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Data Journalism Beyond Technological Determinism

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ABSTRACT

Innovation in journalism became an important element to determine the current and future direction of the profession. Through incremental and cumulative transformations over time, because of many obstacles faced inside the newsrooms, journalism has suffered from significant and fundamental changes, including the deployment of data journalism. In Latin America, the practice has seen an increasing expansion in the last years. Nevertheless, there are important technological gaps that limit its development. The present study draws upon literature on data journalism, media management, and sociology, aiming to contribute theoretically to data journalism research. Our findings show that beyond the technological approach, practitioners are relying on data evangelists, collaboration, and audience-centered innovation to produce data storytelling in their newsrooms. On the other hand, these alliances form “homophily” and “endogamy” features that limit the dissemination of the practice, which must consider the potential implications for the social distance of the audiences. It argues that Latin American professionals are distancing themselves from technological determinism to embrace a more audience-centric innovation in newsrooms. Finally, it also states that it is important to take into account those limitations, as they pose obstacles for data journalism innovation research knowledge. The article concludes with an agenda for future research.

KEYWORDS

Data journalism; innovation; technology; homophily; endogamy; collaboration; audience; Latin America

Introduction

In recent years, the news media industry has been significantly disrupted by the potential of technology-driven approaches across its entire value chain, including the creation, production, and distribution of news products and services (Hernandez Serrano, Greenhill, and Graham 2015). As a result, the impact of these computational resources can be seen in different news products, such as immersive and drone journalisms (Harvard 2020; Kang et al. 2019), analytics (Ferrer-Conill and Tandoc 2018; Nelson and Tandoc 2018), automation (Lewis et al. 2019; Linden 2017), artificial intelligence (Diakopoulos 2020; Jamil 2020), and data journalism (Coddington 2015; Hermida and Young 2019). Inevitably, the future of journalism and its business models seem to be dependent on

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the deployment of technology in news media organizations (Pavlik 2013; Örnebring 2010).

Conversely, resistance to change, the institutional landscape, historical competition, and insufficient funding caused by the collapse of traditional business models have meant that the news industry tends to slowly embrace technological innovations. Therefore, a dialectic between technological skepticism and utopianism has arisen as news media has tried to anticipate and assess the potential implications of newsroom innovation (Dickel and Schrape 2017). Hence, most innovation in the industry has tended to be incremental, based either on modifying existing components or designs (Boczkowski 2004; Paulussen 2016) or on small improvements in news products (Krumsvik et al. 2019).

Data journalism has been able to take advantage of these developments in the industry to evolve from a niche field to a major practice area (Mutsvairo 2019). The practice is based on the gathering of data for interpretation and knowledge retrieval. Data journalism is inherently a technologically driven phenomenon, as evidenced by the fact that it is essentially a by-product of enabling flows and information transactions in the digital environment (Coddington 2015). However, many complex factors affect how data storytelling can be deployed in newsrooms. Research on data journalism has tended to focus on how this process functions within journalistic teams, but little is known about creativity and innovation beyond the technological aspects (Gynnild 2014), and these elements are especially important in regions where technological gaps currently exist.

In Latin America, a region that encompasses South and Central America, Mexico, and the Caribbean, data journalism faces a unique set of hurdles, such as a lack of highly qualified personnel and low levels of literacy and access to technology, together with complex national political contexts characterized by economic instability, inequality, and increasing populism. Consequently, journalists and other social actors often rely on international grassroots communities that bring journalists and technologists together, and such communities have paved the way for data reporting in Latin America (Borges-Rey 2019).

Through collaborative efforts to make data stories pleasant and straightforward to attract and engage the public, these communities have been able to implement and promote innovative solutions for their audiences. Furthermore, collaboration and open data reporting have allowed Latin American journalists to find ways to expose government corruption by investigating the relationships between money and power (de-Lima-Santos and Mesquita 2021a). These developments reveal an atmosphere that foregrounds the need for investigative journalism to serve as a checks-and-balances system supporting a democratic society (Borges-Rey 2019). In this context, this study examines the hurdles encountered by practitioners in Latin America and the strategies they use to overcome such hurdles. The research is based on in-depth interviews ($n = 25$), conducted between November 2019 and November 2020.

