiedliwość* showed any significant presence of any affective polarisation indicator included in our list.

Finally, we created an index with the scores from all the affective polarisation indicators and conducted a one factor ANOVA to compare the means among the different political parties. The variance homogeneity test was significant p <.001 (F value = 8,000) indicating that there is a significant difference between the variances, and Ho is refused. A post hoc analysis (using Tamhane's T2 test) to identify where there were significant differences among the political parties was conducted, which showed that *Alternative für Deutschland* was the specific party that mostly differed from the other parties with a mean in the affective polarisation index that scored quite high on average (4.2) compared to *VOX* (2.8), *Fratelli d'Italia* (2.6), *Rassemblement National* (2.3), *Fidesz – Magyar Polgári Szövetség* (1.7) and *Prawo i Sprawiedliwość* (1.7). These findings partially refused H2, that assumed – by comparing visuals on Instagram from European far-right parties from different countries – that there would be a common pattern containing some of the more relevant visual features that scholars empirically used to measure affective polarisation (Bonikowski et al., 2022; Svraka, 2023; Yarchi et al., 2021). On the contrary, our results showed that, although those affective polarisation indicators were strongly detected among some political parties (*Alternative für Deutschland* being the most relevant example), in general the relevancy of those indicators was quite discrete among other parties, so we

Table 6:
Presence of affective polarisation indicators among different parties (N = 260)

		Alternative für Deutschland (%)	VOX (%)	Rassemblement National (%)	Fidesz – Magyar Polgári Szövetség (%)	Fratelli d'Italia (%)	Prawo i Sprawiedliwość (%)	Total (%)	p-value
Defiant attitude towards institutions	No	75	100.0	91.4	100.0	95.1	100.0	93.8	.007**
	Yes	25	0.0	8.6	0.0	4.9	0.0	6.2	
Representation of military/religious/revolutionary/patriotic symbols	No	60	40.0	91.4	44.4	70.7	70.6	70.0	.003**
	Yes	40	60.0	8.6	55.6	29.3	29.4	30.0	
Representation of stereotypes	No	75	100.0	97.1	100.0	99.4	100.0	97.7	.001**
	Yes	25	0.0	2.9	0.0	0.6	0.0	2.3	
Inclusion or mention of violence/struggle	No	60	93.3	91.4	77.8	59.8	70.6	67.3	.002**
	Yes	40	6.7	8.6	22.2	40.2	29.4	32.4	
Inclusion of the party's ideological symbols	No	0	33.3	5.7	100.0	27.4	82.4	28.8	.001**
	Yes	100	66.7	94.3	0.0	45.8	1.2	71.2	
Mentions divisive visual language	No	15	40.0	60.0	44.4	66.5	100.0	61.5	.001**
	Yes	85	60.0	40.0	55.6	33.5	0.0	38.5	
Predominant use of emotions	No	85	80.0	97.1	55.6	76.8	82.4	80.0	.048*
	Yes	15	20.0	2.9	44.4	23.2	17.6	20.0	
Identification of non-political enemy/enemies	No	40	93.3	85.7	100.0	60.4	82.4	66.9	.001**
	Yes	60	6.7	14.3	0.0	39.6	17.6	33.1	
Call to social or political mobilisation	No	95	60.0	85.7	100.0	98.8	100.0	94.6	.001**
	Yes	5	40.0	14.3	0.0	1.2	0.0	5.4	
Negatively refers to other opposition groups or political leaders	No	65	73.3	65.7	100.0	81.1	64.7	76.9	.077
	Yes	35	26.7	34.3	0.0	18.9	35.3	23.1	

Note: Symbols indicate the following p-values: $^{*}p < 0.1$, $^{**}p < 0.05$, $^{***}p < 0.01$

cannot identify a common pattern of visuals featured as affective polarisers among the European far-right parties included in our sample.

The analysis shows that governmental parties (i.e. *Fidesz – Magyar Polgári Szövetség* and *Prawo i Sprawiedliwość*) used different visual framing techniques compared to non-governmental parties. With *Fidesz* in power in Hungary, their images strongly displayed markers of emotional polarisation, such as the widespread usage of party ideological symbols (100%) and representations of military/religious/patriotic symbols (55.6%). Similarly, *Prawo i Sprawiedliwość* in Poland included symbols related to the military, religion and nationalism (55.6%) but not showing as strong an indication of emotional polarisation.

On the other hand, far-right groups that are not in power have embraced more polarising visual communication techniques. *Alternative für Deutschland* showed the highest results on a number of factors with mentions of inclusive visual language (85%) and the usage of party ideological symbols (100%) being highlighted. Similar results of emotional polarisation were also shown by *VOX* and *Rassemblement National,* especially when it came to the depiction of military, religious and patriotic symbols and references to inclusive visual language. As seen in their aggressive use of emotional polarisation indicators to resonate with their followers and impact public discourse, these opposition parties may rely on confrontational methods to challenge the incumbent parties and rally their voters.

Conclusions

Our study explored the use of visual framing strategies for political purposes on Instagram. Specifically, we examined the differences between six European far-right political parties in how they used the opportunities provided by this platform to build their political identity based on affective polarisation communication resources. The visual framing analysis of 260 images posted on the official Instagram profiles of the sampled European far-right political parties supports previous literature regarding the use of visual affective polarisation on Instagram to build political identity in online contexts. By analysing the use of visual symbols, rhetoric and imagery used by these parties to convey their ideologies and appeal to their target audiences, this work expands the existing literature on visual communication in politics and enhances our understanding of social media and polarisation strategies.

The aim of this paper was to offer a comparative analysis of the impact of visual affective polarisation on Instagram and explore the differences in the visual framing methods utilised by these far-right political parties in Europe. We studied the use of visual symbols and imagery in detail, and analysed the differences with respect to three visual polarisation concepts, that is, denotative, stylistic and connotative. When scrutinised in these three contexts, we concluded that far-right European parties in our sample differ from each other to some extent. Our results showed that the sampled parties use different strategies to create their content, and style the way it is portrayed, as well as to shape the rhetoric they use to spread their message. Thus, despite being in a shared political spectrum, our findings lead us to conclude that these political parties employ distinct visual framing methods. The analysis contributes to the scarce knowledge regarding the intricate and complex relationship between visual framing and political discourse.

This study also focused on the visual features for measuring affective polarisation used by scholars (Bonikowski et al., 2022; Svraka, 2023; Yarchi et al., 2021). The results from our empirical analysis rejected the idea of a pattern of common indicators. They suggested that despite the strong presence of affective polarisation features among certain political parties – *Alternative für Deutschland* being the most pertinent example – their relevance was generally distinct between them. Therefore, we were unable to find a pattern of visuals among the six sampled European far-right parties. Perhaps, the most important difference that we found is related to *Alternative für Deutschland,* which differed most from the other parties in the sample. This party also scored highest in the affective polarisation index, as well as in terms of average number of likes and comments, thus being one of the most engaged on Instagram.

There are several potential causes for the empirical findings of this study. As noted by Knudsen (2021), polarisation is presumed to be more significant and present in the political landscape of the United States compared to that of European countries, primarily because of the differences in the potential of greater polarisation between bipartisan and multiparty systems. Despite this assumption, Gidron et al. (2019) provide evidence demonstrating that the level of affective polarization in the US is average compared to that in other democracies. Interestingly, Switzerland, which is perceived as one of the most stable democracies in the world, scores highest amongst the study's sample of countries. The authors argue that party size is a great determinant of affective polarization in a country, as the perception of voters is more likely to be polarized with respect to a larger opposing political group. Gidron et al. (2019) and Wagner (2020) use different approaches to measure the degree of affective polarization that are based on like-dislike discrepancies for certain political groups, arguing that this helps in capturing party preferences and polarization among voters of different political groups. Both papers stress the importance of party size and account for it by adding a weight index. In addition, cross-country studies (e.g. Gidron et al., 2019) imply the complexity of studying affective polarisation, not just in the context of multiparty systems but also across different countries. These findings show that relative party size in each respective country (i.e. some far-right parties in our sample are significantly larger and more impactful than others) and country-specific factors should be accounted for, as they may cause differences in the level of affective polarisation, and thus differences in the strategies followed.

In conclusion, this study represents one of the first attempts to explore the strategic use of Instagram for affective polarisation among far-right parties from a visual communication comparative perspective. Furthermore, it also provides an addition to the relatively scarce literature concerning affective polarisation in European multiparty political systems, given the relative abundance of papers focusing on the bipartisan one in the United States. Future research can build on the findings of this study, as well as address its limitations. This study represents only six specific countries, thus, for a comparative and more global perspective, it would be interesting to expand this work using international data from other political contexts in which cultural aspects could be a key factor in explaining the construction of political identity. Another problem relates to potential *simultaneity* and/

or *reverse causality* biases between social media usage and affective polarisation. While there is consensus about the fact that these two concepts are correlated, evidence is mixed regarding any causal direction between them – that is, whether social media usage causes affective polarisation, or vice-versa, or whether they cause each other simultaneously. Nordbrandt (2023) challenges the idea of the former by employing econometric models to test the direction of causality and provides sufficient evidence to conclude that affective polarisation causes changes in social media usage, implying reverse causality in the face of the common assumption that social media impacts affective polarisation. Perhaps, the authors' most important arguments are the paper's limitations, which posit that to study and expose the true relationship between these concepts, exogenous variation is required to overcome such biases.

The authors are also aware of the limitations in the choice of methods for framing analysis, namely the most common focus on still images. A further extension to our analysis would be to use an approach that scrutinises framing through moving imagery. Nonetheless, since the main goal of this article was focused on content rather than technical aspects, we consider that limitation does not affect the validity of the findings. Finally, it should be noted that the study focused on the Instagram accounts of political parties, while the political leaders of those far-right parties were not included in this study. Further research could also extend the sample to explore the use of affective polarisation in other countries and in connection with personalisation strategies at the individual level.

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ARTICLE

Generating a Deepfake Frame

A Text Mining Study Based on Reddit

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This study investigates the understanding of deepfake, a highly realistic AI mimicry technique that is rapidly evolving to produce increasingly realistic videos and explores the construction of a deepfake framework through the lens of audience communication using framing theory. It identifies three key findings. First, the public discourse on deepfakes forms a concept hierarchy emphasising technology and its entertainment applications, with core concepts including AI, voice, actor and job, while peripheral concerns such as consent and company receive less focus. Second, employing the BERTopic algorithm, latent themes in public discussions were categorised into two dimensions: social dynamics and cultural phenomena. Third, sentiment analysis reveals predominantly neutral or negative attitudes, indicating concerns over the risks and societal impacts of deepfake technology. The deepfakes framework developed here provides a structured approach to understanding these impacts, highlighting the need for ethical considerations in technological development, regulatory measures and public education.

Keywords: deepfakes, frame theory, BERTopic model, word2vec, sentiment analysis

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Introduction

Deepfakes are defined as "hyper-realistic videos digitally manipulated to depict people saying and doing things that never actually happened" as, for example, in the AI face swap used to "reanimate" the actor Paul Walker in *Fast & Furious 7* (Westerlund, 2019, p. 51). The popularity of generative AI applications has led to the widespread and pervasive presence of deepfakes. They are increasingly being spread across the web via social media, where deepfake content is convincingly and widely distributed. Powerful new AI software has made it easy to create and disseminate videos of people saying and doing things they never actually said or did.

Whittaker et al. (2023), in a systematic literature review on deepfakes identified several knowledge gaps and opportunities for future research. These gaps and opportunities fall under five research streams of interest: generation, information dissemination, adoption and rejection, impact and regulation and ethics. Current research tends to focus more on the development and detection of deepfake technology. However, from the public's perspective, the mere existence of deepfakes has already eroded confidence in digital content because seeing no longer equates to believing. The ability to create deepfakes is becoming increasingly accessible, and online platforms can rapidly distribute false content, threatening both belief systems and truth itself (Heidari et al., 2024). Although deepfakes present challenges, the technology also demonstrates artistic potential in virtual communication, entertainment and visual effects. Future research must continue to focus on balancing the beneficial potential of deepfakes while minimising their negative impact (Naitali et al., 2023).

Recent surveys indicate that the U.S. public perceives both potential benefits and risks associated with AI (Aoun, 2018; West, 2018; Zhang & Dafoe, 2019). These surveys also reveal that opinions about AI differ across political and demographic lines. However, existing research has paid less attention to the potential for communication to shape public attitudes toward deepfakes, an application of AI, or their potential to interact with one another in doing so. While spreading false information is easy, correcting the record and combating deepfakes are more challenging (De keersmaecker & Roets, 2017). Current research on deepfakes has concentrated on algorithmic approaches for detecting deepfake content (Bappy et al., 2019), the dangers and hazards of deepfakes (Godulla et al., 2021) and users' feelings about sexual deepfakes (Wang & Kim, 2022). With regard to deepfakes of the deceased, the resurrection of figures through deepfakes has met with complex responses: while some audiences found the deepfakes to be a powerful prosocial message, others reported feeling uncomfortable seeing the deceased being manipulated through deepfakes (Kneese, 2020).

This brings us to a crucial question: Given their complex attitudes, how do people talk about deepfakes? This is a matter we need to clarify. *Framing theory* offers a potential avenue through which to explore this issue. Framing theory addresses several key questions about the framing process (Reese, 2001; Chong & Druckman, 2007; Scheufele, 1999; Walsh, 1995), including the frames that the public uses to understand issues *(cognitive frames).* Such cognitive or *mental frames* refer to the mental templates individuals use to process information, interpret entities and environments, and determine appropriate actions (Walsh, 1995). This concept provides a foundation for understanding deepfakes from the public's perspective.

There is growing research on artificial intelligence (AI) and its implications within the framework theory paradigm, aiming to construct different methodologies to explain the effects of AI and its reproductions on individuals, organisations or society (Makarius et al., 2020; Ashok et al., 2022; Huang & Rust, 2021). However, current discussions on AI frameworks rarely delve into AI simulations. Due to the unique nature of deepfakes – marked by their aggressiveness and clearer intentions – the AI framework does not fully accommodate the complexities of deepfake scenarios. Therefore, this research seeks to address the question: *What are the audience frames used by the public when engaging with deepfakes*? As a metatheory, framing itself encompasses various aspects of modern human life, and deepfakes, as a highly controversial use of technology, offer a valuable contribution to the application of framing theory.

This study is set against the backdrop of the increasing maturity and development of AI applications such as ChatGPT, Sora and ZAO. Through the lens of framing theory (Entman, 1993; Gamson & Modigliani, 1989; Reese, 2001), it aims to clarify how the public perceives deepfake technology and explore the underlying themes in public discussions of deepfakes. The goal is to analyse public discourse on deepfakes, identify key themes in public cognition on deepfakes and ultimately develop a framework for understanding how deepfakes are framed by the public.

Literature review and research questions

AI frameworks and public perceptions of AI

The study begins with a theoretical exploration of how past experience might influence users' understanding and attitudes towards deepfake technology. Framing, as defined by Gamson & Modigliani (1987, p. 143), refers to "a central organizing idea or storyline that provides meaning to unfolding events and connects them. Frames suggest what the controversy is about and the nature of the problem". Frames consist of metaphors, buzzwords, images and other symbolic devices that help construct meanings for topics, such as emerging technologies (Gamson & Modigliani, 1989). According to Entman (1993), framing involves selecting certain aspects of perceived reality and highlighting them in communicative texts to facilitate specific definitions of problems, causal explanations, moral evaluations and/or treatment recommendations (p. 52). Framing occurs at multiple levels: in communicative texts like news stories, Hollywood movies, television shows, and interpersonal conversations; in the minds of the audience; and as part of the broader culture (Entman, 1993).

A review of existing literature reveals that AI frameworks are generally categorised into four domains: physical, cognitive, informational and governance. Among these, the governance domain has been emphasised by many scholars because it addresses the controversies surrounding AI and how these challenges should be overcome. The ethical implications of AI span multiple scientific disciplines, which provides for ethical AI analyses in various contexts (Ashok et al., 2022; Ulnicane et al., 2021; Akter et al., 2023). Interestingly, much research on AI frameworks also relies on the underlying logic of AI itself, using methods such as computational modelling, emotion recognition, sentiment analysis and human attention and performance monitoring (Górriz et al., 2023).

In studies focusing on AI frameworks, many adopt computational methods (Gourlet et al., 2024; Natale & Henrickson, 2024; Nguyen, 2023; Zeng et al., 2023), employing deep learning techniques to address real world applications and research problems related to AI frameworks. It is noteworthy that review articles tend to engage more deeply with AI frameworks than empirical studies, a distinction due not only to meta-analysis but also to the different levels of AI literacy represented by the research samples. AI literacy, a subset of digital literacy, refers to the ability to understand and apply AI technologies in the AI era, as well as the capacity to comprehend AI's societal impact. This literacy is crucial in adapting to rapidly changing technological environments (Domínguez Figaredo & Stoyanovich, 2023).

AI literacy involves not only interacting with AI applications but also recognising ethical issues (Steinbauer et al., 2021). In this context, ethics are defined as awareness of the responsibilities and risks associated with AI usage, requiring users to ensure AI technologies are used correctly and appropriately (Wang et al., 2023). However, current research remains largely concentrated in data science and computer science fields, leaving room for complementary studies that explore the ethical implications of AI from the perspective of media or audiences.

Audience discourse and audience framing of technology on social media

Social media platforms are increasingly recognised as valuable sources of information and public discourse. As social media has gained popularity within public communities, there has been a significant shift in how public opinion is analysed, moving beyond traditional surveys and interviews. Public perceptions of AI are still in the process of being shaped and developed, which makes understanding and analysing public opinion surrounding AI critically important (Zhou et al., 2024). By examining the public's perspectives, attitudes, and concerns, we can gain valuable insights into the current state of public perception, bridge knowledge gaps, and ensure that the development and deployment of AI technologies align with societal expectations and values (Qi et al., 2024).

Reddit, a popular social networking platform, stands out as a valuable source of data for research due to its large user base, diverse topic communities, and the anonymity of its users. These characteristics make it particularly useful for exploring topics such as politics and mental health, as its data offers unique perspectives and rich material for academic analysis (Li et al., 2023). We have chosen Reddit as the focus of this study because of its distinct social networking features. Unlike Facebook and Twitter, Reddit allows users to post longer comments and threads, encouraging more thoughtful discourse. This, in turn, can generate higher quality electronic word-of-mouth (eWoM). Such reflective communication offers a new lens through which we can explore how users disseminate and interpret information, making Reddit a particularly valuable platform for in-depth social media research (Bonifazi et al., 2023).

Our research focuses on public discussions about technology on social media, which means we have taken an audience-centred approach. The influence of public discourse on people's perceptions of deepfakes has been well documented in public opinion research (Zaller, 1992). Audience frames refer to an individual's perceptions regarding an issue. They are defined as "interpretive patterns that enable individuals to perceive, organize, and understand incoming information" (Valkenburg et al., 1999). The public can use media messages or interact with peers to understand and evaluate AI (Claessens & Van den Bulck, 2016). For instance, research conducted through focus groups has shown that individuals acquire knowledge about topics such as nuclear energy (Gamson, 1992) and genetic technology (Bates, 2005) by engaging in conversations with their peers. During these discussions, the public not only draws from media discourse but also from their own values, experiences and reasoning abilities (Gamson, 1992, p. 117). Moreover, research has shown that interpersonal communication can influence people's attitudes towards various issues (De Vreese & Boomgaarden, 2006; Price et al., 2005). Consequently, some studies suggest that discussing science and technology can reconstruct attitudes towards emerging technologies by providing information and linking it to existing knowledge (Ho et al., 2013; Liu & Priest, 2009). The interaction between audience frames can reshape the original frames.

Previous research has identified two primary modes of public discussion regarding technology. One view presents new technologies as tools for solving problems and improving lives, while the other sees them as potential factors that could lead to uncontrolled or catastrophic consequences (Nisbet, 2009). According to Gamson and Modigliani (1989), framing is not simply about taking a positive or negative stance on an issue. A frame can encompass a range of positions, even though media messages may be dominated by a particular viewpoint. Moreover, there can be multiple "pro" and "con" positions on any given issue (Nisbet, 2009). This suggests that, depending on the perspective, audiences may hold different stances on a specific subject.

Individual attitudes toward deepfakes

Deepfake technology, which utilises deep learning and generative adversarial networks to create or manipulate videos, audio or images with high realism has both positive and negative implications. While it has promising applications in creative and entertainment fields, such as enhancing user experiences in Metaverse applications, improving the realism of virtual customer service agents, and serving as educational tools (Tricomi et al., 2023; Mustak et al., 2023), it also poses significant risks. These include the potential for misuse in generating false information, spreading rumours and committing identity fraud.

Unlike other AI technologies, deepfakes create highly realistic, computer-generated human representations, typically in video format. This realism implies that the content produced appears to be of *actual people* interacting in a human-like manner. Current research on deepfakes often focuses on their risks and negative impacts, such as information manipulation and fake news (Gamage et al., 2022). However, it is also important to acknowledge the benefits of deepfake technology (Mustak et al., 2023), as mentioned above, its potential to enhance user experiences in virtual environments and serve educational purposes.

Discussions surrounding deepfake technology reveal diverse perspectives. While many users find deepfakes fascinating and impressive, there are significant concerns about potential misuse (Cleveland, 2022). On the one hand, deepfakes are criticised for their potential in creating fake news, invading privacy and manipulating public opinion (Saif et al., 2024). For instance, when potential voters are aware of the existence of deepfakes, they may even question the authenticity of genuine videos, potentially undermining their trust in political institutions and reinforcing beliefs about conspiracy (Ternovski et al., 2022). These concerns highlight the potential for deepfakes to disrupt social trust and legal systems. On the other hand, some argue that deepfake technology itself is not inherently harmful; rather, it is the application and regulation of the technology that need to be managed to ensure its positive development, such as its innovative uses in filmmaking and virtual reality (Ahmed, 2021).

Public attitudes toward deepfakes are central to the ongoing debate surrounding this technology. These attitudes not only influence the level of trust the public places in deepfake content but also determine the acceptance of deepfake technology across various applications, including virtual reality environments, virtual assistants and educational programs (Seymour et al., 2021). If the public is generally sceptical about deepfakes, the adoption and positive utilisation of these technologies may be hindered. In consequence, understanding and shaping public perceptions of deepfakes is crucially important in ensuring the responsible and healthy development of the technology. This requires balancing technological advancements with ethical considerations and enhancing public education and awareness, so that people can enjoy the benefits of the technology while recognising and mitigating potential risks.

Our research aims to delineate the core dimensions of the deepfake framework by exploring the central themes in public discussions about deepfakes. Guided by the motivating question, given their complex attitudes, how do people talk about deepfakes? We seek to understand the audience-based framework of deepfakes. Based on this guiding question, we have focused on three research questions (RQs):

RQ1: What is the conceptual hierarchy in public discussions about deepfakes? Which concepts are central and which are marginal?
RQ2: What are the potential themes in public discussions about deepfakes, and how are they categorised into dimensions?
RQ3: What are the emotional attitudes of the public within each theme?
RQ1 examines the priority structure of topics in public discourse. RQ2 explores the dimensional categorisation of the deepfake framework. RQ3 investigates public attitudes within specific dimensions. To address these RQs, we employed text mining computational methods on the collected data. Our findings reveal the potential of the deepfake framework, particularly in highlighting themes of public concern. This provides pathways for further empirical work in theorising and better understanding human–deepfake interactions.

Research design

Data

This study employed the Python Reddit API Wrapper (PRAW, https://praw.readthedocs.io/en/stable/) to collect comments related to deepfakes. The comments on the 20 most popular videos were collected using the keyword "deepfake" from 1 January, 2022 to 18 December, 2023. PRAW was used to retrieve and print comments from specific posts on Reddit. To begin, a Reddit object is created using PRAW and the necessary credentials – including client ID, client secret password, user agent, and username – are provided. Next, the URL of the target Reddit post from which comments are to be fetched is specified. Using the extracted post ID, the specific Reddit post object is obtained via the "reddit.submission (id=submission_id)" method. All the top-level comments are iterated and printed. In this process, "MoreComments" objects, which represent collapsed comments, are excluded as they do not require processing. After this, "submission.comments.replace_more(limit=None)" is called to retrieve all collapsed comments, which are replaced with actual comment objects. Finally, "submission.comments.list()" is used to obtain a list of all comments, which are then printed individually.

PRAW has been used by many previous studies to collect social media data (Deas et al., 2023). A total of 19,910 comment texts, containing 749,375 words, were collected from the 20 most popular videos on Reddit. The raw data was then processed using SPSS 29.0 software's data cleaning tools to eliminate incomplete samples and advertisements, and comments unrelated to deepfakes were manually removed. This process yielded 15,132 comment samples, totalling 569,045 words. The URLs of the twenty most popular videos of deepfakes on Reddit are listed below (see Table 1).

Table 1:
The most popular videos of deepfakes on Reddit

URL	Comments	Video name
www.reddit.com/r/technology/comments/14t4hd7/louisiana_outlaws_sexual_deepfakes_of_children/	509	Louisiana Outlaws Sexual Deepfakes of Children
www.reddit.com/r/LivestreamFail/comments/10q7pot/destiny_reasons_out_why_deepfakes_fundamentally/	548	Destiny reasons out why deepfakes fundamentally feel violating
www.reddit.com/r/LivestreamFail/comments/10pkdpn/xqc_take_on_people_saying_that_it_comes_with_the/	540	xQc take on people saying that "It comes with the territory" about deepfakes
www.reddit.com/r/Showerthoughts/comments/10t5pkg/deepfakes_are_ironically_taking_us_back_to_the/	560	Deepfakes are ironically taking us back to the pre-photography era of information where the only things we can be totally certain actually happened are events that we personally witnessed.

URL	Comments	Video name
www.reddit.com/r/TwoXChromosomes/comments/10pcawi/the_reaction_to_this_streamer_watching_deepfake/	557	The reaction to this streamer watching deepfake porn of women he knows is so scary to me.
www.reddit.com/r/conspiracy/comments/12nop3q/this_is_what_it_takes_for_normies_to_realize_the/	572	This is what it takes for normies to realize the danger of AI. Not deepfakes not their ability to clone your voice. I'm so tired.
www.reddit.com/r/LivestreamFail/comments/10sa1hj/dr_k_on_deepfake_pornography/	578	Dr. K on Deepfake Pornography
www.reddit.com/r/Futurology/comments/133m3vg/aigenerated_deepfakes_are_moving_fast/	630	AI-generated deepfakes are moving fast. Policymakers can't keep up.
www.reddit.com/r/Futurology/comments/1131q2r/keanu_reeves_says_deepfakes_are_scary_confirms/	635	Keanu Reeves Says Deepfakes Are Scary, Confirms His Film Contracts Ban Digital Edits to His Acting.
www.reddit.com/r/LivestreamFail/comments/11l3nh9/twitch_makes_some_changes_regarding_deepfakes/	676	Twitch makes some changes regarding "Deepfakes".
www.reddit.com/r/technology/comments/170iddp/deepfake_celebrities_begin_shilling_products_on/	796	Deepfake celebrities begin shilling products on social media, causing alarm.
www.reddit.com/r/skyrimmods/comments/12zel2z/it_happened_somebody_took_a_skyrim_voice_actors/	884	It happened. Somebody took a Skyrim voice actor's performance, fed through Eleven Labs to create AI-generated voices for a porn mod, and uploaded it to Nexus Mods. This is not acceptable.
www.reddit.com/r/ChatGPT/comments/156hcz7/chatgpt_wrote_all_the_words_coming_out_of_this/	938	ChatGPT wrote ALL the words coming out of this hyper-realistic deepfake – INSANE.
www.reddit.com/r/Damnthatsinteresting/comments/13l19qd/deepfakes_are_getting_too_good/	997	Deepfakes are getting too good.
www.reddit.com/r/technology/comments/16z1hyk/tiktok_ran_a_deepfake_ad_of_an_ai_mrbeast_hawking/	1,100	TikTok ran a deepfake ad of an AI MrBeast hawking iPhones for $2 – and it's the 'tip of the iceberg'
www.reddit.com/r/justneckbeardthings/comments/10rdpt9/how_dare_you_be_sad_about_people_making_deepfake/	1,200	How dare you be sad about people making deepfake porn of yourself? Like, grow up!
www.reddit.com/r/movies/comments/1130ocr/keanu_reeves_says_deepfakes_are_scary_confirms/	1,600	Keanu Reeves Says Deepfakes Are Scary, Confirms His Film Contracts Ban Digital Edits to His Acting.

URL	Comments	Video name
www.reddit.com/r/technology/comments/13einfa/deepfake_porn_election_disinformation_move_closer/	2,200	Deepfake porn, election disinformation move closer to being crimes in Minnesota.
www.reddit.com/r/gaming/comments/14tdayz/pc_gamer_anger_from_voice_actors_as_nsfw_mods_use/	3,600	[PC Gamer] Anger from voice actors as NSFW mods use AI deepfakes to replicate their voices: 'This is NOT okay.'
www.reddit.com/r/collapse/comments/12e0zv6/society_is_absolutely_asleep_at_the_wheel_in/	790	Society is absolutely asleep at the wheel in regards to the impact LLM's & AGI are going to have on the working class.

Source: compiled by the authors

It is important to note that Reddit does not allow us to extract information about users' geographic locations. Additionally, due to the lack of descriptive information about users, we are unable to collect additional data on factors such as age, gender or education level, which could potentially influence attitudes. According to a survey by the Pew Research Center, Reddit has unique mechanisms, and its user demographics differ from those of other social media platforms (Auxier & Anderson, 2021). These differences may provide supplementary insights into understanding public perceptions of deepfakes.

Text mining

The Gensim library was used for data processing. Gensim is a Python library designed for topic modelling, document indexing and similarity retrieval with large corpora, primarily servicing the natural language processing (NLP) and information retrieval (IR) users (Řehůřek & Sojka, 2010). The study utilised three text mining methods: The study began with semantic network analysis, using the Word2vec model to generate a semantic network graph in Gephi. Sentiment analysis was then conducted to determine the text's sentiment orientation. Finally, the BERTopic model was used for topic analysis. The program as a whole was completed using Python 3.10 software.

Gensim was used for text preprocessing, which involved tokenisation, lowercasing, stop word removal, and retaining only alphanumeric tokens. Next, a Word2Vec model was trained on the preprocessed text data using specific parameters such as vector size, window size, minimum count and number of workers (Church, 2017). Pairwise semantic similarity scores were then computed for each word in the vocabulary of the Word2Vec model. An edge was added between two words in the semantic network graph if their similarity score exceeded a threshold of 0.5. The resulting graph was then visualised using Gephi software (Bastian et al., 2009).

BERTopic, as an efficient text clustering tool, excels in extracting contextual meanings and semantic relationships from text by leveraging pretrained BERT models to capture deep semantic features. It automatically identifies and interprets interpretable topics, providing highly interpretable output results. This allows users to further simplify topics based on domain knowledge. Empirical validations have demonstrated BERTopic's superiority over traditional topic modelling techniques such as LDA in handling large volumes of unstructured text data (Tang et al., 2024). The latest BERTopic algorithm has gained prominence in the field of topic modelling, with researchers from various domains applying it and validating its superiority and adaptability compared to other algorithms (Egger & Yu, 2022; Chen et al., 2023).

Mendonça & Figueira (2024) reviewed several studies using the BERTopic method and emphasised that UMAP better retains local and global features of high-dimensional data compared to alternatives such as PCA or t-SNE. HDBSCAN allows noise to be treated as outliers and does not assume centroid-based clusters, which provides advantages over other topic modelling techniques. Additionally, the classic TF-IDF variant used during the c-TF-IDF process generates a word bag at the cluster level, connecting all documents within the same cluster. TF-IDF is then applied to the word bag of each cluster, providing a measure for each cluster rather than for the entire corpus.

Past experiences support the use of our method, and BERTopic is recognised as a reliable topic classification tool. We have, therefore, utilised BERTopic for topic classification of our samples. In this study, we employed BERTopic topic modelling techniques to analyse text data, identify, as well as interpreting the underlying topic structures. Initially, we converted the text into vector form using the multilingual model from the Sentence-Transformer library for further analysis. Next, we reduced the dimensionality of the vector data using the UMAP algorithm and identified topics in the data using the HDBSCAN algorithm based on the set minimum cluster size parameters. During the training process, we applied a ClassTfidfTransformer to enhance the textual representation of topics. After training, we saved the BERTopic model to a file and created a DataFrame containing each document and its corresponding topic, which was then exported to an Excel file. Additionally, we generated various visualisations, including bar charts, distribution plots and hierarchical charts of topics and saved these visualisations as HTML files for intuitive presentation of the topic modelling results.

Although Gensim does not provide direct sentiment analysis capabilities, it can be a valuable tool for text processing to facilitate sentiment analysis tasks. Sentiment analysis is a crucial tool for mining social media opinions and can be categorised into two approaches: dictionary based and machine learning based (Bordoloi & Biswas, 2023). Dictionary based methods classify emotions by mapping words to emotional directions using predefined dictionaries. However, in practice, user-generated social media content often contains misspellings and internet slang, making dictionary based methods less effective (Chatterjee et al., 2019). Consequently, this study will rely on artificial intelligence and deep learning based sentiment analysis toolkits to improve robustness and flexibility.

We used Gensim along with the machine learning library Scikit-learn (Pedregosa et al., 2011) for sentiment analysis. We first converted each text sample into vector representations by averaging the word vectors derived from the Word2Vec model. This step transforms raw text data into a format suitable for machine learning algorithms. Next, we trained the vectorised text data using Scikit-learn's logistic regression classifier and generate sentiment analysis results. By leveraging the semantic information captured by Word2Vec embeddings, this method allows the sentiment analysis model to learn and

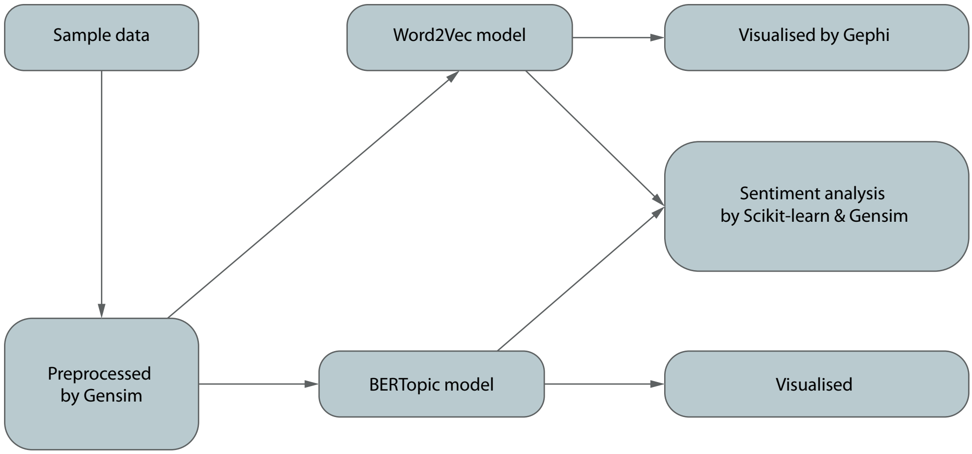

Figure 1:
Visualisation of the research process
Source: compiled by the authors

recognise emotional patterns in the text data. The combination of Gensim and Scikit-learn provides a powerful framework for conducting efficient and effective sentiment analysis tasks.

Specifically, each post$_c$ is labeled with positive sentiment QUOTEp_c^+ and negative sentiment p_c^-, with their sum equal to 1. Based on previous research (Stieglitz & Dang-Xuan, 2013), this study aggregates these two probability values into their difference to obtain a single sentiment polarity score $p_c = p_c^+ - p_c^-$. A positive polarity score indicates that post$_c$ is more likely to be positive (i.e. favourable) rather than negative, and vice versa. This study expects to perform sentiment polarity scoring for all posts. The resulting scores will operationalise the variables discussed in the framework. Figure 1 illustrates the operational steps mentioned in the research design.

Results

Construct semantic network of deepfakes

The data processed by the Word2vec program in Gensim was exported to Microsoft Excel and imported into the network visualisation program of the Gephi software (version 0.1.0). We created a semantic network graph for Reddit comments of deepfakes, where words are nodes and relationships between them are edges. The semantic networks are weighted undirected networks. Weighted degree and eigenvector centrality are used to identify key topics. Nodes with a higher degree of weighting are more strongly linked to other nodes, indicating their importance in the domain represented by the semantic network. Figure 2 shows the results of the comments in question are from the 20 Reddit videos that were analysed.

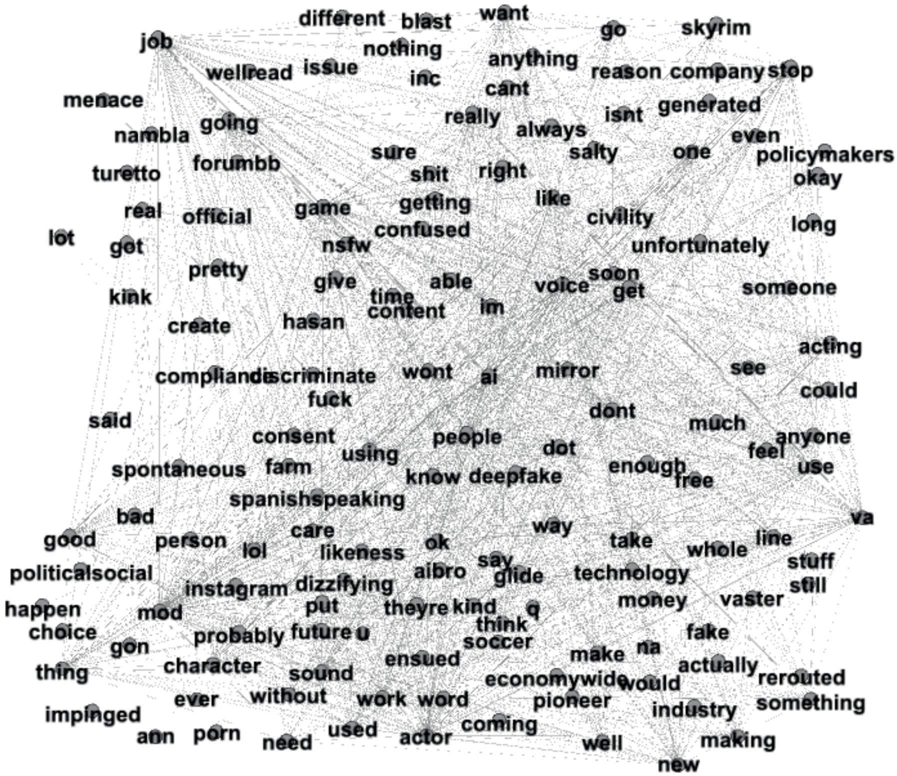

Figure 2:
Reddit – Deepfakes semantic network graph
Source: compiled by the authors

Table 2:
Top 10 calculations of weightiness and eigenvector centrality

Node	Weighted Degree Centrality	Eigenvector Centrality
people	52.074165	0.17240552768185900
like	40.911532	0.1499078425130630
ai	61.753613	0.1901658607102540
dont	43.468393	0.15751680700516600
would	13.922207	0.0661679654480382
think	28.429315	0.11528943155156200
voice	63.991547	0.1944615061402010
make	25.782831	0.10529209455008400
get	47.715491	0.16655182472667600
thing	31.827821	0.12745003892592100

Source: compiled by the authors

This semantic network graph comprises 147 nodes and 1,814 edges. In the public discussion of deepfakes, the conceptual hierarchy reveals that concepts related to *technology* and *applications* are positioned at the core, while discussions on *ethics* and *social impacts* are more peripheral. Core concepts include *AI, Voice, Actor, Job* and *Use.* The high centrality and feature vector centrality of these concepts indicate that public discourse is primarily focused on the development of deepfake technology and its applications within the entertainment industry, particularly concerning its impact on the careers of actors.

At the same time, the concept of *People* is also centrally positioned, reflecting public concern about the effects of deepfakes on privacy, reputation and social trust. In contrast, concepts such as *Consent*, *Company*, *Stop*, *Sound*, *Different* and *Bad* are positioned at the margins. Although these concepts address privacy issues, company policies and negative ethical viewpoints, they are emphasised relatively less in the overall discussion. This hierarchical structure indicates that the public is more focused on the technological development and application impacts of deepfakes rather than in-depth discussions of ethical or policy issues.

However, the high importance of the "people" node highlights the public's concern about the social impacts and moral consequences of deepfakes. It is crucial to consider the human aspect and how individuals should interact with deepfakes. This insight enriches our understanding of the deepfakes framework and underscores the importance of addressing the broader societal and ethical implications in future discussions and research.

BERTopic topic modelling and sentiment polarity analysis of deepfakes

This study applied the BERTopic algorithm, utilising individual modules SBERT, UMAP, HDBSCAN, and c-TF-IDF for modelling. The initial modelling was completed using default settings, incorporating the reduce_outliers algorithm to minimise noise interference. Without predefining the number of clusters, the model automatically generated 154 topics. As shown in Figure 3, the overall topic distribution exhibited characteristics of small scale aggregation and large scale dispersion, indicating potential for further aggregation between smaller topics. The figure illustrates the distribution of algorithm-generated topics in a two-dimensional scaling space. Each circle in the chart represents a distinct subtopic, and the size of the circle typically reflects the number of documents associated with that topic in the dataset. The position of the circles indicates the relative distance and similarity between topics: circles closer to each other suggest similar thematic content, while those further apart indicate greater content differences.

During the process of further determining the number of topics, we manually reviewed the original topic distribution in the figure above and the semantic network diagram to optimise and consolidate the topics. By continuously adjusting parameters related to BERTopic, such as "min_topic_size", we ultimately determined that 16 topics produced an optimal result. Figure 4 shows the distance distribution between topics, where each topic is relatively dispersed with minimal local overlap, indicating a relatively ideal clustering effect. Table 3 presents representative text content for each topic.

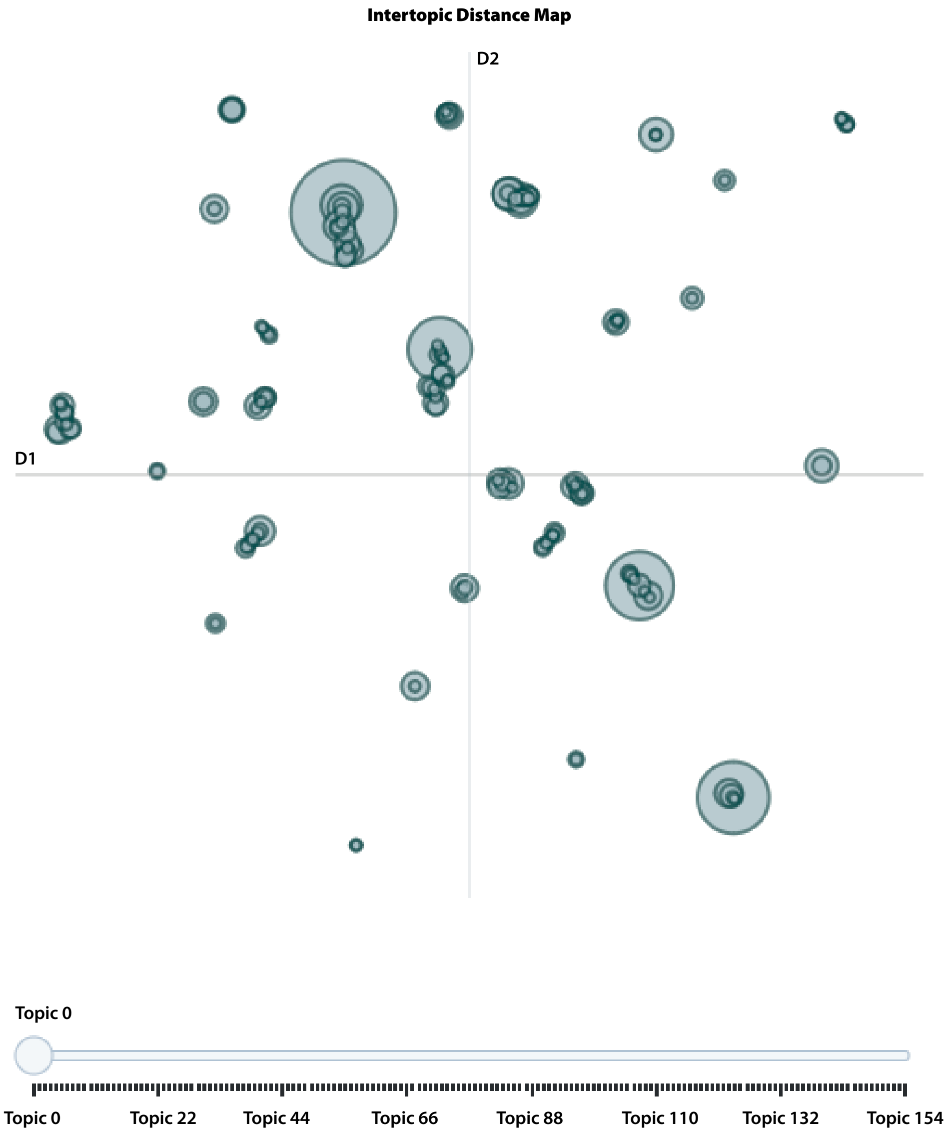

Figure 3:
Fully automated topic distribution
Source: compiled by the authors

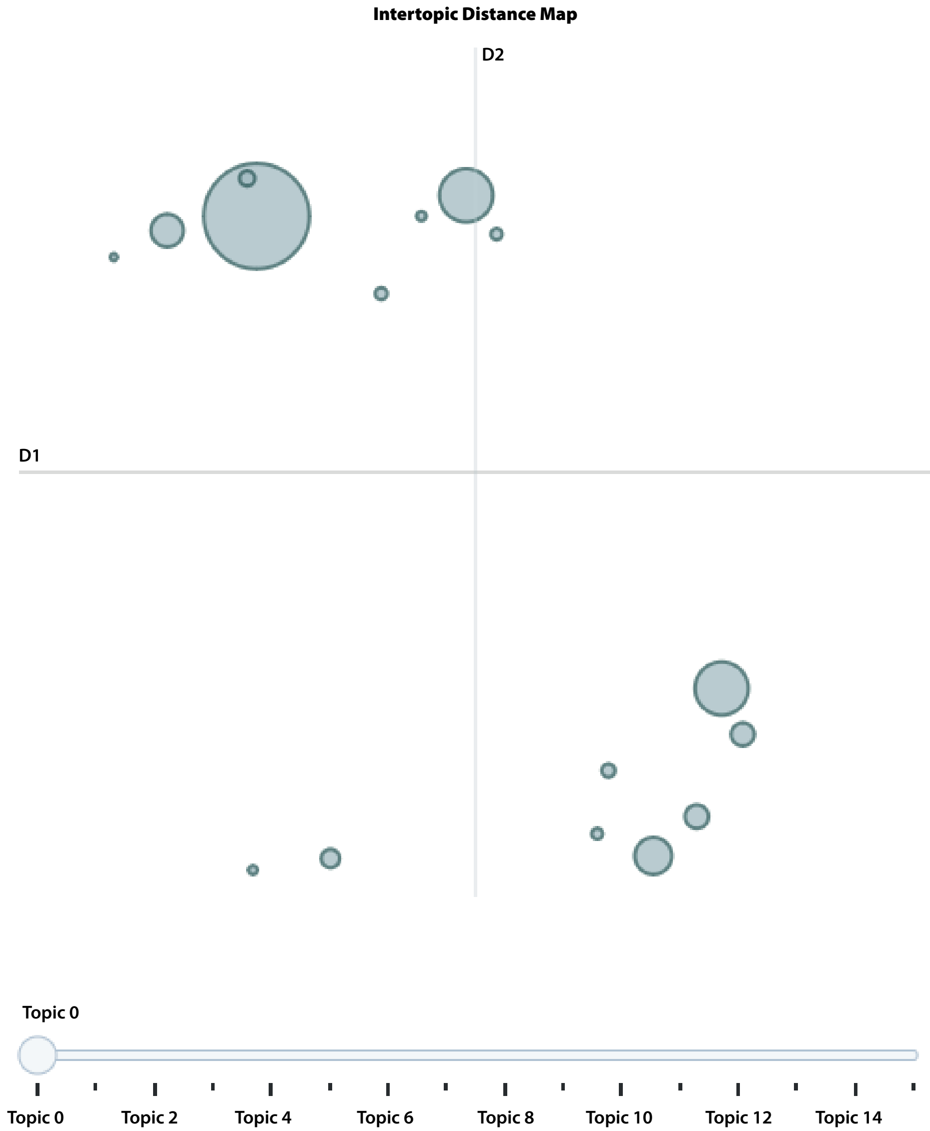

Figure 4:
The visualisation of the BERTopic model

Note: We uploaded the entire model to Google Drive and made it accessible via a dynamic web page after download (The visualisation of the BERTopic model: https://drive.google.com/file/d/1XoIL4IOgt0Ru3x-SJAmsXkzA3-1fM8bj/view?usp=share_link). Readers can explore the topic model for their own interests using an interactive, intuitive interface.

Source: compiled by the authors

Table 3:
Representative text content for each topic

Topic	Representation	Representative
0	[‘porn’, ‘voice’, ‘ai’, ‘like’, ‘people’, ‘actors’, ‘don’t’, ‘women’, ‘think’, ‘deepfake’]	[‘ai isn’t limited voice cloning fact much better making new voices don’t sound like particular person that’s what’s going replace voice actors’, ‘everyone porn made everyone make porn’, ‘honestly don’t really see issue horny modders use computer skills put artificial voices mods long don’t claim voices real vas don’t see problem don’t copyright voice don’t think besides voice mods vas voice imitation essentially thing mod voiced someone really good impression original vat shouldn’t person like able’]
1	[‘school’, ‘people’, ‘election’, ‘don’t’, ‘speech’, ‘law’, ‘laws’, ‘like’, ‘illegal’, ‘politicians’]	[‘case let’s say exact thing court case external event school participating likely involved bit planning school students community participating purely school activity’, ‘school trip kid outside school property school event happening also agree doesn’t political expression value makes political expression vulnerable deeply political justices rather less you’re implying honestly I’m confused stance okay limit freedom expression students don’t matter ai generated political expression cant infringed draw lines supreme court’, ‘don’t free speech school rules’]
2	[‘jobs’, ‘ai’, ‘work’, ‘job’, ‘people’, ‘internet’, ‘technology’, ‘money’, ‘new’, ‘dont’]	[‘want jobs’, ‘think people don’t care say 34 years ai taking work forces jobs’, ‘omg I’m project manager advertising terrifying I’ve seriously considering else try work seems like blue collar jobs like plumbing carpentry construction etc. safe woman interest sure could actually type work I’m strong handy one thing saving grace white collar jobs ai advancement think people still want work people ai running projects clients want talk person companies super lean current job 3 full time employees I’m pm I’ve using ChatGPT able things quickly take projects simultaneously I’m worried shake’]
3	[‘comment’, ‘edit’, ‘thanks’, ‘thank’, ‘fuck’, ‘read’, ‘that’s’, ‘point’, ‘yeah’, ‘reading’]	[‘yeah, sure comment’, ‘read comment lol’, ‘even read comment’]
4	[‘reddit’, ‘social’, ‘media’, ‘mods’, ‘twitch’, ‘mod’, ‘facebook’, ‘streamers’, ‘nexus’, ‘content’]	[‘much social media us talking social’, ‘reddit isn’t technically social media least original definition social media follow people you’re exposed content share interact reddit follow topics content see shared people social connection goes people interact comments social connections aspect defines social media less completely missing reddit’, ‘still social media’]
5	[‘empathy’, ‘people’, ‘crying’, ‘trauma’, ‘feel’, ‘scary’, ‘victims’, ‘pain’, ‘emotional’, ‘like’]	[‘don’t need basic human empathy would enough’, ‘people like empathy would hate happened’, ‘I’m sure know empathy’]
6	[‘world’, ‘time’, ‘future’, ‘years’, ‘humanity’, ‘live’, ‘old’, ‘ago’, ‘ai’, ‘end’]	[‘could live real world’, ‘future ai’, ‘last watched 20 years ago still think time time’]