In order to make a theoretical contribution to data journalism research, this study draws upon literature on data journalism, media management, and sociology. We introduce the concepts of “homophily” and “endogamy” (Lambert and Griffiths 2018) to describe social networks that tend to be self-contained and often end up creating content largely for their own peers. We also focus on innovation management, which has been deemed essential for the survival of media organizations (Pavlik 2013; Posetti 2018).

The aims of this study are twofold. First, we discuss some hurdles and challenges experienced by the data journalism community in Latin America which limit the extent to which it can produce data reporting and disseminate it beyond specific niches to reach a mainstream audience. Second, we discuss how these obstacles can be surmounted through innovative and resilient approaches. The article poses two specific research questions:

RQ1: What are the hurdles and opportunities identified by Latin American practitioners in terms of tailoring strategies to deliver better data stories for the public?

RQ2: How do social network mechanisms support and constrain the practice of data journalism in Latin America?

Theoretical Grounding

Uncovering Data in Newsrooms

Relatively low levels of creativity and innovation in journalism (compared to other industries like manufacturing and technology), coupled with the deployment of information and communication technologies (ICTs), have motivated news media organizations to rethink the way they work and to consider how to incorporate new technologies into newsrooms (Koivula, Villi, and Sivunen 2020). Furthermore, as journalism becomes ever more complex and fragmented, new fields are emerging across a wide variety of contexts that support their survival and reproductive success. One example is data journalism, a term popularized after *The Guardian's* Datablog launched in 2009 (de-Lima-Santos, Karim Schapals, and Bruns 2020).

In the early years of data journalism, once the practice had begun to thrive in the newsroom cultures of early-adopter countries, an extensive scholarly literature developed, focusing on the Western paradigm (Appelgren, Lindén, and van Dalen 2019; Mutsvaio 2019). The technological nature of data journalism brought a range of new behaviors and issues to newsrooms, including new entanglements between journalists and civil society (Cheruiyot, Baack, and Ferrer-Conill 2019), an expansion of the boundaries of the traditional definition of journalism (Carlson and Lewis 2015), and a substantial rise in peripheral actors and industry newcomers supporting data journalism work (Eldridge 2017).

The arrival of these new entrants has led to significant changes in institutional standards and practices, driven by experience and expertise from other industries. These arrangements have become a norm established by “contributions from a distributed set of actors, usually outside the boundaries of conventional organizations” (Lewis and Usher 2013, 6060). Journalistic outsiders, typically technologists, have become intrinsically important to the news media business, particularly to data units dedicated to producing data-driven stories, which count on these professionals “to solve problems and inspire innovation” (Kosterich 2019, 7). Also known as “news nerds,” their open-source thinking, as a structural and cultural dynamic, has helped to challenge entrenched cultural mind-sets within the journalistic community, thus contributing to the emergence of new norms, behaviors and routines. One example of this is an increase in collaborative working, a shift away from the lone-wolf thinking traditionally fostered by investigative

journalism toward a radical sharing model, which has led to a growing consciousness of the complexity of collaboration culture (Carson and Farhall 2018).

On the other hand, previous research has shown that there are still challenges to the formalization and integration of data units within newsroom culture, given that data journalism is still considered a subculture in newsrooms (Stalph 2020). Nevertheless, by fostering cultures of collaboration and cooperation across Latin America, the practice has created innovative and results-oriented projects. In Argentina, *La Nación* has become internationally recognized for its high-quality work that has engaged the public in news production and promoted open data in the country (Palomo, Teruel, and Blanco-Castilla 2019). More recently, similar progress has been seen in numerous organizations that have been recognized for their outstanding work in data and investigative reporting, such as *G1* (Brazil), *Convoca* (Peru), *Ojo Público* (Peru), *Postdata.club* (Cuba), and *Rutas del Conflicto* (Colombia), among others.

Expanding Beyond its Network Roots

This open-source culture which has grown as more technologists have begun working in newsrooms has increased the structural complexity of news organizations, acting as a subculture which reflects a meaningful change in behavior patterns. By combining the common features of the tech profession and journalism, “hacker culture” has transcended the normative principles previously established in newsrooms (Kelty 2013). The data journalism community has tended to form alliances, allowing them to deploy entirely new products through cooperative efforts to increase their technical capacity and foster innovation. By working together, organizations can collectively develop innovative capabilities that had not previously been possible in their own newsrooms due to limitations in time, staffing, and funds (Almodovar and Teixeira 2012). In other words, “similarity breeds connection” (McPherson, Smith-Lovin, and Cook 2001, 415), a principle that favors homogeneous social networks with a tendency to reproduce social behaviors, in which like-minded persons or nodes are connected by some sort of compatibility.