7	['mouth', 'eyes', 'hands', 'facial', 'lips', 'movements', 'eye', 'face', 'expressions', 'movement']	['voice excellent mouth movements facial expression made clear fake still really impressive, good enough trick people sure', 'face eyes hair skin movements speaking mannerisms', 'facial expressions lips don't match intonation I'm sure it'll improve time really close']
8	['tom', 'cruise', 'scientol-ogy', 'hanks', 'fudge', 'guy', 'looks', 'hes', 'look', 'packer']	['tom cruise real tom cruise isn't real', 'except really tom cruise', 'tom cruise']
9	['deepfake', 'deepfakes', 'know', 'isnt', 'wait', 'willis', 'bruce', 'realistic', 'unrealkeanu', 'doesnt']	['someone makes deepfake', 'deepfake already ai', 'deepfake']
10	['jesus', 'christ', 'faith', 'religious', 'religion', 'pope', 'church', 'people', 'beliefs', 'bible']	['jesus christ clearly idea saying', 'jesus christ get ass', 'jesus christ lol']
11	['smoking', 'cigarettes', 'nicotine', 'vaping', 'health', 'smoke', 'cigarette', 'cancer', 'cardiovascular', 'smokers']	['mean said pretty straightforward I'm sure struggle smokers switch vaping cigarettes huge favor I'm saying people pick vaping don't smoke anything there's much harm reduction going cigarettes vaping suggest two pure ignorance', 'compared smoking cigarettes kills 6 million people around world every year nicotine less harmful inhaled cigarette smoke inhale nicotine wouldn't see kinds health risks health harms burdens see says nancy rigotti director tobacco research treatment center massachusetts general hospital cigarette smoke grab bag chemicals including 250 well-known bad us according national cancer institute includes heavy metals carbon monoxide hydrogen cyanide comes causing chronic lung disease cancer don't think nicotine big player rigotti says', 'you're talking smoking cigarettes vs vaping yes unlikely vaping cause damage long term smoking cigarettes could vaping possibly dangerous smoking cigarettes long term know ingredients']
12	['water', 'liquid', 'radioac-tive', 'peanut', 'sauce', 'diet', 'butter', 'balls', 'eat', 'boil']	['slow flowing liquid would like molasses tar pitch high viscosity liquid shown behave like liquid famous tar pitch drop experiment', 'edit rest story amorphous solid call amorphous liquid non flowing liquid whatever whole old glass windows flowing downward common misconception like always comes part discussion', 'know boil water']
13	['china', 'chinese', 'russia', 'russian', 'kinu', 'ukraine', 'offices', 'care', 'make', 'propaganda']	['would illegal china', 'yup even make laws west places like china russia ignore shit', 'also sue chinese companies think you'd china']
14	['mirror', 'black', 'episode', 'joan', 'season', 'awful', 'episodes', '6', 'new', 'steps']	['feels like black mirror episode', 'seen new black mirror episode', 'black mirror shit']
15	['friends', 'friend', 'elusive', 'friendship', 'asking', 'map', 'doors', 'open', 'maya', 'associated']	['big elusive friends ask', 'let take minute explain elusive friends' real life game mode called elusive friends', 'asking friend']

Source: compiled by the authors

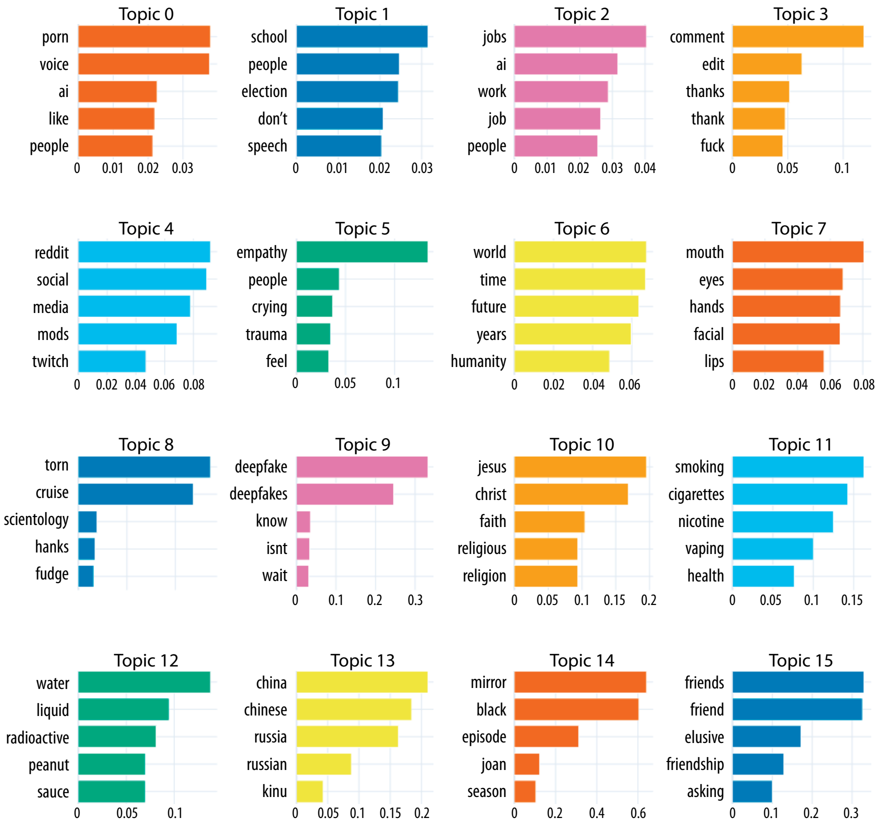

Figure 5:
The word score results by topic
Source: compiled by the authors

Figure 5 shows the keywords with the highest c-TF-IDF scores in each topic, illustrating the composition of different topics and identifying the most influential keywords defining these topics. Each subplot represents a topic, with the horizontal axis indicating the weight or contribution of the keywords within the respective topic, and the vertical axis listing the top-weighted keywords for each topic. The length of the bars in the bar chart represents the weight, with longer bars indicating a greater contribution of the keyword to the topic.

As shown in Figure 6, the hierarchical topic map generates a dendrogram to visualise the hierarchical clustering of the 16 topics, where topics of the same colour share greater similarity. The diagram illustrates the relative relationships and hierarchy between the extracted subtopics. Each topic is labelled with a number and descriptor on the left side of the chart, while the different coloured lines represent various topic categories and clustering branches, helping to distinguish broader group relationships between topics. On the horizontal axis, smaller values indicate greater content similarity between connected topics, while larger values indicate greater differences between topics, providing guidance for the hierarchical categorisation of the deepfakes framework.

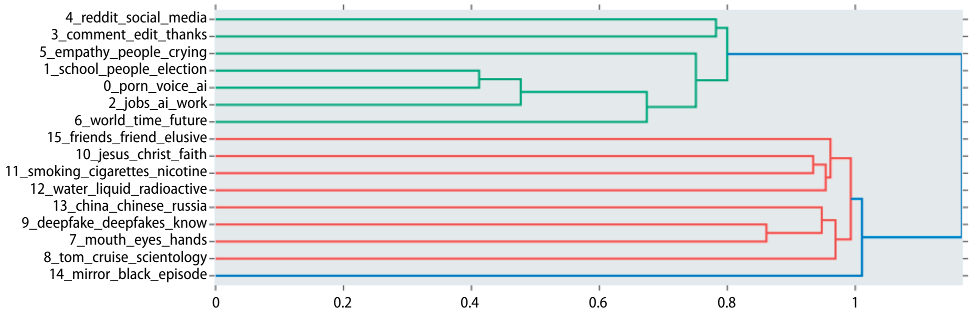

Figure 6:
The hierarchical map of topics
Source: compiled by the authors

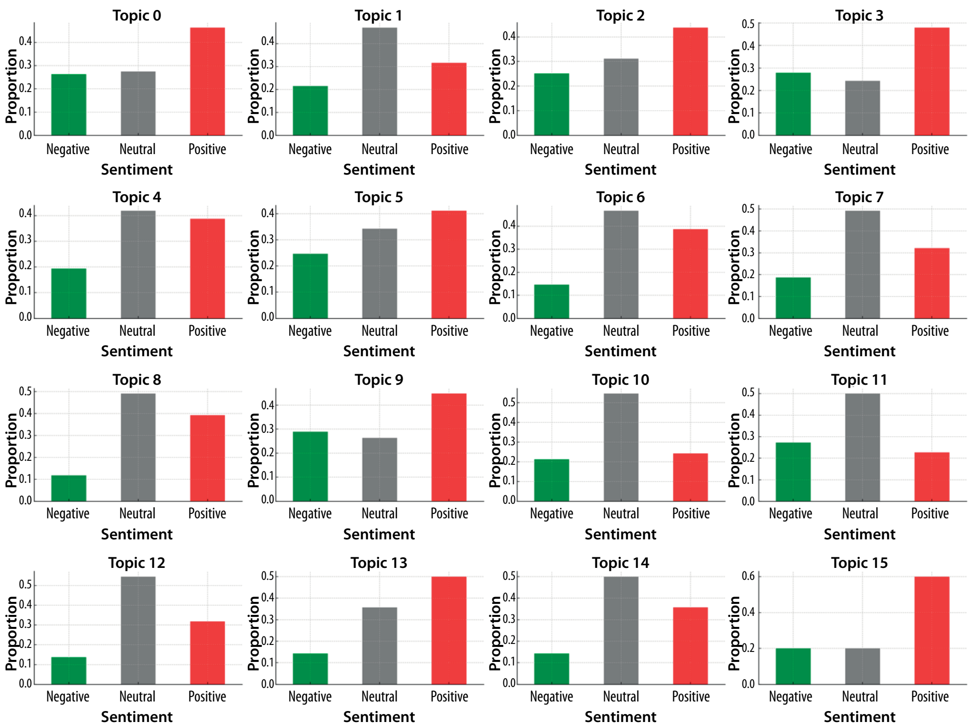

Figure 7:
The sentiment polarity analysis result of topics
Source: compiled by the authors

We generated a corresponding sentiment polarity analysis for each topic. The figure aims to show the sentiment tendencies within each topic. It is apparent that neutral or negative sentiments are more dominant in each topic, which also provides some insights for structuring our framework (see Figure 7).

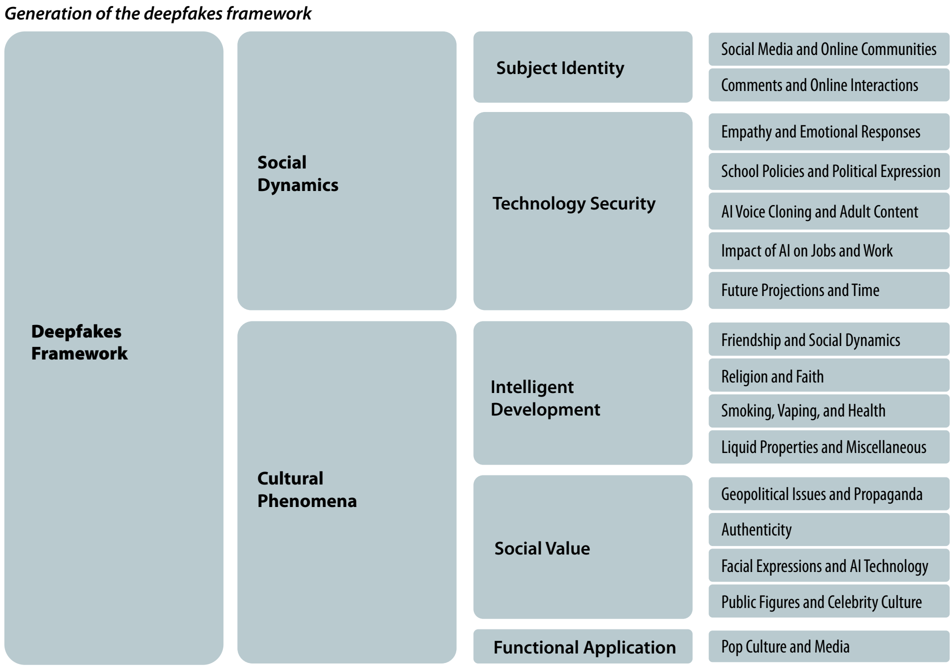

Figure 8:
The deepfakes framework of users
Source: compiled by the authors

In alignment with the findings, this study constructs a deepfakes framework that is exclusive to the audience, integrating the results from BERTopic's thematic exploration, thematic hierarchy and sentiment polarity analysis (see Figure 8). This framework illustrates the various levels involved when the audience discusses deepfakes. We have identified two significant themes: *Social Dynamics* and *Cultural Phenomena*. These dimensions not only reveal the mechanisms by which deepfakes operate within different social structures but also reflect their role in shaping contemporary cultural phenomena.

Social Dynamics refer to the patterns and changes in behaviours among individuals and collectives within social interactions. Within the context of deepfakes, this theme involves the way in which technology impacts the construction of personal identity, the nature of social interactions and the responses of legal and educational systems. Regarding the construction of *Subject Identity,* deepfake technology enables the facile imitation and reproduction of identity expressions and personal images. As demonstrated in representative documents from "Social Media and Online Communities", the public has a complex attitude towards AI-generated content, reflecting concerns about personal privacy and the authenticity of information. In the educational domain, the application of deepfake technology has sparked discussions about academic integrity and the veracity of knowledge. For instance, cases mentioned under the subtheme "School Policies and Political Expression" reveal the risks of deepfakes being used to disseminate misinformation or manipulate public opinion. Furthermore, the subtheme "Empathy and Emotional Responses" within Technology Security underscores the influence of deepfakes in eliciting emotional resonance and moral considerations, particularly when dealing with content related to trauma.

Cultural Phenomena focus on how deepfakes shape and reflect societal values, belief systems and health perceptions. Under the framework of "Intelligent Development", deepfake technology has not only altered our understanding of friendship and social interaction but also triggered philosophical and ethical discussions on the authenticity of interpersonal relationships. The subtheme "Religion and Faith" explores the application of deepfakes in religious content creation and its potential impact on belief systems and spiritual practices. Additionally, the subtheme "Smoking, Vaping, and Health" addresses the role of deepfakes in health communication and their potential and challenges in educating the public about the risks of smoking and vaping products in particular. Against the backdrop of "Geopolitical Issues and Propaganda", deepfake technology is considered as a potential new propaganda tool, influencing international relations and political dynamics, as evidenced in discussions regarding countries such as "China" and "Russia". The subtheme "Pop Culture and Media" reflects a potential application of deepfakes in entertainment and media, namely the creation or imitation of celebrity images, which also raises discussions about celebrity imagery and personal privacy.

In summary, the role of deepfake technology in *Social Dynamics and Cultural Phenomena* is multifaceted and complex. It has not only changed the ways in which we communicate and express ourselves but also posed new challenges to fields such as law, education, health and international relations. As technology continues to evolve, we must adopt an interdisciplinary approach to understand and address these challenges, ensuring that the application of deepfake technology adheres to ethical standards and promotes the overall well-being of society.

Discussion and conclusion

This study was intended to examine the construction of the deepfake framework from the perspective of audience communication using framing theory. The research yielded three major findings. First, when discussing deepfakes, the public formed a concept hierarchy centred around technology and its applications. Core concepts such as *AI, Voice, Actor*, *Job* and *Use* reflect the public's primary focus on the development of deepfake technology and its applications in the entertainment industry. In contrast, peripheral concepts such as *Consent* and *Company* indicate a relatively lower emphasis on ethical and legal concerns. This hierarchy reveals both curiosity and concern about the potential of deepfake technology, highlighting the need for deeper discussions on the impact of its applications. Second, through the BERTopic algorithm, the study identified latent themes in public discussions, which were categorised into two main dimensions: social dynamics and cultural phenomena. In the social dynamics dimension, the themes addressed issues such as personal identity, social interactions and the responses of legal and educational systems. Meanwhile, in the cultural phenomena dimension, the themes focused on how deepfakes shape societal values, belief systems and perceptions of health. These dimensions encompass both the social and cultural impacts of deepfakes, providing a multifaceted view of how the public perceives and understands this technology. Lastly, sentiment analysis showed that in each theme, public attitudes tend to lean toward neutral or negative emotions. This reflects public awareness of the potential risks of deepfake technology and uncertainty about the societal changes its applications may bring. This emotional tendency underscores the need for greater consideration of ethical and social impacts in the development and application of the technology, as well as the importance of cultivating a more balanced and comprehensive public understanding of deepfakes.

The deepfakes framework serves as an analytical tool for delving into the societal and cultural impacts of deepfake technology. By defining two core dimensions – Social Dynamics and Cultural Phenomena – it uncovers how deepfake technology shapes individual behaviours, social structures and cultural values.

Within the dimension of Social Dynamics, the framework thoroughly examines the effects of deepfake technology on the construction of personal identity, the nature of social interactions, the formulation of legal policies and the educational environment. For instance, deepfake technology's ability to easily impersonate and reproduce personal identities poses threats to individual privacy and reputation, challenging the authenticity of legal systems and educational content. The framework emphasises the close connection between technological development and social responsibility, indicating that the developers and users of technology must consider the societal impact and responsibilities alongside innovation.

The Cultural Phenomena dimension analyses how deepfake technology reflects and shapes religious beliefs, health perceptions, international relations and popular culture. This dimension illustrates the interplay between technology and culture, such as the application of deepfake technology in religious content creation, which may influence belief systems, or in health communication, potentially altering public awareness of health risks. Furthermore, the use of deepfake technology in international relations and political propaganda could impact national images and foreign policies, necessitating a collective effort from the global community to establish regulations and strategies for response.

The practical significance of this framework is that it provides a shared language and perspective for various stakeholders to understand and discuss the implications of deepfake technology. Raising awareness of the potential risks of deepfake technology not only helps the public but also guides developers in considering ethical, legal and social impacts during the design and implementation processes. Policymakers can utilise this framework to assess and formulate relevant policies to ensure that the application of technology does not harm societal interests.

In the academic realm, the deepfakes framework fosters the development of interdisciplinary research, integrating the findings from various fields such as communication studies, sociology, law and computer science. It offers researchers a comprehensive theoretical framework for analysing the societal impacts of deepfake technology and lays a solid theoretical foundation for future empirical research. Through this framework, researchers can explore the challenges and opportunities of deepfake technology applications in the real world more deeply, thereby providing scientific evidence for and practical guidance in constructing a more responsible and sustainable technological development environment.

It is important to note that most of the research on deepfakes has concentrated on the risks and negative perceptions associated with the technology, such as manipulation, misinformation and fake news (Gamage et al., 2022; Hancock & Bailenson, 2021; Lyu, 2020). The rapid advancement of deepfake technology, characterised by increasing quality, suggests a potential rise in its prevalence in the future. The application of deepfake technology in real-world scenarios is more likely to exacerbate a crisis of trust – a phenomenon reflected in the sentiment analysis across all subtopics, where neutral or negative emotions are more predominant. The ability of this technology to mimic the voices and images of real individuals with unprecedented realism allows for the creation of highly convincing false content on social media, political propaganda and even in everyday life. The direct consequence of such technological progress is a widespread public skepticism regarding the authenticity of media content, coupled with profound concerns about personal privacy and data security.

Understanding the potential risks associated with deepfakes, and accurately identifying them to ensure that artificial intelligence technologies such as deepfakes align with human values is of paramount importance. The regulation of AI, particularly AI-generated content, has become a new global risk and challenge. However, all discussions regarding regulation face a key dilemma: whether it is humans or AI that should be regulated? In addressing this question, let us return to the essence of artificial intelligence. Asimov (1942) proposed the "Three Laws of Robotics": First Law: A robot may not injure a human being or, through inaction, allow a human being to come to harm; Second Law: A robot must obey the orders given it by human beings, except where such orders would conflict with the First Law; Third Law: A robot must protect its own existence as long as such protection does not conflict with the First or Second Laws.

To some extent, the Three Laws of Robotics outline a general framework for *machine ethics,* implying that AI, under any circumstances, should be considered more as a tool than anything else. Whether in deepfakes or any of the other dilemmas brought about by AI technology, AI essentially exists as a tool rather than an independently thinking *person.* Thus, while many topics and scholars discuss how to constrain *AI,* fundamentally, we are discussing *the way in which people use tools.* To ensure that deepfake technology is used responsibly and to establish necessary trust in society, a multifaceted approach is required (Drabiak et al., 2023; Hagendorff, 2020). First, technology developers should incorporate ethical considerations from the design phase on to ensure that the use of technology does not harm society. Second, policymakers need to enact relevant laws and regulations to oversee the use of deepfake technology and prevent its misuse for improper purposes. Lastly, public education is crucial; we need to raise public awareness of deepfake technology and enhance their ability to discern truth from falsehood. Today, as deepfake technology matures, we face the challenge of rebuilding societal trust. By viewing AI technology as a tool and working together on ethical, legal and educational fronts, we hope to guide this technology towards beneficial societal development. Building trust takes time, but through responsible technology development and use, we can enjoy the conveniences it brings while maintaining a healthy, trustworthy social environment (Torresen, 2018).

Naturally, this study has areas that need further development. First, in terms of research methodology, while BERTopic is competitive with other models, it has certain limitations. It assumes that each document contains only one topic, which may not always reflect reality. Additionally, a bag-of-words approach is used to generate topic representations, meaning it does not consider the relationships between words. As a result, the words within a topic may be redundant in explaining the theme, so it is essential to return to the original texts to validate the effectiveness of the results. Second, in terms of sample selection, different platforms foster different atmospheres, which can bias the research outcomes. Future studies could explore how people evaluate deepfakes across different platforms and even compare the discussions across various platforms to identify differences. Third, to date, there is no effective unified standard to evaluate or regulate AI use; much of the discussion revolves around ethical considerations. Therefore, we call for a policy framework – given the opportunities and risks that deepfake technology presents, what is needed now is a set of standards to align the utility of tools with humanity's rational values, ensuring that they develop together.

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ARTICLE

Speaking for the Unheard

A Scientometric Examination of the Marginalisation of LGBTQ+ Scholarship Issues in the Global South

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This study investigates the impact of restrictive environments on LGBTQ+ scholarship in the Global South, focusing on publication patterns, research themes and the role of international collaboration in enhancing research visibility. Analysis was conducted on data from 57 countries over a 30-year period (1993–2023) from Scopus using bibliometric and network analyses to explore the barriers scholars face when addressing LGBTQ+ issues in regions where these topics are socially or politically censored. The findings reveal a steady increase in LGBTQ+ research from the Global South, with a strong focus on identity and health-related themes, while political and legal discussions remain underrepresented. Collaborations with Global North scholars significantly boost visibility and citation impact, although issues of equitable power sharing within these collaborations persist. The study concludes that international partnerships, while crucial in amplifying marginalised voices, must ensure equitable contributions from scholars in the Global South to promote a more inclusive and balanced body of knowledge.

Keywords: LGBTQ+ scholarship, Global South, scientometrics, cultural taboos, publication disparities

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Introduction

Internationalisation is a goal that is actively pursued in academic knowledge production (Aguado-López et al., 2016; Demeter et al., 2023). It improves publication performance, visibility and author diversity (Abramo et al., 2009; Woldegiyorgis et al., 2018), it is also proven to be beneficial for the amelioration of research visibility with particular attention to Global North and Global South collaborations as they are able to co-generate results on similar topics from vastly different perspectives (Payumo et al., 2021), even enhancing innovation by building and combining local knowledge (Stek & Van Geenhuizen, 2016). However, it is crucial to emphasise that internationalisation in research is usually understood as the globalisation of academic knowledge production in a historically westernised, Eurocentric scholarly space (Demeter et al., 2023) in which the English language is used and accepted as the "lingua franca" almost exclusively (Li & de Costa, 2021). Disparities between academics from various countries have also come to light as a result of internationalisation, especially when it comes to subjects that question political, religious and cultural standards for a variety of structural, economic and frequently social reasons (Hallward, 2008).

These disparities are most evident in the study of LGBTQ+ issues. Here, it is important to conceptualise what is understood and guides the present study under this term. Although a comprehensive conceptual synchronisation would extend the limits of this paper, LGBTQ+ issues can be generally described as a multidimensional (and, from an academic standpoint, a highly transdisciplinary) approach to the LGBTQ+ identity, the challenges and difficulties LGTBQ+ people face, their rights and the advocacy thereof (Lax & Phillips, 2009), their culture (Parmenter et al., 2020), and their experiences (Richards et al., 2017). It is also evident that no uniform definition can be given to the concept. Within the aforementioned highly abstract approach, however, in this particular research endeavour we understand LGBTQ+ identity as not merely an individual attribute but as a socially constructed concept with reference to the *Butlerian* interpretation of gender (Butler, 2004). It is one that is heavily shaped by theoretical frameworks (Nagoshi et al., 2012), historical variability and societal changes concerning *which* issues relate to the "conventional" perspective on LGBTQ+ identities (Janoff, 2022; Wagaman, 2016), cultural perceptions – with particular attention to the conflict between "acceptance" or "normalisation" in heteronormative societies (Mellini, 2009) – and various other aspects, including race, class and environment (Wagaman, 2016; Russell et al., 2023). One key issue in pinning down LGBTQ+ issues in the myriads of interpretations stems from its highly contextual nature, too, which is exceedingly significant in terms of the scope of our research. In short, Global North narratives of LGBTQ+ identity often centre around rights-based frameworks (e.g. related to particular rights in the fields of family law [marriage], criminal law [the de-criminalisation of homosexuals, for instance] or civil law issues), and institutional recognition, not to mention the plethora of activist action throughout the 1960s and onwards. In contrast, Global South perspectives are more deeply entwined with local traditions, religious structures, and socio-political constraints (Moussawi, 2015). The acts and events that transpired in the other hemisphere have been brutally repressed in the countries of the Global South, sexuality and gender topics remained as strict societal and cultural taboos, and those who have aimed for an activist, liberal interpretation of LGBTQ+ rights and identities have been actively persecuted (cf. Ozbay, 2021). Furthermore, research has also polemicised the use of Western frameworks for LGBTQ+ identities in the context of the Global South since it can be viewed as a form of neoliberalist activism or neo-colonialism (Radics, 2019; Day, 2023; Abu-Assab & Nasser-Eddin, 2023).

LGBTQ+ issues are complex and both the historical and, unfortunately, current *weltgeist* often assesses them with an attitude lacking inclusiveness and tolerance. Moreover, LGTBQ+ issues are frequently considered "taboo" in many countries and societies due to prevailing social and religious beliefs (Meyer, 2003; Norris & Inglehart, 2011; Moreno et al., 2020). In many regions, especially those dominated by conservative and populist ideologies (Biroli, 2018; Kováts, 2018) or governed by strict religious laws (Johnson & Vanderbeck, 2014), topics related to gender equality, sexual orientation and gender identity face significant censorship and academic suppression (Engeli, 2020; Reinhardt, 2023) causing a "chilling effect" in knowledge production signifying the *fear* of repercussions from which self-censorship emerges. This discriminatory environment creates a skewed global landscape; one in which scholarship from the Global North dominates, while research from the Global South and other underrepresented regions remains underproduced, marginalised, or downright invisible, creating a core-periphery nexus (Collyer, 2012; Demeter, 2019, 2020) between those scholars who *can* and those who *cannot* disseminate knowledge on taboos.

The study of LGBTQ+ issues is well-established in Western academia mainly due to the "human rights turn" in LGBTQ+ movements (Kollman & Waites, 2009). Except for a few adverse tendencies, such as in the case of Hungary, which was the first in the European Union to revoke licences for gender studies programmes (Pető, 2021), LGBTQ+ issues are often discussed in education and in Academia, too. The same cannot be said for much of the Global South. Regionally, especially in North Africa, the Middle East, Russia and Southeast Asia, where cultural and religious taboos are strong – either because of those regions' respective historical dynamics or political background – scholars face social, political and economic barriers that prevent them from freely engaging with these sensitive topics, with a resultant severe limitation on knowledge production about them. Even when such research is conducted, it often remains inaccessible or unpublished due to institutional and governmental restrictions. Rosky (2017) describes the legislative measures serving as the basis for these restrictions as "anti-gay curriculum laws", signifying the strong hierarchical and structural pressure scholars must oblige that manifests in the evasion of writing and research on certain subjects.