Drawing on the work of anthropologists and psychologists, social networks can be understood as “small communities, kinship relations or work relations” (Almodovar and Teixeira 2012, 37), which make up networks characterized by “a set of nodes linked by some type of exchange” (37). In fact, early structural analysts were the first to explore this type of relationship between nodes in a network and the probability of connections existing to link them (see Freeman 1996).

In our organizational lives, we are connected to others through a range of social networks based on various types of exchange, such as ethnic, religious, or educational connections. In communication science, social networks have gained widespread attention through the emergence of sites that reproduce these social behaviors in the digital environment (Boyd and Ellison 2007), where technology has provided access to “networks in large systems with the ability to generalize to a known population” (McPherson, Smith-Lovin, and Cook 2001, 418). Prior research suggests that social networks are dynamic and represent the structural and organizational practices of companies, which find opportunities in relationships between their own workers or with other companies to collectively develop their capacity for innovation (Almodovar and Teixeira 2012). In this respect, some organizations within those networks are more connected than others. In network science

theory, these most active nodes are described as hubs, and play a powerful influential role in the network (Barabási 2016).

In the news media industry, these networks can be perceived through relationships between journalists and the public in contexts, such as participative and collaborative journalism, and more recently in data journalism. In the latter, two elements, in particular, are key to understanding the structure and function of these social networks. First, data journalism is known for its cooperative nature: as a discipline that has its roots in science and technology, the practice co-evolves through networks. These alliances involve skilled practitioners who see the exploration of networks as a form of knowledge diffusion, and, moreover, a way to solve problems collaboratively (Almodovar and Teixeira 2012). Second, “there is no unanimous consensus on data journalism across organisations on staff and managerial levels” (Stalph 2020, 1). This means that the role of data teams is not always formalized within journalistic routines, resulting in a situation where these teams often have stronger ties among themselves rather than with the rest of the newsroom. Several organizations have arisen out of collaborative efforts to solve technological problems for journalism, such as Hacks/Hackers and the National Institute for Computer-Assisted Reporting (NICAR), a program founded by Investigative Reporters and Editors (IRE) (Lewis and Usher 2014). The implications of this type of dynamic approach are related to a set of exogenous and endogenous forces that affect how participants benefit from networks.

A similar situation has occurred in Latin America. Since data journalism first appeared in the region, several organizations have worked together to disseminate knowledge and provide support for data reporting. In Central America, two organizations have been primarily responsible for supporting the development of data skills in newsrooms. In the mid-2010s, Internews arranged various workshops and courses in data journalism in the Northern Triangle of Central America (Guatemala, Honduras, and El Salvador). Similarly, the Mexican non-profit organization SocialTIC founded the Latin American chapter of School of Data (*Escuela de Datos*), providing a range of courses, seminars, and published works for the Spanish-speaking community in Latin America to foster data reporting in newsrooms (de-Lima-Santos and Mesquita 2021a).

In South America, Brazil had a notable role in the development of data journalism. In 2013, an independent chapter of the School of Data (*Escola de Dados*) was established, and a branch of Hacks/Hackers was launched in São Paulo at around the same time. This international grassroots community brought together journalists and technologists with the support of the ICFJ (International Center for Journalists), ABRAJI (Brazilian Association of Investigative Journalism) and the local offices of the Open Knowledge Foundation and the World Wide Web Consortium, paving the way for data reporting in the country (de-Lima-Santos and Mesquita 2021a).

Importantly, these networks contributed to the evolving discursive construction of cultural identities within the data journalism community (de-Lima-Santos and Mesquita 2021b). Journalists and technologists frequently work together to bring novel solutions into newsrooms, challenging old processes in news work and the existing norms of traditional journalism (Gynnild 2014; Tong and Zuo 2021). This innovation potential arguably lies in how these collaborations attempt to “break down the walls” (Gade and Perry 2003) and make use of the flexibility and interactivity that characterize new media. Furthermore, these networks have contributed to longer-term resilience by helping to rebuild basic

infrastructure and to maintain the essential knowledge required for the deployment of data stories in the members' respective newsrooms.

On the other hand, these groups create a "social resin" for the relationships that propagate and sustain these alliances. These social connections are described as "links between people that are not wholly contractual, and that might reasonably be expected, in some way, to offer benefit to the people involved" (Lambert and Griffiths 2018, 15). In data journalism, practitioners tend to combine their efforts and knowledge to facilitate effective collaboration through the exchange of data, tools, and resources, which can result in a situation where the content created is largely aimed at these practitioners' own peers, and this can make outsiders more reluctant to associate socially with these groups.

In social network literature, this phenomenon is usually referred to as "endogamy" or "homophily," and has been attributed to the fact that connections are typically established between those who share similar interests. The difference between the two terms lies in the types of associations that are established between these peers. Homophily suggests "the preference for similarity" and refers to "similarities in circumstances between people who are linked by any form of social relations" (Lambert and Griffiths 2018, 13), while endogamy refers to how social contact works in practice within group boundaries. There are some subtle variations in patterns of homophily and endogamy, but overall these are remarkably consistent across a wide range of social relationships.

Within this paradigm, social connections consist of bonds that are deliberately defined but not necessarily contractual or mutually beneficial. These collaborations can be based on various types of connections, such as social interactions fostered through projects, events, or even friendships (Upright 2004). As individuals hold diverse levels of attractiveness to others, those involved in social networks may endeavor to develop the best strategies to build relationships with those who possess similar levels of attributes (Brynin and Ermisch 2008).

However, the fact that the data journalism community is characterized by social habits that tend to manifest endogamous and homophilous behaviors can create undesirable barriers to expand the practice. In recent years, interest in social connections has grown considerably, and this interest is sustained through opportunities to obtain relevant knowledge from these networks (Lambert and Griffiths 2018). One area of interest is the phenomenon of collaboration bubbles, limiting the participation of individuals who are not considered attractive to the network.

These social habits can influence the outcomes of data stories, as practitioners whose social connections are limited to those with similar experiences might expect that these experiences reflect those of society as a whole. This social distance can lead to the production of data stories that only partially represent reality due to the gaps between influential social categories that determine to a large extent the specific content with which people engage and the knowledge these individuals have access to. In social networks, this can be measured through analysis of the patterns of connections between members and their overlapping needs and requirements. This results in a range of practices to reduce complexity in innovation management, because every audience has its own set of characteristics and rules.

These networks represent individual stocks of essential knowledge that are fundamental for the combinatory process of innovation diffusion. By deploying these innovation

capabilities collectively, members establish networks as a key mode of governance. This regime can steer processes down a path that embraces national and regional limitations (Almodovar and Teixeira 2012). Indeed, “Latin American journalists and news organizations have not always enjoyed the same kinds of infrastructure, resources, freedom, safety or capacity building as their counterparts in North America and Europe” (Borges-Rey 2019, 258). We can thus assert that data journalism in Latin America faces a unique set of hurdles that could be overcome through a wider distribution of innovation and coordinated collaborative efforts to accelerate the deployment of the practice. Therefore, these networks can also be considered a key factor in coordinating innovation within news outlets (Almodovar and Teixeira 2012; Gynnild 2014).

Innovation Management: Finding a Strategic Value

Innovation is fundamental in enabling businesses to gain a competitive advantage against their rivals. However, the innovation potential is often hindered by technological disruption. Gynnild (2014) has argued that computational exploration in journalism is an innovative process that happens “at the intersection between journalism and data technology” (715). This research takes a slightly different approach by arguing that innovations are tacit and invisible and can take many forms. We define innovation as a succession of inventions and their exploitation, in line with Roberts (2007). The invention process covers all efforts focused on conceiving new ideas and making them work, while exploitation refers to the process of transforming these ideas or inventions toward specific goals (Roberts 2007).