The present research aims to systematically examine the disparities in knowledge production on LGBTQ+ issues, focusing on how a taboo can affect the themes, volume, visibility and impact of scholarly work in underrepresented regions. Using a scientometric approach, this study analyses publication trends, citation patterns and collaboration networks to highlight the systemic barriers that restrict research on these topics in countries where these issues are socially or politically censored.

The study aims to find the answer to the following research questions (RQ) and hypotheses (H):

RQ1: What are the publication performance trends among scholars from countries where LGBTQ+ people are oppressed?

H1: The quantity of publications has grown in recent years, however, there is a significant Matthew effect in terms of visibility – the Matthew effect refers to Robert K. Merton's (1968) foundational theory in the field of science sociology which underlines how academic recognition and resources tend to accumulate among already well-established scholars or institutions, while those with less initial visibility struggle to gain recognition. It has been examined countless times in the field of thematic scientometric papers and serves as an instrumental point in addressing RQ1.

RQ2: What are the key themes of LGBTQ+ research for scholars from countries where such people are oppressed?

H2: Very few, or no themes entailing political or legal questions concerning LGBTQ+ issues in the given region.

RQ3: Can international collaboration with scholars from countries where LGBTQ+ people are oppressed elevate the visibility and gather attention to the issues in their respective countries/regions?

H3: International collaborations, especially with the Global North, highly increase research visibility and citeability.

Given the significant socio-political barriers LGBTQ+ researchers face in the Global South, this study seeks to quantify the extent to which these barriers shape research output and visibility. Furthermore, it examines the role of international collaborations, particularly those involving Global North scholars, in amplifying the reach and impact of LGBTQ+ scholarship. To do so, a robust scientometric approach is employed, allowing for the analysis of publication patterns, citation impact and thematic trends over the past 30 years.

Materials and methods

Setting out the scope

This paper sets out a territorial scope for the examination. Given that the term *Global South* is difficult to define due its vagueness and its opaque characteristics, this study is built on professional and academic reports reviewing the current state of LGTBQ+ issues around the world. Three datasets were used to filter out the countries to be analysed:

1. The Human Rights Watch (HRW) Annual Reports from 2020 to 2024. HRW is one of the most renowned NGOs in the field of human rights protection. The HRW publishes a comprehensive country-based report (World Report) each year where specific attention is paid to the rights of the LGBTQ+ community in the respective countries. The HRW has been documented for its accuracy,

its broad influence, and its significance in advocating for human rights around the world (Steinberg & Herzberg, 2018) making it a trusted and reliable source as the basis of this examination.

2. The Amnesty International database. Established in 1961, Amnesty International (AmI) is one of the most prevalent human rights organisations in the world (Goering, 2006). Clark (2001) notes that the AmI's works and reports play a critical part in the shaping of the reception of human rights defence, as well as in policy-making. AmI has a dedicated database on its website under "Countries" where comprehensive reports are stored about each countries' human rights assessment.
3. The EQUALDEX database. EQUALDEX is a collaborative, crowdsourced platform that maps the status of LGBTQ+ rights around the world. The platform uses a sophisticated point-based assessment of the state of LGTBQ+ rights and issues in every country around the world based on indices related to equality, legal status and public opinion. This database is one of the most trusted sources concerning the history and the current state of LGBTQ+ issues.

After reviewing the reports, 72 countries were selected. The dataset was then reviewed in Scopus for data accessibility, at which point 15 countries were excluded due to a lack of useable data (irrelevant document types, no documents registered for the respective country, or missing relevant document information such as title, abstract, or metric data). The final dataset consisted of the following countries (N = 57). When selecting the countries for inclusion, we paid particular attention to common themes in the three databases in order to come up with a more or less uniform set of countries that are equally regarded as 1. Global South countries that are 2. indisputably discriminatory against the LGBTQ+ population. It is essential to highlight that we do not claim, in any sense at all, that these countries are the only nations that could be the focus for study of LGBTQ+ identities in the Global South. For example, there were a few countries that were regarded ambiguously by the three separate databases, however, future research should very much focus on resolving these, for instance, South Africa was not included in the dataset because its evaluation differed severely. EQUALDEX gave South Africa an extremely generous score: an equality index of 71, a legal index of 81 and a public opinion index of 51. In comparison, the United Kingdom had been given an equality index of 72, a legal index of 83 and a public opinion index of 60; similar scores despite evidently different approaches to LGBTQ+ issues as underlined in both the HRW and AmI databases where South Africa has been noted for rising controversies and even physical attacks based on sexual biases which would have qualified it for inclusion. We also opted to exclude Latin American and Caribbean countries as the databases conferred vastly differing opinions and reports on these countries. For instance, EQUALDEX seemed to give the countries in these regions extremely low scores (except for Brazil), while the HRW and AmI databases were fundamentally more positive in general, despite mentioning substantial concerns in the region. Future agenda could focus on these particular regions, however, as all three databases highlighted systemic problems, especially with regard to the lack of legal protection and recognition despite some progressive efforts having been made. Lastly, certain countries, such as Niger, were excluded not on the basis of their eligibility but on the total absence of any research on it in Scopus.

The inclusion of most African and Middle Eastern countries stems from the radical provisions set forth against LGBTQ+ people often prohibiting same-sex relations or in even more extreme cases criminalising it with drastic punishment such as imprisonment (cf. Zambia and Tanzania). Muslim majority countries such as Indonesia were selected based on the conservative religious environment and the targeting of LGBTQ+ people through harassment and threats, as well as aggressively stepping up against LGBTQ+ advocacy through governmental measures and police forces. China has been included as all the reports and databases indicated a rapid and drastic decline in LGBTQ+ rights. HRW, for instance, reported that "LGBT people and rights activists have experienced increased harassment and censorship" (HRW, 2024), and that there has been a systemic and forced shutting down of LGBTQ+ advocacy and help centres. Although Russia and Turkey are sometimes categorised as developed countries and as parts of the Global North (Repinskiy, 2020; Gençay et al., 2019), their status is still debated. In relation to LGBTQ+ issues, however, it is evidently clear that neither of the two countries exhibit any characteristics that are present in the majority of the countries in the Global North. For decades, Russia has been highlighted as a country with deeply homophobic legislative measures (Wilkinson, 2014), with atrocities against the LGBTQ+ community happening frequently and manifesting in torture, physical and emotional violence and the framing of non-heterosexuality as a threat (Khlusova, 2017; Scicchitano, 2019). Lastly, Turkey (Türkiye) has been included because of the increasingly hostile environment there in recent years, especially under the regime of President Recep Tayyip Erdoğan who in May 2023 said explicitly that "LGBT is a poison injected into the institution of the family. It is not possible for us to accept that poison especially in a country where 99% of its people are Muslims" (AmI Report, 2023). Sansal (2021) also underlines that LGBTQ+ people face extreme discrimination and violence in the country, and despite there being no explicitly anti-LGBTQ+ legislation, members of the community do not have adequate legal protection, which makes them extremely vulnerable and marginalised as a group (Yılmaz & Göçmen, 2016) (Table 1).

Table 1:
List of countries examined

N	Africa	Middle East and Asia	Europe	Oceania
1	Nigeria	China	Russian Federation	Papua New Guinea
2	Ghana	Turkey		
3	Kenya	Malaysia		
4	Zimbabwe	Indonesia		
5	Uganda	Pakistan		
6	Egypt	Iran		
7	Tanzania	Bangladesh		
8	Ethiopia	Lebanon		
9	Cameroon	United Arab Emirates		
10	Morocco	Saudi Arabia		
11	Malawi	Sri Lanka		

N	Africa	Middle East and Asia	Europe	Oceania
12	Tunisia	Jordan		
13	Botswana	Qatar		
14	Senegal	Kuwait		
15	Rwanda	Oman		
16	Zambia	Palestine		
17	Namibia	Myanmar		
18	Swaziland	Afghanistan		
19	Cote d'Ivoire	Brunei Darussalam		
20	Democratic Republic of Congo			
21	Lesotho			
22	Benin			
23	Burkina Faso			
24	Mali			
25	Togo			
26	Algeria			
27	Burundi			
28	Liberia			
29	Sierra Leone			
30	South Sudan			
31	Congo			
32	Eritrea			
33	Gambia			
34	Gabon			
35	Mozambique			
36	Mauritania			

Source: Compiled by the author based on HRW, AmI and EQUALDEX reports.

Data collection

Data was extracted from the Scopus database, which was selected for its extensive international coverage, robust metadata, and its inclusion of both high-impact and regional journals. Data were collected from a 30-year period (1993–2023). This period was chosen for three reasons: firstly, from a bibliometric standpoint, the mid-1990s and 2000s marked significant increases in the indexing of metadata that can be used for scientometric endeavours, mainly due to the technological advancements that commenced in this period (Thelwall, 2008). Second, from a more topical perspective, the 1990s marked one of the most progressive decades with regard to the "human rights turn" concerning LGBTQ+ rights and issues – including among other matters, the adoption of more inclusive language in certain political and governmental environments, the transnational network widenings of LGBTQ+ activism that has resulted in "cross-border progress" in advocacy and policy-making in certain parts of the Global South (Swiebel, 2009; Kollman & Waites, 2009; Wilson, 2009). Kelland (2018) also underlines this period as critical in institutionalising LGBTQ+ activism. 1993 was also a symbolic year as the starting point for our investigation, the year in which the now seemingly enigmatic Vienna World Conference on Human Rights was organised and held by the United Nations, and where "organizations of lesbian women and gay men" were accredited for the first time in history (Sanders, 1996). Thirdly, in thematic scientometric research, periods reviewing three decades are often employed to present results on trends and the evolution of themes (see Smith, 2009; Hanafizadeh & Marjaie, 2020; Wu & Ren, 2019; Raj & Sahoo, 2024).

A highly specific search query was crafted to extract publications focusing on LGBTQ+ issues from underrepresented regions. The search string was developed using key terms related to LGBTQ+ topics. This keyword list was chosen based on existing literature and ongoing global discourse on gender and sexuality issues. Additionally, the search was limited to the above listed countries, and the search string to documents falling under the "Social Sciences" category. The search string used in Scopus is as follows:

TITLE-ABS-KEY("LGBTQ" OR "LGBTQ+" OR "LGBTQA" OR "LGBT" OR "sexual orientation" OR "gender identity" OR "transgender" OR "trans rights" OR "gay rights" OR "homosexuality" OR "queer" OR "gender studies" OR "same-sex marriage" OR "queer studies" OR "gender nonconformity" OR "bisexuality" OR "intersex") AND (LIMIT-TO (SUBJAREA, "SOCI")).

The findings then were limited to the examined 57 countries. The search resulted in an initial dataset of 2,511 publications. These records were subjected to a rigorous screening process based on the following criteria:

- Document type: Selection of journal articles and book chapters, excluding other types of documents.
- Duplication: Duplicate records were removed to ensure that each publication appears only once in the final dataset.
- Topic relevance: Publications that did not explicitly address LGBTQ+ issues in their title, abstract, or keywords or were not geographically relevant were filtered out. This stage was particularly important for ensuring the relevance of the dataset to the core themes of this study.

Table 2:
Analysed dataset of publications

Step	Records remaining	Records removed
Initial dataset	2,511	0
After document type removal	2,243	268
After duplication removal	2,243	0
After relevance and geographic relevance check	1,105	1,138
Final dataset	**N = 1,105**	

Source: Compiled by the author.

Data analysis

The analysis is divided into interconnected components: publication trends, citation analysis, topic modelling and collaboration networks.

Bibliometric analysis (BA): Publication trends, citation impact, and global visibility (RQ1 and H1)

To address the first research question a temporal bibliometric analysis (BA) was conducted, using the metadata of Scopus, charting the yearly distribution of publications across the dataset. The objective of the BA was to reveal how research output on LGBTQ+ issues has evolved over time in countries where such topics are culturally restricted. Publication counts were calculated per year, and these trends were analysed across the selected countries. It was intended to reveal whether there has been an increase in research production over time and the interest of scholars in restrictive environments concerning LGTBQ+ topics.

Topic modelling: Thematic analysis (RQ2 and H2)

The latent Dirichlet allocation (LDA) technique was employed to perform a thematic analysis of the dataset, focusing on revealing the key research themes in LGBTQ+ scholarship across the selected regions. The objective of the LDA was to determine the dominant topics within LGBTQ+ research in the dataset, and to explore how these topics differ from one another. The thematic analysis was expected to show that certain topics – such as gender identity or LGBTQ+ rights – are significantly underrepresented in more culturally restrictive countries compared to others.

Collaboration network analysis (CNA) (RQ3 and H3)

To investigate the role of collaborations in facilitating the visibility of scholars from restricted regions, this study conducts an in-depth co-authorship network analysis. The CNA serves as a means to investigate whether scholars from restrictive environments collaborate with international researchers and how these collaborations influence the visibility and impact of their research. Co-authorship data was extracted from Scopus, and a collaboration network was constructed using VOSviewer. This tool visualises co-authorship links and collaboration intensity between scholars from different countries. The analysis was conducted based on the relatedness of countries extracted from the affiliations of the scholars in the database, where co-authored documents with more than 10 countries represented were excluded. The minimum number of documents and citations of a country were both set to 1. After manually clearing the data, 94 countries were identified, the largest set of connections consisted of 92 countries. The key topics based on keyword were also analysed through co-occurrence analysis (KCA). The KCA was conducted on the criteria that the minimum number of keyword occurrence was set to 5. This combined analysis is aimed to reveal whether scholars from culturally restricted regions benefit from collaborations with scholars from the Global North or whether they remain isolated within regional publication circuits.

If not indicated otherwise, visualisations were made via Python's matplotlib and VOSviewer.

Preliminary limitations and justification of certain data collection actions

First of all, it is imperative to highlight that the use of Scopus as the exclusive data source may not comprehensively convey all the research published on LGBTQ+ issues in the examined countries. Scopus is known for its "discriminatory" nature with regard to journals that are published in non-English language countries (Demeter, 2020; Alonso-Álvarez, 2024). Thus, while the exclusive focus on papers published in indexed journals does deliver substantial results, it does not present the full research landscape. It is also critical to outline a specific case in terms of data analysis and the outlining of the results: the inclusion rather than the separation of Chinese research. As seen in Figure 2 below, China's dominance in this particular research segment aligns with the country's overwhelming growth in contribution to Scopus-indexed articles. Elango (2018) mentions that China registered the highest growth in scientific publications among the most productive countries between 1996 and 2015, and the country is widely accepted as the second in the world after the United States in academic knowledge production. This growth, albeit much more conservative, can be seen in the field of social sciences as well (Liu et al., 2021; Elango, 2018). From a strictly quantitative standpoint, it would be rational to claim that China's inclusion in the data analysis could distort results. However, as the paper is built on a more complex scientometric analysis, the country's inclusion is justified by a multitude of factors. Firstly, China ranks consistently low in all three databases. Separating China, therefore, could not be validated based on the data collection criteria. Secondly, the political climate in China has been notorious for imposing both soft and hard censorship stipulations on research regarding LGBTQ+ issues (Cui, 2023b). As Cui (2023a) notes, the Chinese research environment is profoundly heteronormative, and queer issues are scarcely discussed because academics fear repercussions. Discourse on LGBTQ+ issues is strictly oppressed in social media, too. The research of Bernot et al. (2024) shows that LGBTQ+ activism is under severe state-sponsored surveillance and censorship on Chinese platforms, while Cui et al. (2022) and Liu (2022) highlighted that accounts discussing LGBTQ+ topics are systematically shut down and silenced. In view of these details, we opted for the non-separation of Chinese contributions, nonetheless, and we understand that it may alter the exclusively quantitative results.

Results

Based on the precise data from the dataset, the analysis of LGBTQ+ research publications from 1993 to 2023 reveals a clear growth trend, with specific years marking notable shifts. The research output began modestly, with only 2 publications in 1993, followed by a dip in the mid-1990s. There were minimal contributions during this period indicating that LGBTQ+ research was significantly limited. The slow growth persisted throughout the decade, culminating in a sharp increase in 2011 with 22 publications.

From 2015 onward, the number of publications showed substantial growth, reaching 61 publications by 2016, nearly twice the quantity of papers compared to the previous year. Between 2018 and 2020, a significant rise is observed, with publications increasing from 67 in 2018 to 116 in 2020, marking a circa 42% increase in just two years. The upward trend continued, with 2023 recording the highest number of publications at 222, indicating an ever-increasing interest in LGBTQ+ issues.

The compound annual growth rate (CAGR) for the publications from the earliest year to the most recent year in our dataset is approximately 17%, indicating that the number of publications had been growing steadily at this rate per year over the period analysed (Figure 1).

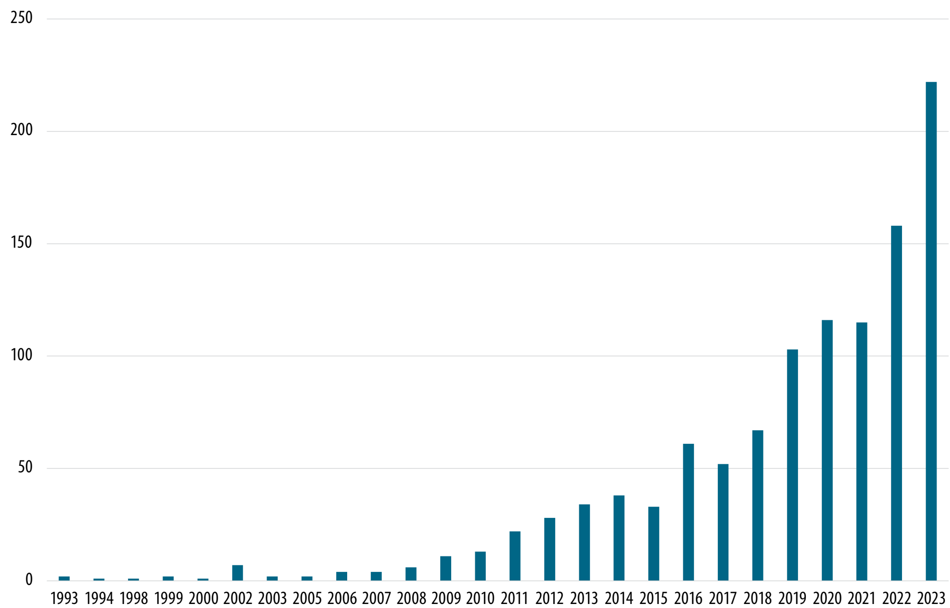

Figure 1:
*The growth of LGBTQ+ issues scholarship in underrepresented regions between 1993 and 2023 ($R^2 = 0.64$, $p < 0.001$ ***)*
Source: Compiled by the author based on Scopus data.

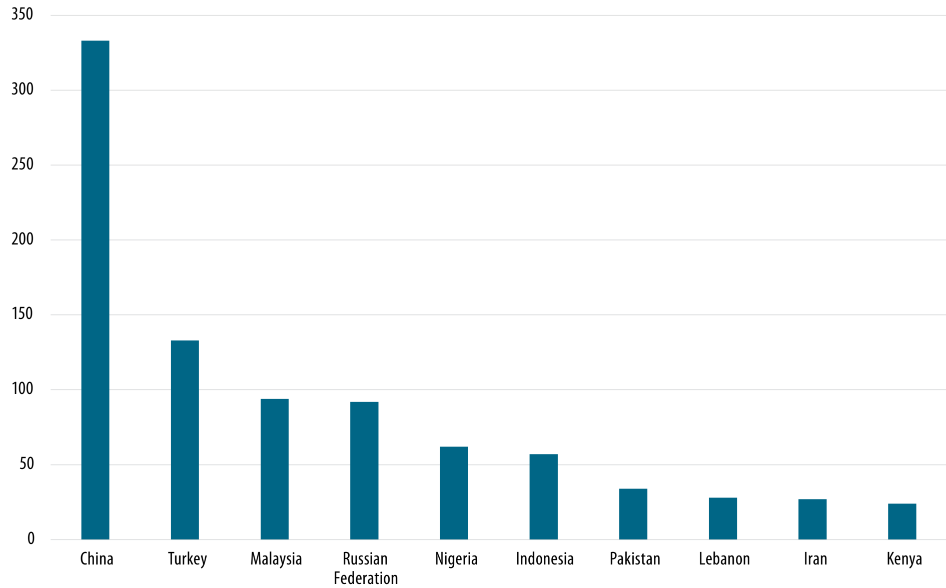

Figure 2:
Distribution of contributions by country between 1993 and 2023
Source: Compiled by the author based on Scopus data.

According to the country-based distribution analysis, China leads with 333 publications, showing a dominant presence in the field compared to other countries. Turkey follows with 133 publications, almost a third of China's. Malaysia and the Russian Federation have similar contributions, with 94 and 92 publications respectively. The remaining countries, including Nigeria (62), Indonesia (57), Pakistan (34), Lebanon (28), Iran (27) and Kenya (24), show a significantly smaller number of publications. This indicates a wide disparity in publication output among countries and regions where LGBTQ+ people are oppressed, with China contributing the most publications by a large margin. This, however, could also be a result of the fact that China's population, which is approximately 1.408 billion, far surpasses other countries in the analysis. Based on non-correlative, purely illustrative and general population by output rates, Russia's (~ 141 million), Indonesia's (~ 282 million), Pakistan's (~ 252 million) and Nigeria's (~ 237 million) population rank them among the top 10 in both population number and the number of outputs. In this context, Turkey (~ 88 million) and Malaysia (~ 36 million) being in the top 3 most productive nations shows that population is one of the, but certainly not the most important conflating factor in the evaluation of research production on LGBTQ+ issues (Figure 2).

To examine visibility, the citations received for the papers were analysed. Using descriptive statistical analysis, it was revealed that the mean number of citations is 10.52, but this figure is significantly influenced by a small number of highly cited papers, suggesting a skewed distribution. The standard deviation of 34.74 further reflects the substantial variability in citation numbers, indicating that some papers are cited many times while

Table 3:
Descriptive statistical analysis of citations of publications

Metric	Value
Count	1,105
Mean	10.52
Standard deviation	34.74
Minimum	0
25th percentile	1
Median (50th percentile)	3
75th percentile	11
Maximum	1,001

Source: Compiled by the author based on Scopus data.

others receive very few citations. At the lower end of the spectrum, the minimum number of citations is 0, meaning some papers have not been cited at all, a common occurrence in many academic fields. In fact, 25% of the papers have only 1 or fewer citations, as indicated by the 25th percentile. This low citation count highlights the difficulty many papers face in gaining visibility or influence within the academic community. The median citation count is 3, which means that half of the papers have received 3 or fewer citations, illustrating that the majority of papers are cited sparingly. Moving toward the higher end, the 75th percentile indicates that 25% of the papers have garnered more than 11 citations. These more frequently cited papers represent a significant portion of the field's academic influence. Notably, the most cited paper in the dataset has been cited 1,001 times, which is an outlier that contributes heavily to the average but is not representative of the broader trend (Table 3).

Moving on to RQ2, the LDA analysis reveals a diverse range of topics across the corpus, each characterised by a distinct set of top words.

In Topic 1, key terms such as "gender", "study", "research" and "sexual" indicate a focus on gender-related research, with a strong emphasis on identity and social constructs. The inclusion of words like "transgender" and "health" further suggests that studies in this topic may explore the intersection between gender identity and healthcare issues, particularly for transgender individuals. The word "individual" reflects a more micro-level analysis, perhaps centring on personal experiences within these social frameworks. Topic 2 is dominated by the term "HIV", signalling a central concern with health, particularly in relation to sexual behaviour and men who have sex with men (MSM). The recurring appearance of the word "social" suggests that this topic could involve the social dimensions of health, particularly in understanding the dynamics of HIV transmission in marginalised communities. The word "student" may point to studies involving younger populations or educational settings, reflecting research that spans healthcare, behaviour and awareness campaigns among at-risk groups. Topic 3 introduces "queer" and "identity" as prominent terms, indicating a thematic focus on queer theory and the social construction of identity. The word "right" suggests an emphasis on advocacy or legal struggles, which is supported by the presence of "social" and "discourse", hinting at the exploration of public debates around queer identities. The word "space" could refer to both physical and social spaces where identity and rights intersect, suggesting research that examines the environments in which LGBTQ+ individuals express their identities. In Topic 4, words like "right", "human", "lesbian" and "gay" point to a discussion around human rights, likely focusing on legal or civil issues affecting lesbian and gay populations. The inclusion of "law" further reinforces the idea that this topic explores legal frameworks, potentially examining the implementation of LGBTQ+ rights in various jurisdictions. The presence of "abstract" and "available" may suggest a more academic or theoretical approach, in which researchers discuss the availability of rights or protections for these groups. Topic 5, again, centres around "HIV" and "sex", but this time with a sharper focus on MSM populations, as indicated by the words "MSM" and "men". The appearance of numerical markers like "0" and "1" could suggest statistical or clinical research, possibly involving data on infection rates or the effectiveness of preventive measures. The frequent use of the word "use" might point to studies on the usage of health services, such as HIV testing or treatment. Topic 6 shifts towards gender and queer theory, with the term "woman" appearing alongside "queer" and "gender". This topic seems to be concerned with the representation and social status of women and queer individuals, possibly within media or cultural studies, as suggested by the word "medium". The presence of "Chinese" and "China" indicates a geographical focus, perhaps exploring LGBTQ+ issues within the Chinese society or culture. Topic 7 explores social attitudes toward LGBTQ+ individuals, with terms like "study", "LGBT" and "attitude" dominating the topic. The inclusion of "homosexual" and "gay" suggests a specific focus on how societal views shape the experiences of these groups, potentially looking at prejudice, discrimination, or acceptance. The repetition of "individual" reinforces the personal aspect of these studies, suggesting that this research may analyse the impact of societal attitudes on personal identity and well-being. In Topic 8, terms like "attitude", "woman", "men" and "sexual" point to a nuanced exploration of gender and sexual attitudes, possibly focusing on the intersections of heterosexuality, homosexuality and gender relations. The frequent use of "lesbian" and "gay" suggests that this topic may examine societal perceptions of these identities, while the word "heterosexual" introduces a comparative element, perhaps exploring heteronormative biases. Topic 9 is heavily focused on social aspects, with terms like "social", "community" and "medium" suggesting an exploration of social networks, media representations, or community dynamics. The appearance of "transgender" and "health" indicates that this topic might involve healthcare access or the portrayal of transgender individuals within social and media contexts. Finally, Topic 10 delves into identity politics, particularly concerning gay men, as indicated by the words "men", "gay" and "identity". The recurring terms "sexual" and "homosexuality" suggest a focus on sexual orientation and its social implications, while words like "article" and "study" point to academic discussions surrounding these issues. Overall, this LDA analysis reveals a rich and diverse set of themes, with strong emphases on healthcare, identity and social justice issues in the LGBTQ+ community, reflecting the complex and multifaceted nature of research in this domain (Table 4).

The LDA intertopic distance map indicates that Topic 2 and Topic 5 are both large and widely spaced, suggesting that they represent distinct, highly prevalent themes. Given the prominence of terms like HIV and MSM in the salient term chart, it can be assumed that these topics focus on healthcare, particularly around HIV prevention and treatment

Table 4:
The 10 identified topics based on LDA

Topic	Word 1	Word 2	Word 3	Word 4	Word 5	Word 6	Word 7	Word 8	Word 9	Word 10
1	gender	study	research	sexual	social	individual	health	people	transgender	identity
2	HIV	sexual	health	sex	men	among	social	MSM	student	study
3	queer	gender	identity	right	article	social	study	space	discourse	transgender
4	right	human	lesbian	gay	law	sex	study	article	available	abstract
5	HIV	sex	MSM	men	among	0	1	study	use	sexual
6	woman	medium	gender	social	queer	study	people	group	Chinese	China
7	study	LGBT	attitude	social	people	group	homosexual	individual	gay	homosexuality
8	toward	attitude	study	woman	men	sexual	gender	lesbian	gay	heterosexual
9	social	medium	transgender	community	study	male	health	people	sex	point
10	men	gay	identity	sexual	homosexuality	article	queer	gender	study	right

Source: Compiled by the author based on Scopus data.

among men who have sex with men, reflecting on the significant public health challenges faced by MSM populations, which is a key area of focus in LGBTQ+ research.

Other terms like attitude, gender and social suggest a strong focus on social perceptions and attitudes toward LGBTQ+ individuals. The clustered proximity of Topics 1, 7, 4, 6 and 10 on the distance map indicates overlapping themes, likely revolving around the intersection of gender identity, social dynamics and rights advocacy. Terms like "queer", "woman", "right" and "transgender" suggest that these topics are exploring gender identities and rights, possibly in the context of legal battles or social movements for equality. Topic 9 is isolated and relatively small, indicating a more *niche* theme. Given the presence of terms like identity and risk in the salient terms, this topic might address mental health, identity formation, or the psychosocial risks faced by LGBTQ+ individuals in specific contexts. The overall salience of terms like study, student and research also hints at a considerable amount of academic research focusing on LGBTQ+ issues in educational settings, perhaps examining the attitudes of students or the inclusion of LGBTQ+ topics in curricula.

To sum up, the LDA analysis underlines the complexity of LGBTQ+ research, with key topics revolving around healthcare access, gender identity, social attitudes and rights advocacy. The distribution of topics indicates a balance between health-related research and socio-cultural studies, highlighting the multifaceted nature of challenges faced by

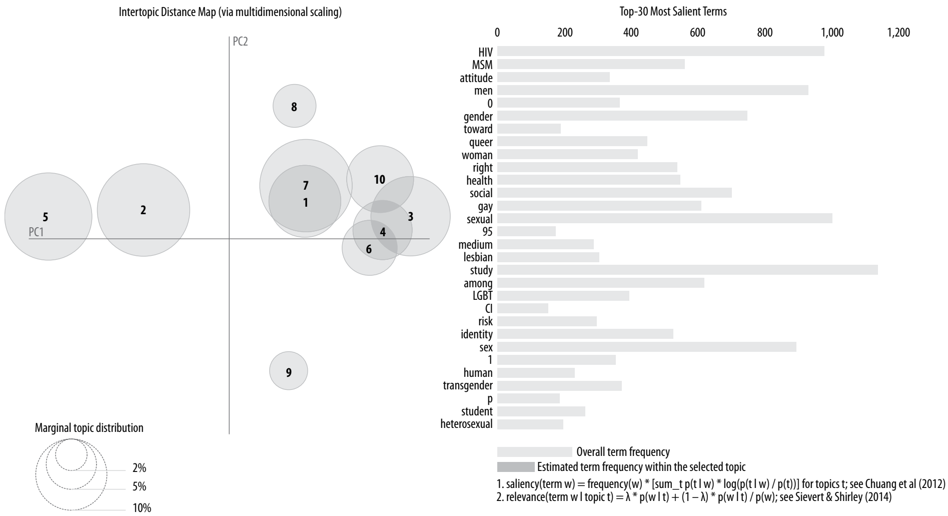

Figure 3:
Intertopic distance map of the LGBTQ+ issues themes
in the publications of authors from the Global South
Source: Compiled by the author with Python's *gensim* based on Scopus data.

LGBTQ+ individuals. The varied size and spacing of topics reflect both distinct and overlapping areas of inquiry, suggesting that while certain themes are highly specialised, others are interconnected within broader social and legal contexts (Figure 3).

Having identified the key topic, a more conventional keyword analysis was conducted via KCA. The KCA revealed distinct clusters of themes related to LGBTQ+ research, each represented by a specific colour:

- Red cluster: Focused on gender identity, homosexuality, homophobia and gender-related issues. Keywords such as "homosexuality", "gender identity" and "religion" are highly interconnected, suggesting significant research into the intersection of gender identity, religion and societal attitudes.
- Blue cluster: Focused on HIV and public health, with terms like "human immunodeficiency virus", "HIV testing" and "social stigma". This cluster highlights the strong relationship between HIV prevention, stigma and healthcare access in LGBTQ+ populations, particularly for marginalised groups like sex workers.
- Green cluster: Focused on clinical and epidemiological studies, with key terms such as "human immunodeficiency virus", "major clinical study" and "cross-sectional studies". This suggests substantial research on the medical and epidemiological aspects of HIV/AIDS in LGBTQ+ populations, examining prevalence, risk behaviours and intervention strategies.
- Yellow cluster: Focused on self-concept, quality of life and mental health, with terms like "self-concept", "mental stress" and "quality of life". This indicates research on the psychosocial impacts faced by LGBTQ+ individuals, particularly how stigma and discrimination affect mental health (Figure 4).

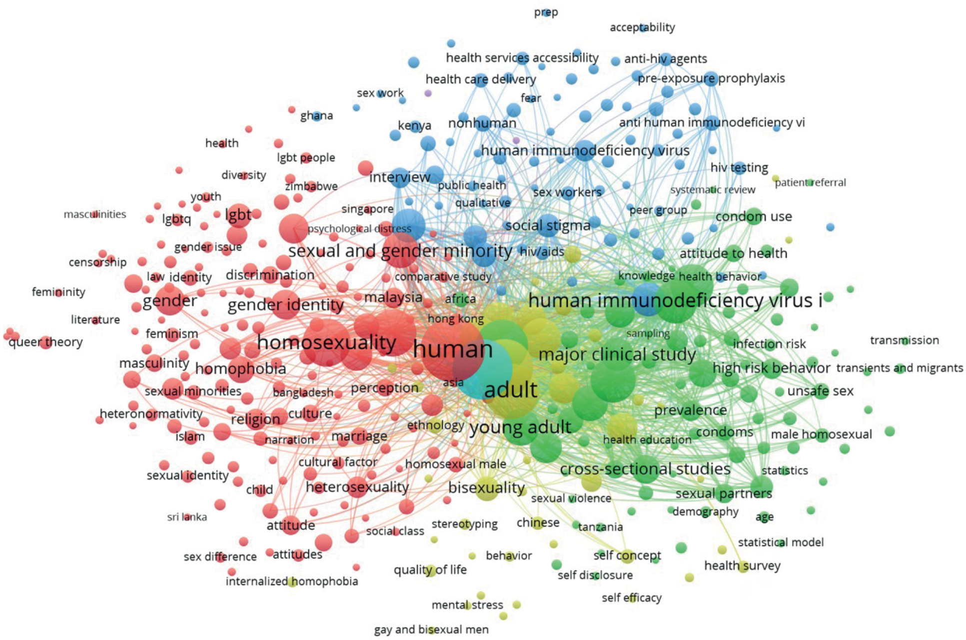

Figure 4:
Keyword co-occurrence analysis of publications concerning LGBTQ+ issues
Source: Compiled by the author with VOSviewer based on Scopus data.

When examining collaborations, two key aspects were inspected. First, a general approach was taken to understand the principal collaborative trends among scholars from different countries using a co-authorship country analysis (COACA), which reveals key collaboration networks between nations, with some countries standing out as central hubs. China and the United States are the most prominent, indicating that these countries are leading in terms of research output and international collaboration on LGBTQ+ topics. Both countries show strong connections with various nations, including Malaysia, Australia, Indonesia and Hong Kong, highlighting a robust global collaboration network. The United Kingdom also plays a significant role in bridging various research networks, particularly linking nations in Europe, Africa and Asia.

Similarly, Turkey and Nigeria emerge as major regional players in their respective areas, with Nigeria being central to collaborations across Africa, and Turkey acting as a "bridge" between Europe and Asia. Interestingly, the African network appears densely interconnected, with countries like Ghana, Senegal, Burundi, Cote d'Ivoire, Lesotho and Cameroon working together, showing significant intra-continental and global collaborations. Russia also shows some connections, although its network appears more isolated compared to China and the U.S. (Figure 5).

A more profound approach was taken to identify the impact of out-of-Global South collaborations: of the 1,105 entries, 381 publications were single-authored (34.48%) while 724 were co-authored (65.52%), meaning that there was more than one author for the

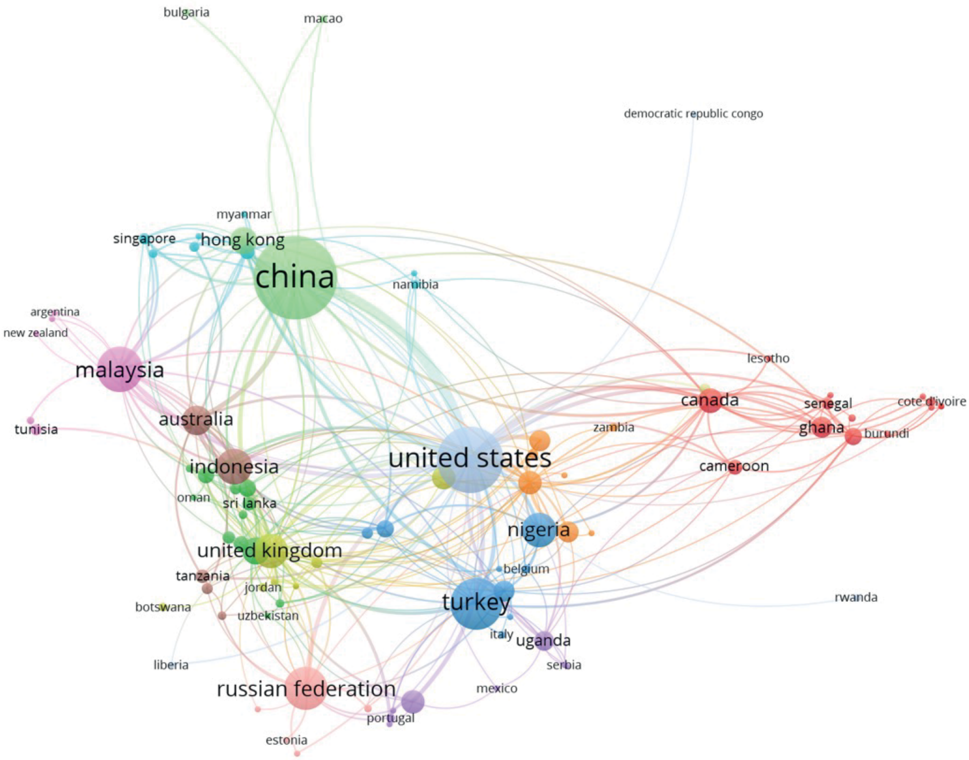

Figure 5:
Co-authorship country analysis of publications concerning LGBTQ+ issues
Source: Compiled by the author with VOSviewer based on Scopus data.

respective publication. Co-authored papers were divided into three sections based on their co-authorship specifics:

- Global North (GN) and Restricted Global South (RGS) collaborations: A collaborative work where at least one author is from a Global North country and one from a Restricted Global South country (e.g. one of the 57 examined countries).
- Unrestricted Global South and Restricted Global South collaborations: Collaborative work where at least one author is from an Unrestricted Global South (UGS) country (neither a GN, nor a RGS country, i.e. India, Brazil, Argentina, or South Africa) and one from an RGS.
- Restricted Global South collaborations: All authors come from one RGS country or different RGS countries.

After filtering out entries where the country category was not clearly evident or was missing (N = 6), the four different categories: 1. single-authored; 2. GN–RGS collaboration; 3. UGS–RGS collaboration; and 4. RGS collaboration were examined based on their

Table 5:
Comprehensive analysis of collaborations and their impact

Category	Count	Average citations	Average N of co-authors	Open Access (%)
GN + RGS Collaboration	185	**20.03**	**5.8**	37.84
RGS Collaboration	307	6.53	3.6	27.69
UGS + RGS Collaboration	226	15.89	5.5	**39.38**
Single-Authored	**381**	6.07	1 (N/A)	19.95

Source: Compiled by the author based on Scopus data.

count, citations, average number of co-authors (only categories 2–4), and their Open Access (OA) status.

The data reveals that GN + RGS collaborations have the highest average citations (20.03) and the highest average number of co-authors per paper (5.8), suggesting that collaborations between the Global North and Restricted Global South tend to attract more scholarly attention and involve larger teams. In contrast, RGS collaborations have the lowest average citations (6.53) among collaborative works and fewer co-authors on average (3.55), indicating more localised collaborations with less external influence. UGS + RGS collaborations fall between these extremes, with a moderate average of 15.89 citations and 5.49 co-authors per paper. The Single-Authored category has the lowest average citations (6.07) with a lower open access percentage (19.95%) compared to collaborative works.

To assess the impact of different types of collaborations on research visibility, both a t-test and a Mann-Whitney U test were performed. The t-test revealed that non-RGS collaborations, which include partnerships with GN and UGS scholars, received significantly higher citation counts than RGS-only collaborations ($p < 0.0001$), indicating a clear visibility advantage for research involving out-of-RGS international partnerships. Further, the Mann-Whitney U test was used to compare GN + UGR collaborations specifically to other collaboration types, confirming that this group had a notably higher citation impact ($p < 0.001$). This non-parametric test was essential to account for the asymmetry in citation distributions and reinforced the conclusion that Global North collaborations significantly boost visibility (Table 5).

Discussion

Overview of the results and hypotheses

The publication trends on LGBTQ+ research in the Global South resemble a plant forcing its way through concrete – emerging and expanding despite the heavy socio-political barriers that persist. As outlined in the findings, the growth of academic output on LGBTQ+ issues in the Global South have been steady but constrained. To address H1: the quantity of publications has grown in recent years, but a significant Matthew Effect persists in terms of visibility – our analysis of publication trends reveals compelling evidence in support of both parts of this hypothesis. Our results show that while the volume of publications has grown, their visibility and impact have been disproportionately skewed toward a small number of highly cited papers. Our citation analysis conveyed that there is an asymmetrical distribution in knowledge produced, which illustrates that despite the fact that more publications are emerging from the Global South, only a small fraction of those achieve significant academic visibility. The existence of this citation disparity directly supports the second part of H1: there is a pronounced visibility gap in the academic discourse on LGBTQ+ issues from the Global South.

Our second hypothesis (H2) concerned whether research in the Global South focuses predominantly on gender identity while largely neglecting political or legal questions. We conducted a multifocal analysis to investigate H2 and found that more than 60% of the publications analysed were focused on health-related issues, with HIV/AIDS being a particularly dominant theme. This preponderance is not surprising; given that health topics, especially in relation to HIV/AIDS, are often considered less aligned with global public health priorities, they are also less politically and culturally sensitive. In contrast, we found a near-total absence of publications addressing political or legal issues related to LGBTQ+ rights. Based on the comprehensive problems set forth by the databases we used, the lack of focus on political activism, legal frameworks, or human rights struggles suggests that scholars in these regions are most likely not *unwilling,* but rather, *unable* to engage with the more contentious political dimensions of LGBTQ+ issues due to the high risks associated with such research. This avoidance was particularly pronounced in the Middle East or North Africa where the examined reports, the HRW and AmI reports in particular, highlight that political or legal questions surrounding LGBTQ+ rights could lead to severe repercussions, including social ostracisation, professional consequences, or even, in extreme cases, imprisonment (see Izugbara et al., 2022 and Solomon & Bekker, 2023 for a more focused paper on Iran, Turkey and Egypt).

Lastly, from a quantitative approach, the role of international collaborations in elevating the visibility of scholarship on LGBTQ+ issues in the Global South is evident from the data. Our analysis confirms H3; international collaborations, especially those involving scholars from the Global North, significantly increase both the visibility and the citation impact of LGBTQ+ research originating from culturally and politically restricted regions. As quantitative evidence based on the t-test and the Mann-Whitney U test suggests, partnerships with scholars from the Global North do more than simply *amplify* the academic output from the Global South; they actively enhance the visibility of research in global academic discourse, resulting in more citations and wider dissemination. In terms of scholarly influence, these international collaborations appear to act as a gateway for research on LGBTQ+ issues in the Global South, helping to overcome barriers that typically inhibit the dissemination of such research, including local political censorship, cultural taboos and restricted access to prominent publication platforms.

Situating the findings from a critical angle on knowledge production

In previous research endeavours, the marginalisation of LGBTQ+ research in the Global South is often framed as a problem of *access:* to resources, publishing opportunities, or institutional support. However, this framing assumes that once access is *granted,* meaning that once Global South scholars are "let in" to the dominant knowledge economy, equity follows (cf. Chitando & Mateveke, 2017). The present study challenges this assumption.

Our assertion is that the deeper issue is not just access or opportunity regarding the dissemination of academic research on LGBTQ+ issues, but much rather, an epistemic legitimacy, a more holistic problem. For instance, the question of publishing on LGBTQ+ issues in the Global South should also focus on *who* gets to define what counts as valuable knowledge, which topics are prioritised, and under what conditions research from the Global South is deemed "worthy" of global recognition. This, however, touches upon the long-standing history and critical attitudes on how knowledge is produced and how the Western hegemony – in a *Feyerabendien* sense which suggests that science is a form of ideology – has pinned down what constitutes academic knowledge (cf. also Demeter, 2020; Waisbord & Mellado, 2014). The dominance of Global North institutions in LGBTQ+ research is not accidental and cannot solely be traced back to structural and societal oppression of the knowledge dissemination in the Global South. It reflects an established and historically "well-preserved" colonial, westernised structure in Academia where certain voices are positioned as producers of theory and others as subjects of analysis (Menon et al., 2021). Although this dynamic is not unique to LGBTQ+ research (see Dawson, 2020), the particular subject and its strong link to identity politics, activism and policy-making makes our focus a particularly strong case for the way in which power operates in academic discourse. In this regard we posit that the relative absence of political and legal discussions in Global South LGBTQ+ research is not just an artifact of censorship, although, as demonstrated above, these factors contribute exceedingly thereto. Much rather, it is also an indicator of how knowledge legitimacy is structured. A key question arises here: if the goal of LGBTQ+ research is to challenge normative power structures, then what does it mean when the production of that research is itself constrained by those very structures?

One of the defining struggles of LGBTQ+ research, especially in the Global South, is that it is rarely allowed to "just be", to put it in simple terms. It is constantly *forced* to justify its existence, its importance and its validity. Unlike fields that are accepted as "neutral" sites of knowledge production (for example strictly quantitative sciences), LGBTQ+ studies are persistently tied to advocacy, legitimacy battles and cultural pushback, a field where conceptual structures and frameworks are strongly tied and rarely interrogated (Borgstrom, 2020; Grundy & Smith, 2007). The question arises, however, as to who gets to decide what constitutes *justification?* For Global North researchers, the mere production of knowledge about LGBTQ+ questions is no longer inherently transgressive in many academic contexts (see Kortegast et al., 2020). In the Global South, however, LGBTQ+ research remains a fragile intellectual pursuit, constantly under scrutiny and vulnerable to political instrumentalisation (Radics, 2019); the work of scholars in the Global

South, therefore, is not just evaluated on its intellectual contributions but on whether it conforms to or resists dominant political narratives. This burden of justification may produce a scholarly self-censorship, where researchers pre-emptively – as a precautionary measure – avoid politically sensitive topics, not just because of external censorship, but because of the constant demand for them to defend the legitimacy of their work. The core finding of the present research and its results, in a critical sense, is presenting that, paradoxically, LGBTQ+ research in the Global South is often shaped as much by what *isn't* said as by what is.

Reinforcing exclusion through inclusion

Thoughts on the dilemma of collaboration and enabling

Claiming that collaboration in research has an amplificatory effect on marginalised voices is not a novel idea (Wang et al., 2024; Brito et al., 2023). However, collaboration is not an inherently liberating process. It can also function as a mechanism of control and enabling. The finding that Global North collaborations increase citation visibility, but not epistemic power, strongly suggests that these partnerships often operate within a paradox: they *allow* Global South scholars in, but only on particular terms, topics and roles. This phenomenon is not novel either. Historically, marginalised scholars have been included in dominant knowledge structures in ways that reinforce their own subordination (Fricker, 2007; Demeter, 2020; Liberali, 2024; Settles et al., 2020). Using Demeter's (2020) theory, the issue in our particular field of LGBTQ+ issues and the scholarship related thereto, is not just that Global South researchers receive fewer citations. It is that their work is often cited in ways that reinforce their peripheral status. When Global South scholarship is referenced, it is frequently as *evidence* of oppression rather than as a *suo jure* theoretical or methodological contribution, reducing Global South researchers to chroniclers of lived experiences rather than *active participants* in shaping the study of LGBTQ+ issues.

Therefore, collaboration can be a two-edged sword and a site of contestation, where the conditions of participation often reproduce the very inequalities they claim to dismantle. True collaboration requires not just the scientometric understandings of co-authorship metrics but rather the shared intellectual authorship, where Global South scholars are recognised as agenda-setters, not just as participants in the Western research agenda. It is crucial to accentuate though that we do not claim that collaboration is detrimental. On the contrary, as demonstrated above, collaborations are beneficial in terms of visibility and academic impact. However, the need for more equitable and inclusive partnership structures should also be raised. We advocate that Global North scholars must be careful and mindful not to *dominate* these collaborations, but rather work in ways that *elevate* and *empower* their Global South counterparts. This is of critical importance, as after all, one may find it odd that the inclusion of scholars who have not experienced the difficulties, and have most likely not lived in the examined countries, or, in certain cases, do not even speak the respective languages, and are certainly less informed than their Global South counterparts of the complex socio-cultural, political and legal background of the particular countries essentially make a contribution that is more successful metrics-wise. In this regard, we recommend that the historical trend of colonial science (parachute research), where scholars from the Global North enter collaborations merely for data extraction or to boost their own academic portfolios, must be avoided (Odeny & Bosurgi, 2022). We also suggest that collaborations on sensitive topics involves shared leadership, mutual decision-making, and a respect for, as well as the promotion of the local knowledge and perspectives that Global South scholars bring to the table. This is particularly important in regions where LGBTQ+ issues are deeply taboo or politically sensitive; giving local researchers an international platform is crucial for producing contextually relevant, impactful scholarship that can drive social change.

Conclusions

This study set out to analyse the influence of taboos on LGBTQ+ scholarship in the Global South through a 30-year scientometric examination of publication trends, research themes and collaboration networks. The results show a consistent, though modest growth in LGBTQ+ scholarship from these regions, with notable increases since the 2010s, despite the political and cultural challenges that scholars continue to face. One significant finding of the study is the limited scope of research themes, which overwhelmingly focus on identity and health, particularly HIV/AIDS, while political and legal topics remain scarce. This thematic limitation underscores the influence of restrictive environments where researchers must navigate sensitive topics with extreme caution. Furthermore, the study highlights the crucial role those international collaborations, particularly with scholars from the Global North, play in increasing the visibility and citation impact of LGBTQ+ research from the Global South. These collaborations not only help bypass local censorship but also facilitate access to global academic networks. However, concerns about unequal power dynamics in these collaborations remain, with Global North scholars often holding a disproportionate influence. As such, there is a pressing need for more equitable and inclusive partnerships that empower Global South researchers to lead.

Ethical considerations

This research is based entirely on data from Scopus and does not involve human subjects. No personally identifiable information (PII) was collected, ensuring full compliance with ethical standards. Careful attention was paid to not misrepresent scholars or their work, particularly those operating in politically sensitive environments.

Limitations

While Scopus provides extensive international coverage, it may underrepresent regional or non-English publications, potentially skewing the dataset towards more globally recognised journals. Moreover, scholars in restrictive environments may self-censor, especially on sensitive LGBTQ+ topics, leading to thematic gaps that reflect socio-political constraints rather than scholarly interest. Additionally, the exclusion of non-indexed local publications limits the study's ability to fully capture the breadth of LGBTQ+ research in these regions. Finally, the focus on 57 countries, while justified by data availability, may exclude relevant regions, affecting the generalisability of the findings.

Furthermore, the data collection is exclusive in terms of publication types and disciplines. While it is established in scientometric research that articles are to be preferred for analysis as they are, in general, they are more accessible and provide comprehensive metadata and follow a more standardised form than other types of publications (such as book chapters or conference proceedings) (Riehl, 2024). Nonetheless, articles do not capture the full scientific spectrum (see Brigham, 2014), therefore, future research may focus on a more inclusive choice in data collection with reference to the topical analyses mentioned in this paper.

Lastly, this paper specifically focuses on social sciences and LGBTQ+ issues. Though it can be confidently established that such issues gained increased attention in this particular field which then transpired in a more rapid and visible growth in publications in this category than in others, it may be useful to investigate the presence of the subject in other subject categories such as in the fields of arts and humanities or in multidisciplinary sciences.

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ARTICLE

Building Bridges in Academic Publishing and Research

A Study of the Corvinus Institute for Advanced Studies

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This study explores the publication practices and collaboration networks of the Corvinus Institute for Advanced Studies in order to understand its contribution to global academic knowledge production and the way in which semi-peripheral academic institutions can navigate global academic hierarchies, achieve greater visibility, and foster equitable knowledge production. The analysis shows that fellows at the institution overwhelmingly prioritise high-impact journals, with approximately 70% of their work published at Q1-ranked venues. This focus underscores the institute's dedication to academic excellence and its commitment to increasing the global visibility of Hungarian research. Most of the publications are concentrated in Western academic journals, especially those based in the United States, United Kingdom, and the Netherlands, reflecting the extant academic networks of the fellows, and the institution's strategic emphasis on high-quality, internationally recognised publication outlets. However, while international journals dominate, a smaller, yet significant, portion of publications appears in local journals, indicating a balance between global engagement

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and local impact. Situated within a world-systemic framework, this paper argues that Institutes for Advanced Studies can act as bridges between semi-peripheral academic institutions and leading global research networks. By supporting international collaboration and emphasising impactful publishing, the Corvinus Institute for Advanced Studies not only enhances its own reputation but also serves as a model for other institutions seeking to raise their profile in the competitive landscape of global academic publishing.