The importance of innovation has tended to be underestimated as sustainability has become the norm in the news industry over time (Gynnild 2014). Nevertheless, technological advances and changes in platforms, news products, and audience consumption habits drive media companies to innovate. Thus, innovation is fundamental for the survival of media outlets (Belair-Gagnon and Steinke 2020; Koivula, Villi, and Sivunen 2020). Prior research suggests a twofold approach to fostering innovation in news organizations, described as radical and incremental innovations. A radical strategy involves quantum leaps in product performance and is generally enabled by significant technological breakthroughs. Incremental innovation, meanwhile, can be cultivated by leveraging emerging technologies and offering improved solutions based on better analysis of users’ needs (Verganti 2009).

In general, radical innovation requires breaking design rules and challenging prior knowledge that could impede breakthroughs. Consequently, it has the potential to create an environment of uncertainty. This incessant product and process innovation mechanism that destroys established practices and replaces them with new ones has been referred to by the economist Joseph Schumpeter as “creative destruction” (Hendrickx and Picone 2020). Despite rapidly changing journalistic skillsets, newsrooms do not usually adopt radical innovation mechanisms as the prevalent mindset tends not to be innovative, and there is typically a reluctance to challenge established norms and routines (Paulussen 2016).

The news media industry seems to adapt slowly in the short term, rarely encouraging experimentation and evolving only incrementally over time due to the many obstacles to change typically found in newsrooms (Paulussen 2016). This attitude is “marked by

reactive, defensive and pragmatic traits” (Boczkowski 2004, 51) and a general reluctance to embrace innovation, leading to various excuses for not implementing novel practices (Paulussen 2016). This condition has previously been referred to in the literature as a “yes, but syndrome” (Ryfe 2012). However, incremental improvements do develop over several years, and these improvements should not be underestimated (Boczkowski 2004), as cumulative transformations have resulted in significant and fundamental changes in the industry. Overall, these developments in recent years have forced media outlets to become more innovative and creative than before, even if the changes have been limited in comparison to other industries (Gynnild 2014).

In the innovation management literature, one important finding is that “people do not buy products but meanings” (Verganti 2009, 4). Thus, companies need to look beyond utilitarian features and consider the emotional, psychological, and sociocultural messages that permeate their products, i.e., “developing meaningful approaches within the contexts [where] they are operating” (Gynnild 2014, 727). Consequently, user-centered approaches are compatible with an increasing need to give consumers a lead role in conceiving and designing the products and services they want, instead of companies attempting to anticipate their needs and passing that along to the industry (Hippel 2005). This is opposite to the model of design-driven innovation that takes a step back from users and adopts a broader perspective (Verganti 2009). For example, the late Apple CEO and co-founder Steve Jobs implemented a radical change when he introduced the iPod as a new way to consume music. He disrupted the music streaming industry by forcing it to move away from CDs in favor of digital files that users download or listen to via live streaming.

In a similarly user-centered approach, news media can embrace audience-centered innovations to deliver content that captures the public imagination and maintains their interest. In part, this approach has resulted from the increasing availability of quantitative audience data feedback, also known as audience analytics, which has allowed publishers to make sense of data and predict public preferences to tailor news products (Ferrer-Conill and Tandoc 2018; Nelson and Tandoc 2018). Using this approach, some scholars view innovation as a network-based phenomenon, where innovations are spread through peer-to-peer influence among individuals connected through networks (Deroian 2002). We argue, along with Verganti (2009), that “companies should begin an innovation project by analyzing market needs, looking closely at users” (3).

In the case of data journalism, news outlets can replace traditional, linear storytelling with a strategic value path that will allow them to regain their audience’s trust, thus making an impact at the individual level (Green-Barber 2020). This approach has thus far been only briefly addressed in the literature. To fill this gap, this article discusses the positive impact of innovative practices on the deployment of data journalism, and we then discuss the limitations imposed by the simple patterns, structures, and techniques adopted by the data journalism community.

Methodology

In an effort to understand the realities and challenges faced by data journalists in Latin America, specifically regarding the adoption of innovative processes in data reporting, and to address the proposed research questions, this study adopted a qualitative research paradigm, based on semi-structured, in-depth interviews with $n = 25$ practitioners in Latin

America. Using the social network concepts, respondents for this study were initially selected from organizations recognized internationally and locally for their outstanding work on investigative and data journalism. Thus, these respondents are “elite” actors, practitioners who have won awards and/or are demonstrably active in the Latin American data journalism scene. Such practitioners arguably hold comparatively influential positions compared to others in their networks.