Keywords: publishing patterns, journal selection, co-authorship in academic publishing, global knowledge production, Institutes for Advanced Studies

Introduction

In today's increasingly interconnected world, Institutes for Advanced Studies (IAS) hold a vital place in the academic landscape (Clark, 2023). These institutions act as centres of innovation and knowledge production, offering scholars the freedom and resources to engage in transformative research across disciplines (Padberg, 2020). By prioritising international collaboration and knowledge exchange, IAS contribute significantly to addressing complex global challenges while fostering intellectual growth. This paper examines the Corvinus Institute for Advanced Studies (CIAS), a relatively new Central and Eastern European IAS, exploring its role in publication excellence, in advancing academic internationalisation, and its impact on both regional and academic global knowledge production.

IAS are essential not only for generating new academic knowledge but also for bridging local and global publication and cooperation networks (Hollstein, 2023). We argue that CIAS exemplifies this dual function, positioning itself as a regional hub that elevates Hungarian and Central European scholarship while establishing strong ties with international research communities, especially in the Global North. This study highlights several CIAS achievements, including its ability to attract a diverse range of international scholars, its emphasis on publishing in high-impact journals, and its extensive collaboration networks. These accomplishments demonstrate how CIAS connects the semi-peripheral region of Central and Eastern Europe with the core of global academia. We found that CIAS attracts scholars predominantly from Western Europe, the United States, and Central and Eastern Europe. The majority of publications by CIAS fellows appear in Q1-ranked journals, emphasising academic excellence, while their collaboration networks are strongest with the USA, the U.K., and Hungary, which positions CIAS as a bridge between global academic hubs and Central and Eastern European research. This function is very important in regions like Central and Eastern Europe, where IAS are instrumental in reversing brain drain, cultivating talent and producing internationally visible publications (Rüland & Gräber-Magocsi, 2022). By attracting world-class researchers and stimulating collaboration, CIAS not only strengthens the regional academic ecosystem but also contributes significantly to the global exchange of ideas. By interpreting the internationalisation patterns of CIAS in a world-systemic theorisation (Demeter, 2019), we argue that the results of our study go beyond presenting CIAS as a case study: CIAS serves as a powerful example of how institutes in semi-peripheral regions can enhance their international presence while also driving regional academic development. CIAS's achievements highlight the enduring importance of IAS as bridges between local and global scholarship that advance innovation and collaboration in an ever-changing international academic landscape.

Institutes for Advanced Study

"Anyone who wants to equip a special heaven for men and women of scholarship and science should take the Princeton Institute as model," asserted János Kornai (1928–2021), Emeritus Professor at both Harvard and Corvinus University of Budapest in his *By Force of Thought. Irregular Memoirs of an Intellectual Journey* (cited in Klaniczay, 2016, p. 87). This is indeed the case: most institutes for advanced study – themselves seen as standing at the apex of academic/scholarly research – continue to view The Institute for Advanced Study at Princeton as their model. Since its establishment in 1930, it has "served as a model for protecting and promoting independent inquiry, prompting the establishment of similar institutes around the world, and underscoring the importance of academic freedom worldwide" (Institute for Advanced Study, 2024). Its historic achievements over almost a century seem unsurpassable:

> "[...] among its present and past faculty and members are 36 Nobel Laureates, 46 of the 64 Fields Medalists, and 23 of the 27 Abel Prize Laureates, as well as many MacArthur Fellows and Wolf Prize winners. Past faculty have included Albert Einstein [...] and distinguished scientists and scholars such as Kurt Gödel, J. Robert Oppenheimer, Erwin Panofsky, Hetty Goldman, Homer A. Thompson, John von Neumann, George Kennan, Hermann Weyl, and Clifford Geertz" (Institute for Advanced Study, 2024)

To date, the world's most comprehensive overview of the institutes for advanced study has been Britta Padberg's authoratative paper, "The Global Diversity of Institutes for Advanced Study" published in *Sociologica* (Padberg, 2020), in which she convincingly argues these institutes are "both products and driving forces of the globalization of research and are closely intertwined with different trends of global science policies" and that they constitute "spaces of global production of knowledge" (Padberg, 2020, p. 119). These characteristics explain the increase in the establishment of such institutions around the world in the decades following Princeton's inception, the first wave of which lasted for approximately forty years (1930–1970) with the Center for Advanced Study in the Behavioral Sciences (CASBS) in Palo Alto, California in 1954, an institute that initially focused most on social sciences. In 1965, for the first time outside the Western world, the Indian Institute for Advanced Study was set up in Shimla, India. In Europe, 1968 saw the founding of the Center for Interdisciplinary Research in Bielefeld, West Germany, and the following year marked the establishment of a similar research centre at the University of Edinburgh in the U.K., and elsewhere, such as Dublin and Paris. The second wave, between 1970 and 2000, saw the establishment of national and independent institutes for advanced study in, for example, Austria, Brazil, Germany, Israel, the Netherlands, Norway, South Korea and Sweden. The first quarter of the 21st century has witnessed a rapid increase in the number of institutes of advanced study, on the global scene. Whereas twenty-five years ago, in the late 1990s, there were fewer than thirty such institutes, today they number around 200 to 250. Most of these more recently established institutes are based at universities and one can now find them on every continent. Apart from the Americas, Asia, and Europe (see above), the Institute for Advanced Study at the University of Western Australia in Perth was established in 2000, and in Africa there are such institutes in Ghana (est. 2018 at the University of Ghana) and in South Africa (Stellenbosch, est. 1999, and Johannesburg est. 2015).

Institutes for advanced study in Central and Eastern Europe

In terms of the Central and Eastern European region, to which the Corvinus Institute for Advanced Studies belongs geographically, we have taken those institutions into account that lie in countries between Germany and Russia, south of Scandinavia and north of Greece and Turkey. Many of the region's countries are now full members of the EU and NATO, some are candidate countries, and all of them share the common heritage of having belonged to the Communist world during the second half of the 20th century. It follows from this definition that certain countries that are sometimes classified as being a part of this region will be excluded, for example Austria in the West and Russia in the East. At the same time, it also means that historically at least three major academic traditions have contributed to shaping the current landscape of regional research practices, institutes, and researchers' habitus: the Prussian–German model (pre-World War Two), the Soviet model (1948–1989), and the Western model (post-transition period, i.e. since the 1990s, especially after the accessions to the EU that began in 2004 with eight formerly Communist countries: the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Slovakia, and Slovenia, and was followed by Bulgaria and Romania in 2007 and Croatia in 2023).

The most recent development in terms of establishing institutes for advanced studies and their umbrella organisations in this region was in 2024 with the foundation of RECAS (Regional Network of Centres for Advanced Studies in Southeast Europe) in order to "induce societal change by promoting the visibility, quality, and relevance of Western Balkans and Southeast European (SEE) research while enabling early career researchers to conduct socially engaging and policy-relevant research in the region" (RECAS, 2024). Just as in the case of CIAS (see below), RECAS was also intended to reverse *brain drain* from the region and attempt to establish practices and policies that would foster the opposite: *brain gain.* Currently RECAS has eight national members: Albania, Bosnia and Herzegovina, Croatia, Montenegro, Kosovo, North Macedonia, Serbia, and Slovenia.

Regional institutes for advanced studies that had been established earlier include New Europe College, Bucharest, Romania (est. 1994); the Centre for Advanced Study, Sophia, Bulgaria (est. 2000); the Institute for Advanced Study at the Central European University, Budapest, Hungary (est. 2011); the Center for Advanced Studies Southeast

Europe, Rijeka, Croatia (est. 2013); the Polish Institute of Advanced Studies, Warsaw, Poland (est. 2016, but ceased its activities in 2023 due to financial difficulties and "less than satisfactory" results [PAN, 2023]), and the Corvinus Institute for Advanced Study (CIAS) at Corvinus University of Budapest, Hungary (est. 2017).

Most of these institutes do a very impressive job when it comes to internationalisation and research publication, for example, the oldest of them, New Europe College, Bucharest, (in its 30th year of operation in 2024) has hosted close to eight hundred fellows from around fifty countries across its history, representing a huge number of academic disciplines. It has also hosted several European Research Council grants, which has significantly contributed to their global visibility and collaborative research output (New Europe College, 2024). Another example is the IAS of Central European University, which remained in Budapest even after its host institute (CEU) moved to Vienna in 2019. In its 14th year of operation they hosted close to 400 fellows from dozens of countries, and quite apart from Scopus indexed journal publications, many CEU IAS fellows have published academic volumes (monographs, edited volumes, etc.) with prestigious publishing houses such as, for example, Cambridge U.P., Cornell U.P., Oxford U.P., and Routledge (Institute for Advanced Study: Central European University, 2024).

Corvinus Institute for Advanced Studies: An overview

Corvinus Institute for Advanced Studies (CIAS) belongs to the so-called university-based category of institutes for advanced studies. Globally, these number fewer than one hundred, and examples of their host institutes include: Fudan University, Nagoya University, National Taiwan University, Peking University, and Waseda University (Asia); University of Western Australia (Australia); KU Leuven, Trinity College Dublin, University of Amsterdam, University of Cambridge, University of Konstanz, University of London, and University of Turku (Europe); Duke University, Harvard University, and Stanford University (the USA). Established in 1920, Corvinus University of Budapest (CUB) has always been one of the most prestigious social sciences research universities in Hungary and the East-Central European region. In the past century, it has gone through some dramatic changes, strongly reflecting the turbulence of Hungarian and East-Central European history. Today, Corvinus University of Budapest is a non-profit, public-benefit higher education institution and a research-intensive university. It has consistently ranked in the top 25% of Eastern European universities, indexed by QS (Topuniversities QS, 2024); 15% of the faculty and more than 20% of its students are international.

After a very careful and in-depth analysis of some of the best models in contemporary global higher education, in 2017 the decision to establish a cutting-edge research hub within the university was taken and CIAS came into being as of 1 January 2018. CIAS was created as a research university-based institute for advanced studies whose ultimate mission is to engage in top level research, attracting globally leading scholars, researchers, and academics as fellows. The mission statement, formulated in the Senate decision of 19 December 2017, is as valid today as it was back then: "Our goal with the establishment of CIAS is the dramatic improvement of the research output and the international potential of the university."

CIAS is pursuing manifold objectives that can be introduced on two levels. Its embeddedness within the research university can be seen as its foundational level. CIAS is an integral part of the university as a whole, serving its research goals in close and coordinated cooperation with the departments, the institutes, and other academic research units of the university. The next level is its contribution to the national research output (both in basic and applied research) in coordination with the various Hungarian and European Union research agencies and institutes. The highest level, evidently, is its role in the global community of similar institutions and their host universities, which explains why CIAS has reached out to partner institutions not only in the East-Central European region, but far beyond it as well: in Africa, in the Americas, in Asia, in Australia, and in Europe.

The first seven international fellows arrived in the 2019–2020 academic year: three from the U.S., two from Italy, one each from China and Portugal, respectively (this latter researcher arrived as a junior fellow and is now a full-time faculty member at the university). At the beginning of the 2024–2025 academic year, i.e. in its sixth year of operation, CIAS welcomed more than twenty international fellows to start their research in Budapest. This robust increase is a good indication of the success of CIAS's international fellowship programmes. By the end of the current academic year CIAS will have had close to one hundred international and fifty Hungarian fellows. When translated into *fellow months,* this represents above 200 months. The disciplines and national backgrounds of these fellows are diverse. In the past six years, CIAS has hosted academics representing, among others, the following disciplines: Business, Communication, Computer Science, Economics, Finance, Game Theory, Geography, Geopolitics, History, International Relations, Management, Mathematics, Network and Data Science, Philosophy, Religious Studies, and Sociology. A non-exhaustive list of the countries represented by CIAS fellows would include: Australia, Austria, Belgium, China, Croatia, France, India, Israel, Italy, Latvia, Mexico, Montenegro, the Netherlands, Norway, Pakistan, Poland, Slovenia, Spain, the U.K., and the USA. To better serve the internationalisation goals of the host university, more than 90% of the successful applicants are international researchers, i.e. come from non-Hungarian institutions. In an attempt to reverse brain drain from the country, Hungarian nationals already employed in research faculties at well established, internationally respected research universities outside of Hungary are also welcome to apply. Other, university-wide international collaboration also takes place at various levels and in various contexts. Corvinus University of Budapest, the home institution of CIAS, has historically worked with a large number of international partners (more than 200). Apart from what might be traditionally labelled *Western institutions* (universities and research centres) predominantly in Europe and North America (e.g. Charles University, Prague; Club of Rome; Concordia University, Montreal; European SPES Institute, Leuven; Princeton University; Tel Aviv University; Stanford University; University of California, Berkeley; the University of Chicago; the University of Economics and Business, Vienna; University of Jena; University of Oxford; University of Tartu; University of Washington, Vilnius University, etc.), CUB continues its active collaboration with many non-Western institutions as well, including but not limited to: the Chinese University of Hong Kong, Fundacao Getulio Vargas; Kobe University; Korea University; National Taiwan University; National University of Singapore; Tecnologico de Monterrey; Tsinghua University; Universidad Adolfo Ibanez; Universidad de los Andes, etc. Its international accreditations include the Association to Advance Collegiate Schools of Business (AACSB), the Association of MBAs (AMBA), and the European Foundation for Management Development (EFMD); it is a member in the Community of European Management Schools (CEMS).

In terms of research projects, various levels should be differentiated: 1. individual level; 2. research group/research centre level; and 3. Institute (CIAS) level, flagship projects. Most permanent fellows belong to a particular research centre within CIAS, whereas most visiting fellows/grantees who come for a semester or a full academic year work on their own individual research projects, often collaborating with other fellows and/or colleagues from the various university departments. With regard to the results of these projects, the international publication record of CIAS affiliated researchers is outstanding. In the past year alone, that is, between 1 September 2013 and 31 August 2024, thirty D1, twenty-two Q1 and fourteen Q2 papers were published. Looking back on the publication history of CIAS as a whole, the number of internationally recognised research publications (in Scopus and WoS indexed venues) has more than doubled in five years. Whereas the combined number of such publications from the first two years of CIAS activity (AY 2019–2020 and 2020–2021) was a humble 20, by 1 September 2024 it had passed 60 (for 2024 only). In terms of disciplinary breakdown, the D1, Q1, and Q2 publications have appeared in internationally highly ranked academic journals categorised by Scimago Journal Ranking (SJR) as, for example: *Accounting; Artificial Intelligence; Arts and Humanities; Business and International Management; Communication; Cultural Studies; Computational Mathematics; Demography; Economics and Econometrics; Environmental Science; Information Systems and Management; Operations Research; Political Science; Renewable Energy and Sustainability;* and *Social Sciences.*

In terms of currently run international flagship research projects, in 2023 the CIAS-affiliated research project proposal for a European Research Agency (ERA) Chairship was approved and was founded within CIAS for a period of five years (2023–2028), led by internationally recognised researcher, Chilean-American César Hidalgo. In 2024, CIAS was joined by the globally leading scholar of convex optimisation, Yurii Nesterov. It was later that year that a multiple year joint research project was launched in collaboration with the University of Chicago, led by Nobel Laureate James J. Heckman.

Internationalisation of academic research and publishing: A world-systemic perspective

In this paper, we adopt a world-systemic perspective to analyse academic publishing and collaboration patterns. This approach builds on Wallerstein's world-systems theory and applies it to the global structure of knowledge production (Demeter, 2019; 2020). Within this framework, *power relations* refer to the unequal distribution of resources, visibility, and influence in academia, which often mirrors geopolitical and economic hierarchies. *World-systemic position* describes an institution's or a scholar's position within the global academic hierarchy – whether it is in the core (dominant institutions from the Global North), semi-periphery (emerging or transitioning academic hubs), or periphery (underrepresented institutions with limited global reach). For example, collaborations with elite U.S. or U.K. institutions often indicate a core affiliation, while limited international co-authorship or local publishing may signal peripheral positioning. Our analysis uses this lens to interpret the publication strategies and collaboration patterns of CIAS as an institute from a semi-peripheral region striving for greater integration into core academic networks.

The expansion of Institutes for Advanced Studies around the world highlights a significant shift in the academic landscape, marked by growing international collaboration and the crossing of national boundaries in research (Clark, 2023). These institutions, including the Corvinus Institute for Advanced Studies (CIAS) and others in Central and Eastern Europe, play a dual role: fostering local academic growth while embedding themselves in global research networks (Demeter, 2018). This interconnectedness ties directly into the broader trends of internationalising academic research and publishing (Moldashev & Tleuov, 2022; Waisbord, 2022; Xu, 2020). The focus on these trends, discussed earlier, provides a foundation for exploring their impact on institutional visibility and scholarly influence. The next section delves into these issues from a world-systemic perspective, shedding light on how globalisation shapes academic publishing and affects the positioning of institutes like CIAS within the broader hierarchy of academic knowledge production.

The need for the internationalisation of research and publication followed the *publish or perish* paradigm (Parchomovsky, 2000) because the skyrocketing number of published papers was only possible through frequent and large-scale collaboration. A variety of reasons lie behind the internationalisation trends in publishing. For instance, there are scientific problems in both natural and social sciences such as climate change, pandemics and energy transitions that are global in scope and cannot be solved within the confines of national borders (Holm et al., 2013). Bringing together diverse expertise and perspectives from around the world enhances the ability to develop innovative and comprehensive solutions for these problems (Salazar et al., 2012). In direct contrast to the character of other scientific topics, in the social sciences and humanities in particular, that cannot be understood without reference to their cultural backgrounds, in these cases, only comparative international research can reveal both the common features and individual differences (Rokkan, 2021). Moreover, many research programmes, such as the European Union's Horizon Europe programme, prioritise international collaboration, incentivising cross-border research partnerships (Kalisz & Aluchna, 2012). To prioritise international research makes sense because unique datasets, advanced laboratories, specific expertise in advanced methodologies or specialised facilities may not be available in any single country or institution, but an international research team can bring all this together (Brooks et al., 2013). From a world-systemic point of view, the internationalisation of a research institution or a university contributes to its global visibility and also places it on the world-system of academic knowledge production (Demeter, 2019). All the aforementioned aspects of internationalisation – publications, cooperation, and the capacity to gain international funds – marks world-systemic positions with specific characteristics that consists of power relations (Demeter, 2017). Specifically, publishing in international journals enhances a university's research visibility and influence, which is a critical factor in rankings (Kivinen et al., 2017). High-impact journals, often indexed in databases like Scopus and Web of Science, reach a global audience, ensuring that the research is widely read, cited and recognised (Pranckutė, 2021). Rankings typically consider citation metrics, such as field-weighted citation impact or h-indices, to gauge the significance and influence of a university's research. Papers co-authored by international teams tend to receive more citations, as they are disseminated through diverse academic networks and often address transnational issues of broad relevance (Parish et al., 2018). This directly boosts the university's citation scores, a core component of many ranking methodologies. In this vein, it is of crucial importance that internationalisation patterns of research publishing are analysed, understood, and critically interpreted because the results can shed light on real-life power positions as they develop over time (Demeter, 2019).

To gain prestige in an increasingly competitive field such as academia, internationalisation is one of the most important factors and, as world-systemic analysis shows us, it is especially true for institutions from emerging countries (Comel et al., 2024; Tóth & Demeter, 2021). First, internationalisation and prestige in academia are closely related because global engagement might signify a commitment to top-tier research and collaboration. Specifically, collaborating with already established international institutions like elite universities or researchers with high international impact enhances an emerging institution's reputation by association, showing that it operates at a comparable level of excellence (Dobbins & Kwiek, 2017). In the world-system of global publication, cooperation with institutions that already have top positions can also enhance the power position of the agents connecting with them, so co-publishing with researchers from leading institutions raises the international visibility of scholars from emerging world regions as well (Kwiek, 2021). International cooperation, especially with experienced researchers from top institutions, often leads to publication in prestigious journals, which guarantees high visibility and impact in the corresponding research field, as well as showing the potential of the participating institutions to produce high-quality research. Accordingly, while these publications increase the visibility of the institution's research they also reflect positively on its academic standards and output quality (Sasvári & Lendvai, 2024).

As discussed above, attracting established researchers from around the world contributes to visibility and prestige. A diverse team of researchers demonstrates that the institution is a hub for global intellectual excellence (Mapes et al., 2020). The most characteristic field to be directly influenced by internationalisation is that of research assessment and international rankings, where it plays a leading role in at least two ways. First, as more and more countries strive for greater visibility on the international rankings, they push their researchers to publish in outlets that are recognised by global rankings such as QS World University Ranking, Academic Ranking of World Universities (ARWU) or Times Higher Education (*THE*) (Demeter et al., 2024). With this, international publication excellence has become a key factor in research evaluation at both institutional and individual levels that highly influences the career trajectories of scholars (Gao & Zheng, 2020). This phenomenon can be partially explained by the categories that university rankings use for evaluation, since the internationalisation of research is closely tied to an institution's performance in global university rankings that emphasise research output, impact, and international collaboration. These elements are integral in the way universities are assessed for their global standing (Hazelkorn, 2024). From a world-systemic point of view, university rankings clearly show intellectual and academic power relations with a set of top-tier institutions (and countries) at the centre, a more diverse and numerous set of countries in the semi-periphery, and legions of research institutions and universities at the periphery of academia that are not even represented in global rankings (Demeter, 2020). To gain international visibility, more peripheral countries and their institutions should cooperate with elite institutions if they want to be represented in the world-systemic network of science production (Syed et al., 2012).

Beyond publishing co-authored papers, international collaborations also influence rankings by showcasing a university's ability to engage with the global academic community (Gao & Zheng, 2020). Metrics like the proportion of research outputs resulting from international collaboration are explicitly considered in systems like *THE* and QS (Loyola-González et al., 2020). These collaborations demonstrate the institution's integration into global knowledge networks and its capability to contribute to internationally relevant research. For example, co-authorship with researchers from high-ranking universities or institutions in multiple countries signals a level of prestige and academic excellence that rankings reward (Sasvári & Lendvai, 2024). Furthermore, international research efforts often lead to partnerships with renowned global institutions, resulting in joint projects, grants, and shared initiatives (Kwiek, 2020). Such partnerships enhance the university's reputation among peers, which is another significant metric in rankings, especially in those relying on academic and employer reputation surveys (Selten et al., 2020). An institution seen as a hub for high-quality, internationally engaged research is more likely to receive favourable evaluations in these assessments, which may be important to universities, especially from emerging world regions where good positions on international rankings are of crucial importance in attracting international students (Pham et al., 2021).

In the past decade, CIAS invited many experienced international scholars who have produced a significant number of papers, and the resultant rise in visibility of the institute is beyond question. However, we still lack knowledge on the geographical distribution of the scholars, their papers and their cooperation networks. From a world-systemic point of view, the international patterns of research production can show not just the international visibility of the corresponding institution but can also help to shed light on its world-systemic position (Demeter, 2019), making it possible to interpret its development in the past and to suggest further steps for future internationalisation. Following our literature review and the world-systemic theoretical considerations on research publishing, we developed the following research questions:

> **RQ1:** What is the geographical and regional diversity of CIAS fellows, and how does it reflect the global representation of academic knowledge production?

Despite the growing literature on the internationalisation of academic research (Demeter, 2019; Kwiek, 2020; Waisbord, 2022), there remain significant gaps in our understanding of how IAS in semi-peripheral regions navigate global academic hierarchies. While prior studies have emphasised the role of international collaboration and high-impact publishing in gaining visibility (Demeter et al. 2024; Comel et al., 2024), few have examined how these dynamics play out at the institutional level within Central and Eastern Europe. Specifically, there is a lack of research that combines institutional-level data with network-based approaches to explore how IAS fellows from semi-peripheral regions integrate into global publishing and collaboration networks.

RQ2: What are the publication patterns of CIAS scholars, including journal selection, publisher geography, and journal prestige, during their tenure at CIAS?
RQ3: What is the structure of the international cooperation network among CIAS scholars, and how does co-authorship represent the geographical composition of publishing?

Methods

Data collection

From CIAS archives, we downloaded the curriculum vitae of all CIAS fellows between 2019 and 2023. The first year in which CIAS received fellows was 2019, and 2023 was the last year for which we have full data in terms of publication. We collected data on both academic profile and publication patterns. After careful data cleaning, we had the profiles of 63 CIAS fellows.

For academic profiles, we collected data on academic history (place of BA, MA and PhD studies) and current academic background (affiliation, nationality, seniority, research field). The data was incomplete for several variables, so we used nationality to identify geographical position as we have this data on all the CIAS fellows.

Nationality was selected as a proxy for geographical position because it was the most consistently reported variable across all CVs, and it typically reflects the scholar's academic and cultural background. While we acknowledge that nationality may not fully capture a fellow's current institutional location or research network, it offers a practical and reasonably accurate means of coding world-region affiliation – especially in the absence of uniform data on current institutional ties or citizenship/residency status.

For publication patterns, we collected data from Scopus, recording the number of publications, journal names and journal quartiles. Scopus is generally considered to be the widest international database for peer-reviewed academic publications, and its coverage is especially broad in the social sciences (Rajkó et al., 2023). Scopus was chosen due to its extensive coverage of peer-reviewed journals in the social sciences, which aligns with the disciplinary profiles of most CIAS fellows. Additionally, it offers consistent metadata on authorship, affiliations, and journal quartiles (e.g. Q1–Q4), enabling structured comparison across publications. Although other databases like Web of Science or Google Scholar were considered, Scopus provided the most complete and reliable dataset for our research aims.

Analysis

To address our first research question regarding the international composition of CIAS fellows, we coded their nationalities as presented in their curriculum vitae. We also coded world regions (Western Europe, Eastern Europe, North America, Africa, Asia, Latin America, Middle East and Oceania). For the analysis and visualisation, we used Gephi (version 0.10).

To answer our second research question that related to the publication patterns of CIAS scholars, we analysed their publication trajectories during their stay at CIAS. We checked their publication records on Scopus, we recorded the journals in which they published and also recorded the publishers and the prestige factor of the journals (Q1, Q2, Q3, Q4).

Finally, to address our third research question regarding the cooperation network of CIAS scholars, we conducted network analysis in which we analysed international cooperation. We coded all the published papers affiliated to CIAS, focusing on the nationality of the co-authors to draw the international cooperation network. For the analysis and visualisation, we used Gephi (version 0.10).

Results

Our first research question was related to the national diversity of CIAS fellows. Our results show that most scholars came from the Western world, especially from the USA. However, the analysis reveals that a significant number of scholars arrived to CIAS from the Central and Eastern European region alongside researchers from the Asiatic region as well, and from India in particular. Both the Western and the Central and Eastern European hubs are diverse as many countries are represented in the corresponding world regions, with a specific presence of British academics (Figure 1). Latin America and Oceania are represented by Mexico and Australia.

When considering the publication trends, we found that most articles by CIAS scholars were published in the Western countries where the most prestigious publishers are located (the USA, the Netherlands and the U.K.). However, the presence of Hungarian journals are also perceptible, showing that some of the CIAS scholars also decided to write for the local community (Figure 2). Notwithstanding that, the national distribution of the preferred publishers clearly shows that CIAS scholars brought their own publishing cultures to Hungary, and they tended to publish in journals with which they were already familiar. This suggests that CIAS scholars aim to reach a global, well-regarded academic audience and are inclined to publish in well-established, highly ranked outlets that may bolster the visibility and impact of their research, and through this, they contributed to the international visibility and impact of CIAS, too. In other words, CIAS scholars brought their prior publishing preferences and academic networks with them, even when working in Hungary, rather than fully adopting local or regional publication venues. This dynamic underscores both the international orientation of the CIAS scholars and the influence of established scholarly networks, cultures and habits on their publishing choices.

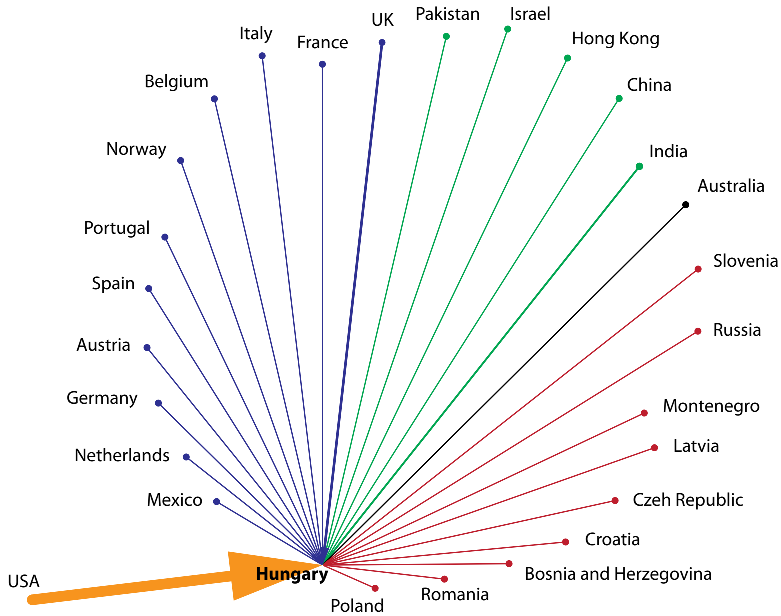

Figure 1:
Countries and regions of CIAS fellows

Note: Blue = Western Europe; Orange = USA; Red = Central and Eastern Europe; Green = Asiatic region. The direction of the lines represent source–target relations, where Hungary (the home of CIAS) is always the target. The width of the lines represent the frequency of the corresponding mobility.

Source: Compiled by the authors.

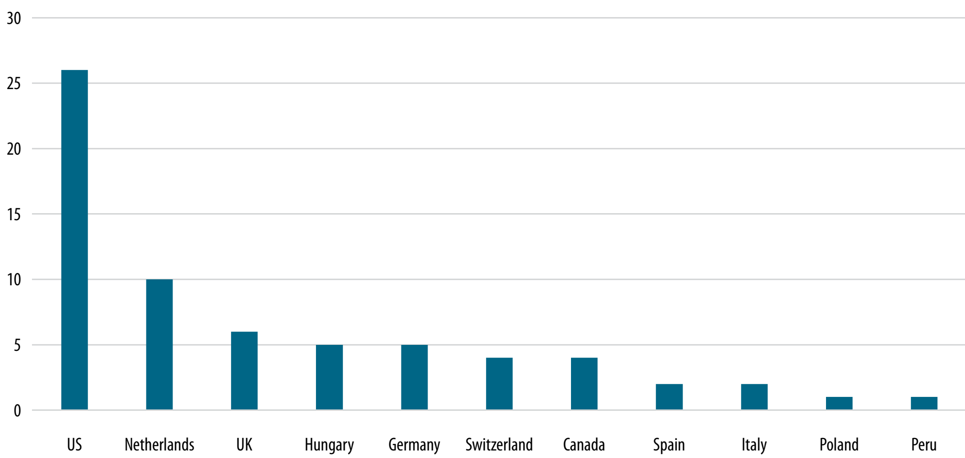

Figure 2:
Countries of publishers
Source: Compiled by the authors.

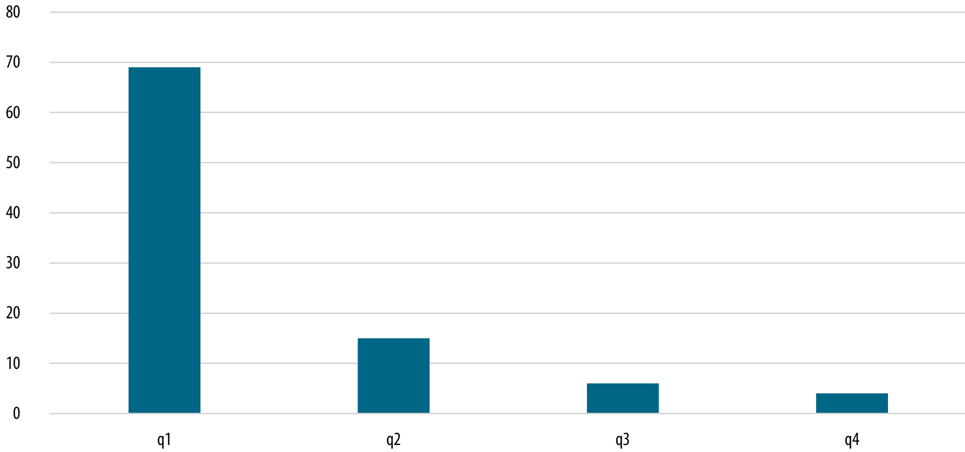

Figure 3:
Journal prestige factors
Source: Compiled by the authors.

Another finding is that the vast majority of publication output from CIAS scholars was published in the most prestigious journals in the first quartile of Scopus (Q1). As Figure 3 shows, around 70% of the published work was published in Q1 journals, and the proportion of papers in lower quartiles (Q3–Q4) is below 5%. This distribution shows that CIAS scholars prioritise high-impact outlets, likely aiming to maximise the visibility, academic credibility, and influence of their research. Such a pattern could reflect both the fellows' commitment to academic excellence and the rigorous standards expected by CIAS, emphasising the centre's focus on high quality research, international visibility and reputation.

Finally, our third research question relates to the international pattern of CIAS scholars' publication trajectories, with a specific emphasis on their collaboration networks. As Figure 4 shows, the collaboration network is even more diverse than the national diversity of CIAS scholars presented in Figure 1. The most characteristic network is formed by a legion of Western countries with the USA and the U.K. in central positions. Interestingly, Poland is more incorporated in this Western hub than in the Central and Eastern European hub, which is already a loose one, showing that scholars from that region tend to cooperate more with Western coauthors than with their Central and Eastern European peers. France is in a *star position* in the loose hub of several countries of the Global South such as Brazil, Chile, Saudi Arabia or the United Arab Emirates, and France also has more connection with these countries than with countries of the Global North. Finally, as the size of the loop around Hungary shows, Hungarian–Hungarian cooperation is substantial, meaning that a huge number of published papers were written by more than one Hungarian author. This reflects the integral role of CIAS in leading Hungarian research, involving many scholars from different national universities to cooperate with CIAS fellows that brought their longtime experience in research excellence. With this, CIAS fellows do not just enhance the prestige and international visibility of CIAS and its home institution, Corvinus University of Budapest, but significantly contribute to the wider context of Hungarian academia.

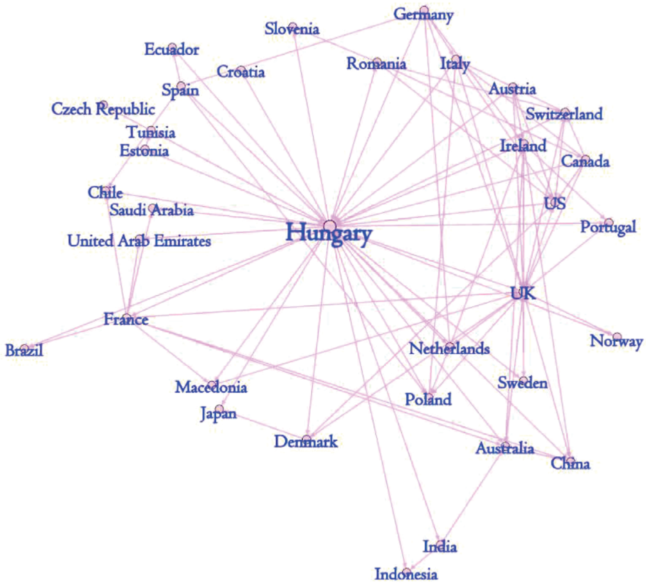

Figure 4:
Co-authorship networks of CIAS fellows

Note: The lines represent co-authorship, referring to the authors of the same papers with different affiliations. For instance, an edge between Hungary and Brazil represents a paper that is co-authored by a Hungarian and a Brazilian researcher where countries represent the nationality of the affiliation of the researchers (and not the authors' nationality).

Source: Compiled by the authors.

Discussion

The findings of this study offer a multifaceted understanding of the internationalisation dynamics of the Corvinus Institute for Advanced Studies (CIAS). By examining the geographical diversity of its fellows, the publication patterns during their tenure and their international collaboration networks, this research highlights both the achievements and challenges inherent in advancing the institution's global academic footprint. This discussion situates these findings within the broader theoretical framework of research internationalisation and world-systemic analysis (Demeter, 2019; 2020) and contributes to the ongoing discourse on how institutions in Central and Eastern Europe can enhance their global academic relevance (Sasvári & Lendvai, 2024).

Understanding the internationalisation efforts of CIAS holds broader significance for global academia. As a semi-peripheral institution, CIAS operates in a space often characterised by structural disadvantages in the global distribution of academic capital (Demeter, 2019). Its success in attracting international scholars, prioritising high-impact publishing and fostering global collaboration provides a compelling model for how institutions outside traditional academic power centres can enhance their visibility and influence.

In a period marked by increasing interest in the decolonisation and decentralisation of academic knowledge production (Comel et al., 2024), studying CIAS offers valuable insights into how emerging academic hubs can challenge entrenched hierarchies and contribute to a more pluralistic and equitable global research landscape.

The geographical and regional diversity of CIAS fellows *(Research Question 1)* demonstrates significant representation from Western Europe, the United States, Central and Eastern Europe and to a lesser extent, Asia. This reflects CIAS's success in integrating into the core of global knowledge production networks, attracting Western scholars with collaboration networks, knowledge and academic culture. The inclusion of scholars from diverse backgrounds aligns with theories that posit institutes for advanced studies act as cross-cultural academic hubs (Rüland & Gräber-Magocsi, 2022). Incorporating scholars from the world-systemic centre contributes to both the international visibility of CIAS and, through institutional cooperation, it helps to develop regional research culture and publication habits (Demeter, 2020). However, despite the building of strong ties to the centre being a fruitful strategy for semi-peripheral institutions (Xu, 2020), the underrepresentation of fellows from regions like Latin America, the Middle East and Africa suggests room for improvement in fostering a more globally equitable academic presence. This gap underscores the need for targeted outreach and strategic partnerships to enhance representation from these areas, contributing to a more inclusive global academic landscape (Demeter, 2020). Moreover, according to current decentralisation and de-Westernisation trends in the world system of academic knowledge production (Comel et al., 2024), non-Western world regions can be potential strategic partners in enhancing the visibility of non-core world regions such as Central and Eastern Europe (Demeter, 2018). Thus, while building strong ties to the centre is obviously a positive way of developing research excellence and international visibility, focusing more on excellent scholars from emerging world regions, especially from China (Demeter et al., 2024; Xu, 2020) would be a reasonable next step for CIAS in their internationalisation strategy.

The publication patterns of CIAS scholars *(Research Question 2)* reveal a clear preference for high-impact journals, with approximately 70% of their output appearing in Q1-ranked venues. This trend underscores CIAS's emphasis on academic excellence and global visibility and justifies its aim to appeal to prolific international researchers. Most CIAS-affiliated publications are associated with Western-based publishers, reflecting the fellows' central academic networks and their focus on reaching international audiences. While this approach enhances CIAS's prestige and aligns with global academic standards, the limited engagement with regional journals beyond the Western world highlights a potential trade-off between global visibility and local academic impact (Demeter, 2018). Encouraging dual publication strategies that include regional outlets could address this issue, supporting both international and local academic ecosystems (Comel et al., 2024). However, we found that some researchers published in Hungarian journals, and that can be interpreted in at least two different ways. On the one hand, it is possible that those researchers who prefer Hungarian journals have topics related to the local community. In this sense, local publications can help to keep local themes, traditions, and audiences, while through indexing on Scopus, Hungarian scholarship is attached to the central knowledge production network. On the other hand, however, it is also possible that these authors prefer journals in which they were published before their CIAS membership, and did not want to change their publication trajectories. Future research should explore whether the choice of Hungarian publication outlets is a sign of serving local academic cultures or a sign of some lack in competitiveness (Tóth & Demeter, 2021).

The international cooperation networks of CIAS scholars *(Research Question 3)* are dominated by collaborations with Western academic institutions, particularly in the United States and the United Kingdom. These connections enhance the visibility and impact of CIAS's research outputs, consistent with the findings that international co-authorship often leads to higher citation rates (Comel et al., 2024). From a world-systemic perspective, collaboration networks signify power relations within the field of academic knowledge production, where semi-peripheral collaborators gain prestige and recognition, while central collaborators gain the wider international significance and diversity that have become increasingly important in knowledge production (Demeter, 2020; Mapes et al, 2020). While the most typical pattern in the case of CIAS is to make ties with central scholars, interestingly, the collaboration networks reveal a robust Hungarian–Hungarian cooperation dynamic, reflecting CIAS's integral role in strengthening national academic networks. This duality – between strong international ties and active local engagement – positions CIAS as both a global and a national academic leader. However, the relatively loose integration of other Central and Eastern European countries within the network suggests opportunities to foster stronger regional academic ties (Demeter, 2018).

The findings of this study hold important implications for CIAS's strategic positioning and its role within Central and Eastern European academia. First, the success of its fellowship program and publication record shows its potential as a model for other Hungarian and regional institutes (Tóth & Demeter, 2021; Sasvári & Lendvai, 2024). By promoting high-quality research and international collaborations, CIAS enhances not only its own reputation but also the visibility of Hungarian and Central and Eastern European scholarship in the global academic field. This achievement aligns with the goals of reversing brain drain and promoting brain gain in the region, and could help to make Hungary more attractive to international scholars and students (Pham et al., 2021).

However, the study also highlights areas for improvement. To achieve a more inclusive internationalisation strategy, CIAS could implement measures to attract scholars from underrepresented regions, such as Latin America, Africa, the Middle East and Asia (Salazar et al., 2012). These efforts could include targeted outreach, the establishment of thematic research programmes relevant to these regions, or partnerships with institutions in the Global South (Demeter, 2020). Such initiatives would enhance CIAS's role as a truly global academic hub that not only strives to provide Hungary and the region with a more central position, but also to help decentralise the international field of academic knowledge production (Comel et al., 2024).

To deepen engagement with underrepresented regions and stimulate interdisciplinary, cross-regional research, CIAS could consider implementing several targeted strategies. One approach would be to launch thematic research calls that explicitly encourage cross-regional collaboration – such as joint proposals between scholars from Central and Eastern Europe, Africa, Latin America and Southeast Asia – focused on globally relevant but locally grounded issues (e.g. migration, sustainability, digital inequality).

CIAS could also establish seed funding programs or short-term mobility grants to enable researchers from underrepresented regions to initiate collaboration, conduct fieldwork, or to co-author with CIAS-affiliated scholars. Additionally, by integrating interdisciplinary workshops and summer schools into its programming – particularly those that combine social sciences with emerging technologies or policy studies – CIAS can serve as a platform for innovative, inclusive and globally connected knowledge production.

The underrepresentation of scholars from Africa and Latin America likely reflects a range of structural barriers that inhibit participation in programs like CIAS. These may include limited access to international research funding, fewer institutional partnerships between CIAS and universities in these regions, and logistical challenges such as visa difficulties or language barriers. Additionally, regional disparities in digital infrastructure, academic visibility, and publication opportunities may constrain the ability of researchers to compete for international fellowships. Addressing these challenges would require a combination of proactive outreach, financial support (e.g. travel grants or language training), and partnership-building with institutions in the Global South. Doing so would not only broaden the geographical diversity of CIAS fellows but also reinforce its role as a truly inclusive hub in the global academic landscape.

To operationalise deeper engagement with emerging publishing hubs such as China and Ibero-America, CIAS could consider several targeted strategies. One approach would be to launch region-specific fellowship programs that invite scholars from institutions in these regions to apply, possibly with reserved slots or thematic research focuses that align with shared academic priorities. Additionally, bilateral institutional partnerships – including exchange agreements, co-hosted events, or joint PhD supervision – could help build sustained collaborations. Co-funded research initiatives, especially those aligned with global issues such as sustainability or digital transformation, could also serve as vehicles for deepening engagement. Such measures would not only strengthen CIAS's ties to dynamic non-Western academic communities but also contribute to the broader goal of de-Westernising global knowledge production networks.

Another key consideration is the balance between global and local engagement. While our results show that CIAS fellows focus on publishing in high-impact international journals that strengthen the global visibility of CIAS, this might risk sidelining regional academic platforms. Developing a dual publication strategy – with an international focus – that emphasises both international and regional dissemination could mitigate this risk. For instance, encouraging fellows to publish in Scopus-indexed Hungarian or other Central and Eastern European journals on topics of regional relevance would reinforce CIAS's contribution to local academic discourse without compromising its international impact (Tóth & Demeter, 2021). Similarly, those CIAS scholars that have topics related to non-Western academic cultures (such as Asia, Latin America, Africa or the Middle East) could publish more in Scopus indexed journals by non-Western publishers. It is well known that the majority of high-impact journals are in the hands of Western publishers (Kwiek, 2020), but there is a significant countermovement from both China (Xu, 2020) and Ibero-America (Loyola-González et al., 2020) to make high quality journals indexed in international databases such as Scopus and Web of Science (Demeter et al., 2024). CIAS might need to participate in this de-Westernisation process by seeking publication in high-quality non-core journals while, in order to keep its pioneering position as a producer of high-quality international research, its focus should remain on international excellence (Comel et al., 2024).

In addition to enhancing international visibility, contributing to Central and Eastern European journals offers important benefits for regional engagement. Publishing in high-quality regional outlets enables scholars to address context-specific issues, reach local academic and policy communities, and contribute to the development of regional research cultures. These journals often provide a platform for emerging scholars from the region, and by contributing to them, CIAS fellows can play a role in mentoring, capacity-building, and fostering a stronger, more resilient local academic ecosystem. A dual publication strategy – where fellows aim for international visibility while also engaging with regional journals – can therefore help balance global recognition with meaningful local impact, reinforcing CIAS's role as both a bridge to global networks and a pillar of regional academic development.

Similarly, the findings suggest that the collaboration networks of CIAS could be leveraged further to address structural inequities and the-Westernisation processes in global knowledge production (Demeter, 2020). By actively fostering South–South (or periphery – semi periphery) collaborations or projects that prioritise underrepresented voices, CIAS could contribute to a more equitable academic ecosystem. This approach would not only diversify its networks but also align with global science policy trends emphasising inclusivity, diversity and decentralisation (Waisbord, 2022).

In conclusion, our study showed the transformative potential of research internationalisation for semi-peripheral academic institutions like CIAS. By attracting a diverse cohort of international fellows, promoting research excellence and high-impact publications and cultivating extensive collaboration networks, CIAS has established itself as a key player in the Hungarian academic landscape that can be considered to be a role-model for other regional (and other semi-peripheral) countries. However, the findings also reveal critical areas for growth, particularly in diversifying geographical representation and balancing global and local engagement in the Central and Eastern European context (Demeter, 2018). Addressing these challenges will be essential if CIAS is to fully realise its mission of advancing knowledge production and stimulating equitable academic exchange. Through strategic initiatives and sustained efforts, CIAS can continue to serve as a model for research excellence and international collaboration in Hungary, Central and Eastern Europe and beyond.

While this study focuses on CIAS, its implications extend beyond the Hungarian context. CIAS exemplifies a broader pattern among semi-peripheral institutions – particularly in Central and Eastern Europe, Latin America and parts of Asia – that are actively repositioning themselves in global academic hierarchies. Through targeted strategies such as attracting international scholars, prioritising high-impact publishing and cultivating global collaboration networks, these institutions challenge the traditional centre–periphery divide in knowledge production. By examining CIAS in this light, our study contributes to a growing body of research on how semi-peripheral academic actors assert agency in a stratified global research system (Demeter, 2020; Kwiek, 2021).

Limitations and future research directions

While this research provides valuable insights into the internationalisation dynamics of CIAS, several limitations should be acknowledged. First, the reliance on secondary data sources, such as Scopus and manually collected curriculum vitae, may introduce biases related to incomplete or inconsistently reported information. For instance, gaps in the fellows' academic profiles or publication histories might impact the comprehensiveness of the analysis. Second, the analysis of publication patterns focused heavily on quantitative metrics (e.g. Q1 rankings, publication counts) while qualitative aspects, such as the thematic relevance or societal impact of the research, were not explored. Finally, the network analysis conducted to map collaboration patterns primarily emphasises co-authorship connections. This approach may overlook informal or emerging academic networks that are not yet reflected in publications but could significantly influence the international presence of CIAS.

Future research should aim to address these limitations by expanding the methodological and geographical scope. For instance, longitudinal studies tracking the career trajectories of CIAS fellows post-tenure could provide deeper insights into the sustained impact of the institute on global and regional academic ecosystems. Similarly, comparative studies involving other institutes for advanced studies in Central and Eastern Europe such as the New Europe College in Bucharest, Romania or the Centre for Advanced Study in Sophia, Bulgaria could identify best practice and unique challenges in promoting international collaboration. In addition, future research should integrate qualitative methodologies – such as interviews with fellows and institutional stakeholders – to reveal the motivations, challenges and perceived benefits of participating in CIAS programs. This approach would add important nuances to the understanding of how internationalisation shapes academic experiences and outcomes in the CIAS community.

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ARTICLE

Personalised vs. Non-Personalised Peer Review Requests

Preliminary Data for Calculating Effects on Response Rate, Quality and Completion

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Peer review is and will remain the cornerstone of research publishing, but finding the right candidate to write an evaluation report for submitted manuscripts can be a challenge for academic publishers. Reaching out to peer reviewers always leaves a written trail (both for reasons of editorial accountability and quality control) and generally starts with an email inquiry from the editors. The content and style of these emails can influence how the recipient responds to the request, and analysing them could offer publishers valuable insights on how to design such initial contacts for optimal efficacy. This article is aimed at presenting a database and preliminary results for such analysis, consisting of 854 anonymised peer review requests sent out through traditional email, academia.edu and researchgate.net private messages between 2018 and 2022. It was found that personalised peer review requests had a higher response rate and higher ratio of submitted reports than non-personalised ones, and personalisation has the best results with peers of low academic seniority. Requests sent through academic social media had a response rate comparable to personalised email messages but received significantly fewer refusals and resulted in more completed evaluation reports, especially when female academics were targeted.

Keywords: editorial process, peer review, response rate, email personalisation, quality control

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Introduction

Although most commercial academic publishers use semi-automated solutions linked to subscription-based manuscript submission systems to recruit suitable peer reviewers, a number of society publishers, non-profit operations and standalone academic journals cannot afford to use such services. Editors without access to Clarivate's Reviewer Locator, Elsevier's Editorial Manager (the former relies on Web of Science, the latter on SCOPUS) or other smaller proprietary services are required to find, screen, and connect with potential reviewers in other ways. They may reach out to specific peers within their existing academic networks, scan through the list of references in a particular submission or use search tools in various academic databases to find other scholars working on similar topics. If not using their existing social capital, they are essentially constrained to cold-contacting potential reviewers with requests for reviews, their main channels being email and social media, in the hope of receiving a favourable answer, and using design and rhetorical techniques in order to increase the probability of success.

A variety of opportunities are provided by different channels to design these initial contacts. For example, it is easier to contact multiple reviewers simultaneously through emails with identical generic requests, the official email address of the journal, a pre-built reviewer pool, email signature and clickable links to the journal's website that all serve as signs of legitimacy to the recipient. In contrast, in social media communications the journal's official or the editor's personal profile can be accessed instantly by the potential reviewer, with content on these accounts (including altmetrics, affiliation data and personal recognition) being the main factors by which the sender's legitimacy can be confirmed, and decisions about cooperation with the sender be made.

In this article, we argue that due to the similarity of the medium, the outreach process, and the desired results, peer review requests originating both within and outside of the framework of semi-automated solutions linked to manuscript submission systems can be conceived and studied as specific cases of email and direct message marketing. This study also aims at reporting exploratory data for measuring how general use of personalisation techniques in this field can increase the likelihood of a potential reviewer accepting a request from an editor.

Personalisation of peer review requests: the editor's perspective

The Internet and, most importantly, online social media platforms have offered a new paradigm in customer focused marketing that operates through micro level customisation. Among marketing channels, email has retained its relevance among the proliferation of social media marketing and is still widely used mainly because of its cost efficiency. According to studies conducted by the Data & Marketing Association (2018, 2020), while businesses are making an average of 2.0 Return on Advertising Spend (RoAS) on paid advertising, email marketing consistently performs better with RoAS figures of 25.0 in 2017, 28.0 in 2018, and 35.4 in 2020, respectively.

One of the elements contributing to this success is the personalisation of messages sent by email. Personalisation is normally defined in the literature using a combination of profile, content and timing. Tailoring relevant content for customers based on the needs and preferences derived from their profile data, and sending it to them at specific times can make them more receptive to a delivered message if it consists of this basic framework for personalisation (Salonen & Karjaluoto, 2016; Huang & Zhou, 2018; Rhee & Choi, 2020). From the customer's viewpoint, a personalised message can enhance their awareness of their importance and personalised offers may serve their actual needs better than generic campaign messages (Goic et al., 2021). Although most customers are not terribly happy about the large number of emails that businesses send them and complain about it (Zhang et al., 2017), there is meanwhile an observable trend in increasing consumer demand for personalised marketing messages (Wilson, 2019).