National and international awards and competitions included the ONA’s Online Journalism Awards, the former GEN’s Data Journalism Awards (held until 2019), the Malofiej International Infographics Awards, and the new Sigma Awards. We also considered local prizes for journalism, such as the Gabo Prize (Latin America) and the Cláudio Weber Abramo Awards (Brazil). Awards have been used as a basis for sampling in various scholarly studies and have proved an excellent empirical access point (Ojo and Heravi 2018; Young, Hermida, and Fulda 2018; Loosen 2021). The nature of these forms of recognition “influence[s] the development of the field as a whole as they are highly recognized, are considered to be a kind of gold standard and, as such, also have a cross-border impact” (Loosen 2021, 361).

However, the potential issue of double bias has also been discussed in this context. This is justified because awards are self-selecting, data journalists both decide which projects should be submitted to a competition and also make up the juries that define the gold-standard in the industry (Loosen 2021). To mitigate this, we subsequently followed a snowball sampling method based on selection by referrals, that is, by reaching potential participants through the recommendations of other actors in the field (Bryman 2016). As has previously been reported in the literature, the data journalism community is known for its collaborative nature, which made this snowball sampling feasible (Lewis and Usher 2013), as the research participants were easily able to suggest others who were producing data journalism in their countries.

The interviews were conducted between October 2019 and November 2020 via video conference and covered the main topics shown in Figure 1. The interviews were conducted in Portuguese and Spanish, and each interview lasted about 60 min. As shown in Table 1, the respondents came from a broad range of news outlets, countries, and seniority levels. It is important to note, due to the rapid turnover of jobs within the data journalism industry, that we have only listed participants’ most recent position or



Figure 1. Topics covered in the interviews.

Table 1. Information about the respondents.

Code	Organization	Gender	Country
I1	<i>La Nación</i>	Female	Argentina
I2	<i>La Nación</i>	Female	Argentina
I3	<i>A24</i>	Male	Argentina
I4	<i>Ojo con mi pisto</i>	Female	Guatemala
I5	<i>El Intercambio</i>	Female	Guatemala
I6	<i>Plaza Pública</i>	Male	Guatemala
I7	<i>El Universal</i>	Female	Mexico
I8	<i>PODER</i>	Female	Mexico
I9	<i>Serendipia</i>	Female	Mexico
I10	<i>Los Tiempos</i>	Female	Bolivia
I11	<i>El Deber</i>	Female	Bolivia
I12	<i>El Tiempo</i>	Female	Colombia
I13	<i>El Tiempo</i>	Female	Colombia
I14	<i>DataSketch</i>	Male	Colombia
I15	<i>Rutas del Conflicto</i>	Male	Colombia
I16	<i>Rutas del Conflicto</i>	Male	Colombia
I17	<i>UOL</i>	Female	Brazil
I18	<i>InfoAmazonia</i>	Male	Brazil
I19	<i>Piauí</i>	Male	Brazil
I20	<i>Fiquem Sabendo</i>	Female	Brazil
I21	<i>Agência Mural</i>	Male	Brazil
I22	<i>24h</i>	Female	Chile
I23	<i>Ojo Público</i>	Male	Peru
I24	<i>IDL-Reporteros</i>	Female	Peru
I25	<i>La Nación</i>	Male	Costa Rica

experience discussed during the interview. The interviewees have been anonymized for standardization purposes.

The data obtained were then analyzed using the method proposed by Charmaz (2014), which involves collecting and analyzing qualitative data simultaneously to identify different themes and the relationships between them. During this process, we performed three coding analyses: first, open coding, which enabled us to identify emerging concepts; second, focused coding to detect patterns in the interviews; and third, axial coding seeking consistency and associations between the established categories (Anderson and Borges-Rey 2019).

Findings

Data Evangelists: in Charge of Changing Mindsets

According to the assessments of our interviewees, the Latin American data journalism community reflects the fact that news organizations in the region do not always enjoy the infrastructure, resources, autonomy, safety, or capacity to produce journalistic outputs available to their Western counterparts. This means that practitioners often need to use multidisciplinary and innovative approaches beyond the dominant perspective of technological determinism to deploy data projects in newsrooms. Typically, they see their counterparts in the US and Europe as receiving a level of top-down support and access to sufficient resources to produce data stories that are not available in Latin America. In general, practitioners also lamented that they spent a great deal of time amending and standardizing processes due to the low quality of data, leaving them

with less time for data analysis per se. This reveals an important characteristic of these professionals: their resilience in overcoming problems and adversity.