Personalisation in email marketing is a commonly accepted and cost-effective practice, and only a small minority of marketers do not tailor messages to specific groups or even individuals based on information gathered about them. Thus, with almost every agent using personalisation in their marketing strategies aiming to optimise cost and relevance, algorithmic personalisation increased its share in the U.S.A. from 26% in 2018 to 46% in 2020 (Evergage, 2020). Personalisation holds benefits and challenges for both marketers and customers. Marketers have higher response rates to personalised emails, which generate greater customer loyalty and satisfaction when compared to generic ones. However, they must also take into account that customers may view these mails as an invasion of their private sphere, and extra measures must also be taken during the profile building process in order not to violate regional data protection laws. Academic publishers, just like any other businesses, have a variety of specific laws to adhere to. In the European Union, the General Data Protection Regulation (GDPR) poses many limitations on processing personal data. Publishers either have to acquire specific consent from the data subject (i.e. the potential peer reviewer) or claim another legal basis for sending out peer review requests. This basis could be to preserve the legitimate interest of the publisher because the workflow and maintenance of an academic journal is not possible without peer reviewing research before acceptance and publication. However, this only applies to the first contact, and sending further communications requires the other party's explicit consent. Due to its emphasis on affirmative action, pre-checked boxes are not considered to amount to consent in the EU, while in contrast, legal practice in the U.S.A. offers the right and opportunity to opt out or unsubscribe from receiving emails from any given business, which is articulated through the Controlling the Assault of Non-Solicited Pornography and Marketing Act (CAN-SPAM Act).

The basic principles of how profiling, timing and content tailoring apply to emailed peer review requests is not immediately evident. For example, in preference to biographical date, profiling for email marketing involves gathering behavioural data such as the time range of service usage (Telang et al., 2004), length of a browsing session (Bucklin & Sismeiro, 2003) or the attention a reader pays to certain parts of the visible screen (Kósa et al., 2020). However, this type of data is either not available to editors or not taken into account when deciding whom to ask to review a given paper. If an editor uses Clarivate's Reviewer Locator or Elsevier's Editorial Manager they can receive algorithmic

Table 1:
Algorithmic options offered by Clarivate and Elsevier

Profile data displayed after filtering	Reviewer Locator (Clarivate Analytics)	Editorial Manager (Elsevier)
Name	✓	✓
Affiliation	✓ (full affiliation history)	✓ (current affiliation only)
Matching keywords between manuscript and author areas	✓	✓
Contact email	✓	✓
Relevant publications	✓	✓
Citations received to relevant publications	✓	✓
Total number of indexed publications	✓	
Total number of reviews completed	✓	
Name and number of reviews completed for journals with keywords matching with those of the manuscript	✓	
Publons profile	✓	
ORCID	✓	
H-index		✓
Connections to the author, journal, author's institution or country		✓

Source: Compiled by the author.

recommendations for suitable reviewers (see Table 1), but they can also manually define a set of profile data based on which a list of suitable reviewers will be compiled by the software. This data includes institutional affiliation, country/region and relevant indexed publications from the recent years or their subject areas.

In addition, these services also display decision-supportive information on potential reviewers (see Table 2), such as their affiliation history, total number of indexed publications, citations received, journals they reviewed for and the number of reviews they have completed, and editors have one-click access to their publication data and email address.

As can be seen, the profile data based on which a reviewer is contacted is barely connected to the biological or professional age of the person. It is rather a combination of relevant expertise, publication behaviour, and impact, with the potential for further screening by other, more exalted prestige factors derived from the scientific rank/reputation of their country, their institution, and the journals they have published in/reviewed for so far. Editors using manuscript processing systems with in-built reviewer search functions profit not only from the aggregated data based on which suitable reviewers can easily

Table 2:
Decision-supportive information on potential reviewers

	Reviewer Locator (Clarivate Analytics)	**Editorial Manager (Elsevier)**
Filtering possible by…		
Country/region	✓	✓
Name	✓	
Email address	✓	
Institutional affiliation	✓	
Indexed publications in the past 3-5 years	✓	
Journal name	✓	
Manuscript title	✓	
Manuscript abstract	✓	
Areas of expertise		✓
H-index		✓
Connections to the journal/ publisher		✓
Interested reviewers		✓

Source: Compiled by the author.

be found and contacted, but also from being able to signal a level of professionalism and credibility that editors who do not have access to such systems are unable to. Emails sent through manuscript processing systems usually contain information about their parent company and the Domain Keys Identified Mail (DKIM) signature in the email metadata, which helps the request to get through institutional spam filters. Moreover, as something coming from a widely known and trusted source among academics, such information may better motivate recipients to open and respond to the email because, as has been repeatedly demonstrated, the trustworthiness of the sender positively influences response rates to invitational emails (Trouteaud, 2004; Porter & Whitcomb, 2005).

On the other hand, editors at journals who are not subscribed to manuscript processing systems still have access to a variety of profile data through their institutional subscription to abstracting and indexing services. They may not be able to immediately identify reviewers who might have connections that make them more liable to accept a review request, but the results of a manual search by topic or field of interest can be further refined or ordered by using the same variables as manuscript processing systems, although they will not be able to profit from the credentials provided by the parent companies of these services, they will have other channels where they can use their own personal/institutional reputation to strengthen the recipient's trust in the sender, such as using an institutional e-mail address, or academic social media (most notably researchgate.com and academia.edu) where their full profile can be checked and verified.

Finally, editors can personalise the text of the review request based on the information automatically aggregated from abstracting and indexing services or that found during manual searches. Certain proven personalisation techniques used in email marketing, such as using the recipient's name in the subject line (Sahni et al., 2018) or the main text of the email (Munz et al., 2020) can be adapted to peer review requests without much modification. Knowledge about an individual recipient, gathered while looking for suitable reviewers, can be further used by an editor to personalise a general peer review request email template, using specific formulas referring to academic data tied to the specific person. They can also use a review request to build trust and legitimacy for later contact emails such as asking for recommendations if the contacted person either does not have the time or does not feel well-positioned enough to evaluate the manuscript in question. If the original recipient recommends names or groups to contact, the email later sent to them can include a mention that they were recommended by X of Y University, providing a reference to a person the recipient is probably going to be more familiar with.

Other techniques such as the use of incentives would depend both on the characteristics of the academic field, the needs of the contacted academic, and the resources editors have at their disposal. One could certainly target a demographic that would view non-pecuniary rewards, such as giving recognition to the name of the reviewer on the journal's website or issuing a certificate of review as an adequate and useful compensation of their work, for example, lower level-academics who still need to "prove their worth" to the system, women – who are structurally disadvantaged in academia and need more symbolic capital to be recognised as being equal in status to their male colleagues – or academics in certain countries or institutions where extra points or recognition for completed peer reviews are given at their yearly performance evaluations. Based on previous findings, however, offering these types of certificates can discourage intrinsically motivated and scientifically productive reviewers (Zaharie & Seebert, 2018). Motivation through rewards that come not from editorial offerings but simply from the role and authority such reports on editorial decisions about publication have should not be neglected either. As the number of citations received are counted in most countries for academic career advancement purposes, a recipient may be motivated to participate in the review process if they can anticipate opportunities to recommend results/insights from their already published work for use in the author's manuscript to be incorporated into the list of references.

Some journals are experimenting with pecuniary rewards; however, there seems to be agreement in the literature that such measures are similarly harmful to intrinsic motivation and the sense that writing a peer review evaluation is a form of service academics provide to their community by voluntarily evaluating each other's work when asked to do so (Gagné & Deci, 2005; Squazzoni et al., 2013; Zaharie & Osoian, 2016). Moreover, smaller journals without a strong commercial or major scholarly society background do not necessarily have funding for such rewards, and a monetary incentive can also raise suspicion if coming from less-respected or lesser-known journals. Global wealth inequality also means that a lump sum of X would be more appealing for academics from lower income countries, and less appealing to their higher income peers, which could strongly affect the regional distribution of reviewers completing reports for the journal which, taking into account the fact that high income countries are generally more successful in knowledge production than low income ones, could result in a drop in the perceived quality of the peer review process. Academic rank could also influence the effectiveness of monetary rewards because early career academics with less income might be more strongly motivated by a given fee than their more highly ranked and better paid colleagues.

Tailoring rewards (whether pecuniary or not) to specific people based on seniority, gender or country of origin could also raise serious ethical issues and increase injustice and discrimination in academia, for example, by female academics being targeted with requests promising reviewer recognition – because their constant struggle against gender bias in academia would mean they would be more likely to accept that, or offering them a lower fee than their male peers on the assumption that that is just "how the system works" – would be highly cynical, and could potentially cause a range of PR issues, reputation loss, or even cancellation of the journal or the editor responsible if such stories were to gain traction across social media.

In consequence, it was decided that in this study we would discuss the effect of personalisation rather than offering rewards on the effectiveness of peer review requests.

Methods

We complied a database from peer review requests sent and delivered from the official email address of the Hungarian journal *KOME – An International Journal of Pure Communication Inquiry* (ISSN 2063-7330), and from the Researchgate.net and Academia.edu accounts of the journal's editor-in-chief between 1 January 2018 and 31 April 2022. A total of 854 requests were identified; 691 via email and 163 via academic social media.

The requests for reviews had not been designed specifically for the current study, instead we worked with pre-existing message threads in email and academic social media. The journal used different templates with different levels of personalisation for both email and academic social media requests, depending on the topic of the paper and the availability of external experts. After a manuscript had passed a preliminary editorial evaluation (ending in a decision on whether the editors would like the paper to be externally reviewed, or desk rejected), the editor-in-chief assigned papers to different editors and editorial board members to handle the external peer evaluation process. As part of their editorial duties, the editor-in-chief personally handled such processes.

Data extraction was done manually. Emails or social media messages were deselected and not included in the analysis if they were sent out but could not be delivered to the intended recipient either because their mailbox was full, or the address was no longer in use, or an institutional server/spam filter blocked the delivery. Individual editor-reviewer interactions (message threads) from the designated time period were first anonymised through number assignment, categorised by variables, and then analysed to gain an overview of recipient behaviour to personalised and non-personalised peer review requests. According to the type of reply (or lack of one) received, message threads provided the following results:

- *No Reply:* When the initial peer review request was sent out and delivered, but the editor received no human reply from the recipient within 30 days. Automatic replies triggered by incoming messages, notifying the sender about academic or parental leave, illness or other reasons for unavailability were not counted as genuine replies. If a human answer did not follow these messages or a reply was received more than 30 days later, we categorised the thread as ending with No Reply)

- *Refused:* When the initial peer review request was sent out and delivered and the editor received a negative reply within 30 days, we categorised the thread as ending with Refusal.
- *Accepted:* When the recipient replied within 30 days and accepted the offer to review, this was followed by a second message from the editor, sending instructions for the completion of the review, together with the anonymised manuscript and any supplementary materials in file attachments with a deadline of approximately 2 months. If the report was not submitted by 5 days before the deadline, a notification about the approaching deadline was sent out. If the editor received no reply and the report was not submitted by the deadline, they received another reminder about the report being past deadline. If no further communication was received from the expert, or they communicated that they would not be able to complete the review at all or requested a deadline extension that did not meet the current needs of the journal, the thread was still categorised as ending with Acceptance.
- *Completed:* Since for variety of reasons not all reviewers finished their agreed tasks, we had to discern between accepted requests to review and those that were actually completed and the reports submitted to the editors. We categorised threads as Completed where the recipient accepted, finished and submitted a detailed evaluation report of sufficient quality to the editor either by the requested deadline or to an extended one.

For both email and social media requests, the journal used a template text. Email requests, according to the degree of personalisation their text went through before being sent out, were variations of this main template, and were categorised in 4 subgroups, numbered from 0 to 3 for the analytic goals of the present study.

- *Group zero* requests had no personalisation at all; they were sent to clusters of 5 to 16 academics, hand-picked by the editor based on their expertise and knowledge about the topic of the manuscript. They started with a general salutation and no mention of the recipient's name in either the text or in the subject line of the email.
- *Group 1* requests (lvl1 personalisation) were personalised by name, where the salutation in the first line of the main text contained the full name of the recipient. These emails were personally dispatched to the addressed recipient only. Group 1 requests were used only when the editor was unable to find at least two external experts for the given manuscript in ~1 week with group zero requests. 95% of peer review requests sent out through email were either Group zero or Group 1 requests.

- *Group 2 requests* signalled familiarity with the recipient's recent professional activity in addition to the salutation by name,[1] and were only used when Group 1 requests had also failed to acquire external experts.
- *Group 3 requests* were only sent out in cases when a recipient had turned down a Group 0, 1 or 2 email request but had recommended other academics to approach instead of them. In such cases, the text of Group 1 emails was modified by adding the text: "[...] XY (University of Z) recommended you as a potential expert who might be interested", adding a further layer of personalisation to the contact email.

All peer review requests were sent out with GDPR protocols attached and communication was continued only in cases when the recipient explicitly expressed their intention to participate in the peer review process.

Besides the types of requests we sent them, we also took the recipient's gender into account, as well as their academic rank and region. When we received an email reply, we first checked the email signatures for pronouns, affiliation and academic rank. If none were present, we conducted a simple Google search, identified the recipient's ORCID and matched their affiliation history and academic rank with the email date. If any of these were not found, a further search identified the recipient's CV and the data was manually extracted from these documents. In the case of multiple affiliations, we always looked at the main affiliation of the recipient. If multiple academic ranks (for example at different universities or research institutions) were present simultaneously, we registered the highest one only. Gender was first identified from the pronouns used in the email signatures, if not present, then from the biographical statement at their main affiliation. In cases when an institutional biography was not available, or was not written in English, French, German or Spanish, we made the categorisation based on the recipient's name and profile picture.

When we received a reply through academic social media, academic rank, institutional affiliation and gender were mostly accessible from profile data. When not, we extracted the data from ORCID and the institutional biography by following the same protocol as with email requests.

Academic ranks were further categorised into 4 main categories. We treated individuals who were external professionals or independent researchers separately and deselected them from the total. The remaining academics were categorised, based on their positions, into *low-*, *mid-*, and *high-level* groups, and an *entry-level* group was also constructed for those who were in various stages of completing their PhDs. We mainly followed the U.S. system, with non-tenure track positions and assistant professors ranked as low, associate professors ranked mid-level and full professors ranked as high-level academics. In this way we created four groups to work with during the analysis, labelled from 0 (entry-level) to 3 (high-level). During the coding process we accounted for regional differences in the

1 This was done by adding a few lines to the appropriate parts of the text, such as "Since the author used your critical concept of the 'misfit' and relies on narratives you are certainly familiar with, [...]", or "I thought that you might be interested based on two of your publications I've recently read (one was about science communication during COVID and the other about whitelists/blacklists addressing the issue of predatory publishing)."

content of similarly named academic ranks; so, for example a Hungarian senior lecturer was categorised in the low-ranked (1) group, while those from the Commonwealth countries were mid-ranked (2).

The region of the recipient was measured at country-level according to the location of their main affiliation. Country-level data was further grouped into seven regions defined by cultural, geographical and economic boundaries: U.S., $n = 257$ (Region 1), U.K., $n = 74$ (Region 2), Australia, Canada and New Zealand, $n = 57$ (Region 3), Europe top half per capita GDP, $n = 167$ (Region 4), Europe bottom half per capita GDP, $n = 54$ (Region 5), Asia, $n = 59$ (Region 6) and Other, $n = 23$ (Region 7).

Results

The data (see Table 3) shows that only a minority of peer review requests sent out by the journal were answered; most commonly they were not engaged at all. Personalised peer review requests had a higher response rate and higher ratio of submitted reports than non-personalised messages. Requests sent through academic social media had a response rate comparable to personalised email messages but received significantly fewer refusals and resulted in more completed evaluation reports. Academic social media also stands out in the sense that these requests, while receiving fewer direct refusals then emails, had a relatively high ratio of unfulfilled promises: On researchgate.net and academia.edu, only 33 out of 42 academics (79%) who promised to submit an evaluation report did manage to complete the task. Those who were contacted by email managed better: 43 out of 50 those academics (86%) who were contacted through non-personalised emails and 29 out of 33 (88%) those contacted through personalised emails who promised to write a report actually submitted it to the editorial office. However, when asked, 65% of replies to non-personalised emails and 62% to personalised emails contained a clear refusal while the answers received through academic social media were initially more favourable, only 32% (academia.edu) and 37% (researchgate.net) declined the request.

Although the number of cases was low, further personalisation (in the cases of lvl2 and lvl3 emails) of peer review requests resulted in higher response and completion rates.

Table 3:
Responses to email and academic social media requests

	No. of requests	No answer (%)	Refused (%)	Accepted (%)	Completed (%)
email lvl0	444	300 (67.6)	94 (21.2)	7 (1.6)	43 (9.7)
email lvl1	214	127 (59.35)	54 (25.23)	4 (1.87)	29 (13.60)
email lvl2	8	1 (12.5)	5 (62.5)	0 (0)	2 (25)
email lvl3	25	7 (28)	4 (16)	0 (0)	14 (56)
academia.edu	83	47 (56.63)	11 (13.25)	5 (6.02)	18 (21.69)
researchgate.net	80	49 (61.25)	11 (13.75)	4 (5)	15 (18.75)

Source: Compiled by the author.

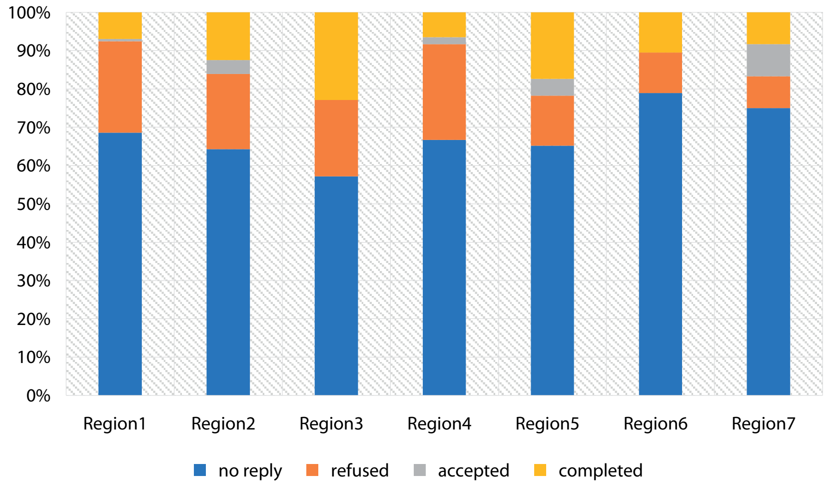

Figure 1:
Engagement with non-personalised (lvl0) email requests
Source: Compiled by the author.

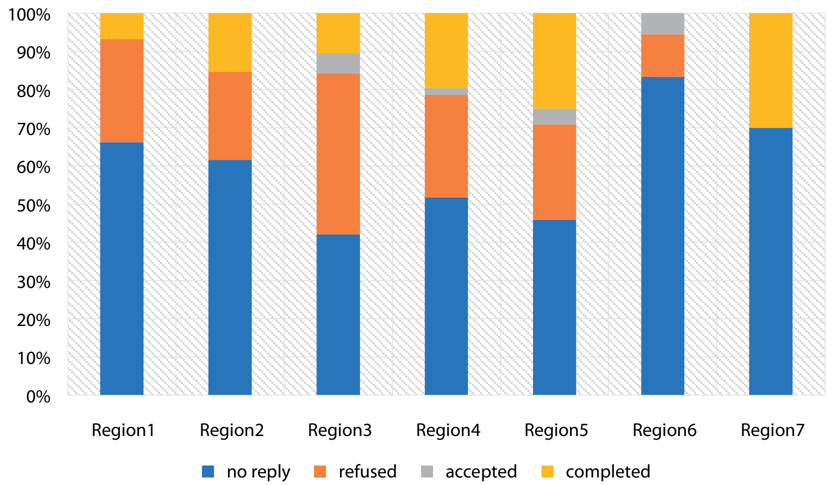

Figure 2:
Engagement with personalised (lvl1) email requests
Source: Compiled by the author.

If we look at regional differences in the data, we can see that a personalised peer review (Figure 2) request was, on average, more successful in acquiring evaluation reports from scholars from Europe and from the developing world, while scholars from the U.S.A. and the U.K. did not seem to respond more positively to personalised requests than to generic ones. In fact, the ratio of responses we got from these two countries are very similar in each category to those we got for non-personalised requests (Figure 1). In the cases of

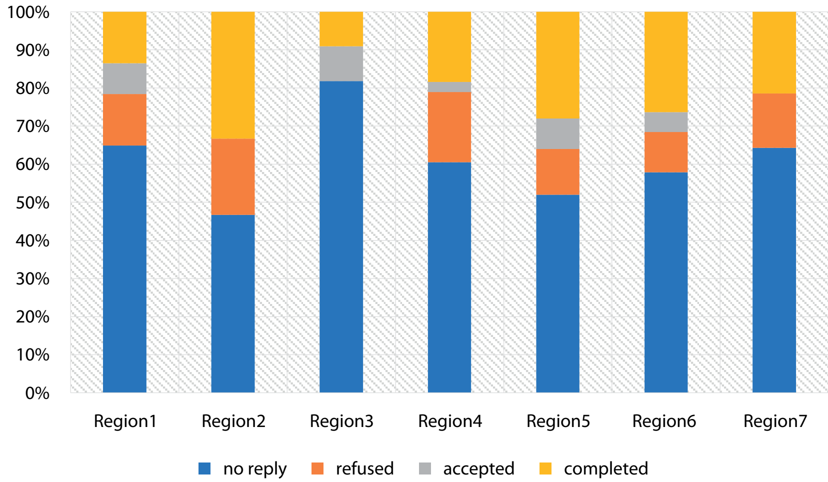

Figure 3:
Engagement with academic social media requests
Source: Compiled by the author.

Asia, Canada, Australia and New Zealand, in percentage terms we experienced that even fewer reports were submitted to personalised requests. Not counting Asia, this negativity strengthened when the request went through academic social media, resulting in even fewer completed reports and more unanswered requests.

Response rates and the types of response received to requests sent through academic social media (Figure 3) are generally higher and more successful than personalised emails when addressed towards U.S., U.K. and Asian academics. It is also evident that, on the other hand, academics in the Anglophone countries of Region 3 react to social media requests less favourably; these resulted in fewer completed reports and more than 80% of requests being left without any reply. A smaller but still noticeable decline can be seen for academics affiliated with institutions in the *Other* category, not only in the ratio of completed reports, but also their being the only cluster investigated where reaching out through academic social media resulted in an increase of straightforward refusals (in all other categories, communication through social media resulted in fewer refusals than in the case of email requests).

Looking at the types of replies received to non-personalised and personalised requests, we see that personalised requests are ignored slightly less often by both male and female academics than non-personalised ones (Figure 4), and result in relatively more completed reports when received by male academics. The ratio for completed reports does not seem to differ for female academics for email personalisation, however 23.9% of them submitted a report if asked via social media compared to just 9% when asked by email. With male academics, the difference was more subtle. Academic social media requests, while outperforming general emails, remained slightly less efficient than personalised emails.

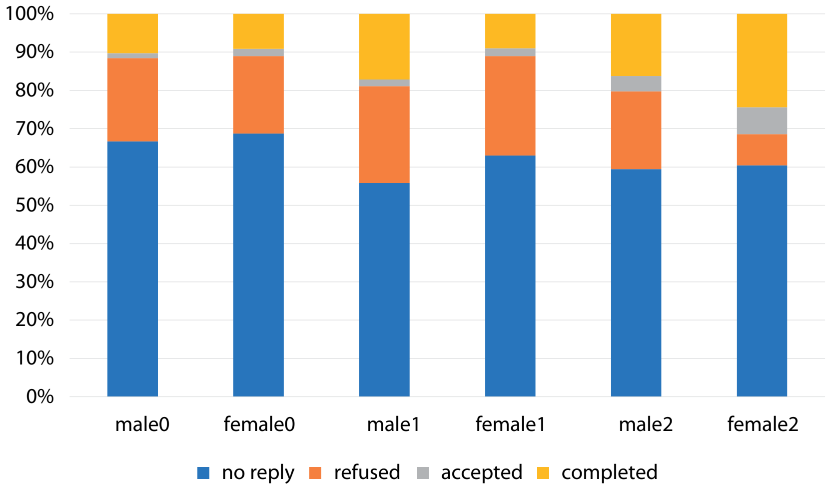

Figure 4:
Reply types per gender for personalised (0) and non-personalised (1) email, and academic social media (2) requests
Source: Compiled by the author.

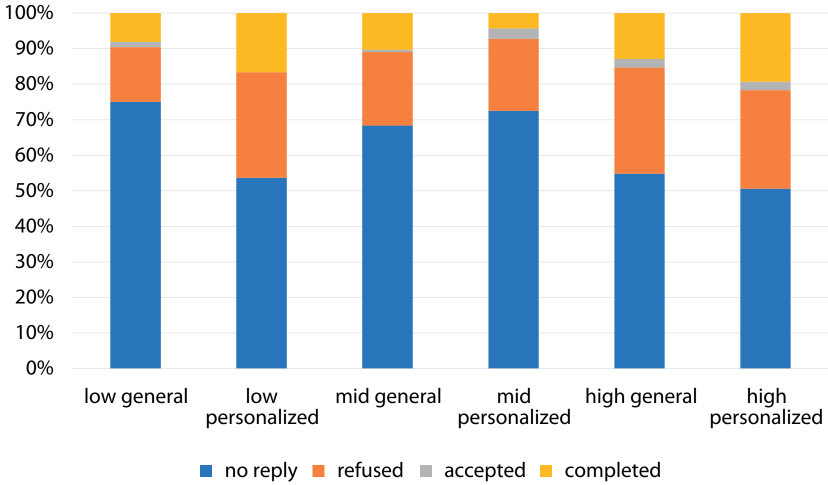

Figure 5:
Engagement with peer review requests by academic rank
Source: Compiled by the author.

When we looked at how academics of different ranks (Figure 5) engaged with peer review requests received by email, we found that among the four groups, it was high-ranking academics who were the most likely to react to our email and, moreover, had the highest ratio of completed evaluation reports as well. However, they also ranked highest on refusal to participate in the peer evaluation process, and accepted review requests had a lower chance of resulting in a completed report compared to other groups, with the exception of very early career academics without a PhD.

When we compared personalised and non-personalised email requests, we could see personalisation had the best results with the low seniority group; as we experienced a significantly increased ratio in both answered requests and completed reports. The positive effects of personalising requests were more subtle with the high seniority group, while mid-level academics reacted negatively: those who received personalised requests were less likely to complete the evaluation report and more likely to not answer at all.

Conclusion

The data shows that there are at least three areas where research focusing on personalising peer review requests could yield promising results: First, there may be statistically significant differences between the reactions of peers from various regions of the world to such requests, since academics from the Global North might respond less favourably if the academic venue reaching out to them is associated with Global South or semi-peripheral countries. Second, academic rank or the differences between the performance measurement systems academics are subjected to at their workplaces may have an effect on their responses, as there can be a variety (or absence) of incentives to participate in the peer review process of a journal that is not ranked among the traditional elite/prestigious agents of academic science production. Third, gender characteristics can also affect responsiveness and report submission percentages. Further studies in scientometrics are proposed, using and interpreting empirical data from academic publishers to research the above topics, which, in agreement with a recent suggestion for narrative literaturemetrics (Romero, 2024), could include (empirically underpinned) qualitative analysis within a theoretical framework that considers field-theoretic and world-systemic attributes.

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