Interviewees also expressed concern that a significant number of journalists do not fully understand data journalism's role. Hence, these practitioners reported the need to become data journalism "evangelists" to promote and disseminate data storytelling practices in newsrooms. This mirrors findings in the literature, which have referred to the importance of such evangelists in supporting the development of data journalism in its early days (Howard 2014; Knight 2015).

An interesting example came from I2, a New Media Research and Training Manager at *La Nación* (Argentina), a position dedicated to expanding the practice.

In the beginning, journalists could not understand what data journalism meant and how to tell stories with data. Thus, the data unit had to promote short courses and training in the newsroom to show how we work and inform people about us and our work. (I2)

In the same vein, I17 was recruited to the Brazilian digital native media outlet *UOL* to "make people understand what they could do with data" (I17). I17's role was to serve as a bridge between journalists and technologists so they could communicate effectively. However, this was not a straightforward process—I17 said that "my role as an evangelist was not working very well because I was not widely followed and [journalists] were not willing to listen to me"; instead, it was "creating animosity in the newsroom" (I17).

Conversely, I21 shared that his decisive inroad into data journalism happened because of a colleague who was always interested in learning more about it and applying this knowledge within the daily routine of their organization. For I21, the culture of requesting data using freedom of information (FOI) requests in *Agência Mural* had largely arisen from his colleague's interest. This experience, along with those reported by I2, I17, and I22, shows that these data evangelists have become central and highly connected nodes within their professional networks. By becoming hubs, these practitioners have developed direct and indirect connections that give them access to most other nodes more quickly than others (Barabási 2016), helping to promote data skills.

Another interesting point highlighted by the respondents is that data journalism practitioners are generally younger than most news workers, which may also be a factor influencing homophilous and endogamous behaviors, as age is a primary factor tying social networks together (McPherson, Smith-Lovin, and Cook 2001). I6 began as an intern at *Plaza Pública*, which gave him time to learn and experiment before moving to a senior position. At this level, he began to disseminate data reporting techniques.

I promoted short workshops for the journalists in the newsrooms. Usually, there were about ten sessions on investigative journalism and data with a focus on methods [...]. What was very curious, all those who I worked with and who were older than me became my students later. (I6)

Meanwhile, open data workshops represented a source of income and dissemination of open data culture at *Ojo con mi pisto* (Guatemala). These courses helped to "introduce dozens of journalists to open data and FOI law in Guatemala" (I4). Through their reports on these data journalism workshops, our interviewees made clear that these training sessions are not enough if they are not accompanied by the development of new policies and a fundamental mindset change in newsrooms. The participants reported that in

their newsrooms these had come mainly from bottom-up initiatives, mirroring findings by Barnett and Townend (2015).

Collaboration Leads to Innovation

Half of all the respondents mentioned two events that they regarded as particularly important in disseminating data journalism across the region: the offshore investigations known as the Panama and Paradise Papers (see Obermayer and Obermaier 2016). Led by the International Consortium of Investigative Journalists (ICIJ), these investigations into offshore companies brought together journalists from five continents to analyze a leaked set of 11.5 million documents from the Panamanian corporate service provider Mossack Fonseca. These projects fostered a general change in the journalistic mindset toward a radical sharing model (Carson and Farhall 2018). This has been particularly evident in collaborations among journalists working on the ICIJ projects and beyond. For example, Bolivia was not listed in the first ICIJ investigation, but after contacting some journalists working on the project, I10 and I11 were able to join the investigation and reveal the extent of Bolivian business and political involvement in offshore companies. Collaboration extended beyond these projects; I10 and I11 reported that some data journalists involved in the investigations subsequently went to Bolivia to organize workshops and newsroom training about data journalism.

This paved the way for other collaborative investigations between journalists and news outlets in Latin America. One example mentioned by several interviewees was the Lava Jato scandal (also known as Operation Car Wash), which was first reported in Brazil in March 2014 (see Lagunes and Svejnar 2020). While the case was made public by the police in Brazil, in other countries, particularly Peru, it was primarily revealed by news organizations that had discovered a relationship between their national governments and Odebrecht, the Brazilian construction company under investigation (I24).

Similarly, other news outlets developed smaller data projects based on cross-border collaborations. For instance, I12, from *El Tiempo* (Colombia), launched the data story “Pequeñas Inocentes” (Little Innocents), which described gender-based violence in Latin America. This collaborative project was assisted by *La Nación* (from Argentina and Costa Rica), *El Universal* (Mexico), *El Comercial* (El Salvador), *El Comercio* (Peru), and *El País* (Uruguay). Referring to the motto “union is strength,” I12 added:

We adopted collaborative work, because I consider that our job is enhanced by working together with other people, allowing us to expand our local vision toward a global one. Consequently, we understood that the themes are transverse and exist across different latitudes [not limited to our viewpoint]. Moreover, I always say that data journalism or any other journalistic practice requires lifelong learning. I call [these collaborative efforts] learning clubs, communities that are continuously nurturing and exchanging. Thus, we could deal with the shortage of staff, and together we can produce more powerful news products to strengthen our work in our newsrooms.

Historically, the Latin American data journalism community has established strong ties, reproducing a cluster in existing human social networks. As noted by several of our interviewees, the events organized by Hacks/Hackers and the School of Data have helped journalists and technologists to build these networks, which have led to collaborative

projects. These findings are mirrored by Lewis and Usher (2013), who found collaboration to be a key element brought by technologists to newsrooms.

Journalists, technologists, and civic activists have also joined forces to find new avenues for public integration and participation in government and open data through events and projects in the region, forming new nodes for disseminating these practices. Respondent I8 argued that as a mechanism for sharing similar interests, the importance of these networks in the ecosystem goes beyond journalism. “The collaboration is very intrinsic [in Latin America]. There are very strong regional meeting spaces, probably the largest being *Abre Latam con Datos*” (I8), a gathering held annually by the data journalism community.

At these events, alliances are formed allowing practitioners to fill gaps in each other’s skillsets and promote the expansion of data journalism practices, as has been reported in previous studies (Almodovar and Teixeira 2012; Gynnild 2014). The cross-border investigative collaboration Red PALTA (an acronym for *Periodistas de América Latina para la Transparencia y la Anticorrupción*—Latin American Journalists’ Network for Transparency and Anticorruption) is a product of these alliances, aiming to serve as a system of checks and balances in terms of the use of public money and to identify patterns of bad practice in governments across the region. Comprised of seven news outlets—*La Nación* (Argentina), *La Diaria* (Uruguay), *Ojo Público* (Peru), *Datasketch* (Colombia), *PODER* (Mexico), *El Faro* (El Salvador), and *Ojo con mi pisto* (Guatemala)—this network was built through established collaborative relationships and alliances of convenience.

From a series of preexisting relationships, from projects or friendship, we created Red PALTA, which brings together all these informal networks that existed among us [...] in a more organized and formal way, thus, we could do projects that involve us all, always with an initial perspective of contracts. (I8)

This example appears to be consistent with prior research that suggests the growing participation of journalists in collaborative projects in Latin America (Cueva Chacón and Saldaña 2020). Conversely, some of our respondents lamented that these alliances are sometimes characterized by homophilous and endogamous behaviors, limiting the potential for other organizations to get involved in these networks. Three respondents mentioned that they are not part of any network because they do not regard themselves as having sufficient skills to offer help during investigations. This reveals a concern that might compromise networks by limiting social contacts within group boundaries. These findings correspond with those of previous studies which have found that collaboration leads to the formation of networks that allow certain organizations to take advantage of alliances through submissive forms of connection, leading to an “elitization” which privileges the central nodes and results in a lack of plurality in the group’s projects (Alfter and Cândia 2019).

Bursting the Bubble: Giving a Soul to Data Storytelling

These bubbles of teams that frequently work together—thus restricting other professionals’ participation—influence the social habits essential to a shift in culture that would encourage the inclusion of other nodes in the networks. One-third of the

interviewees also said that they believe these influences are reflected in how they see the world around them, with their individual experiences concerning social and cultural expectations persistently limiting how they tell stories, and ultimately influencing how they view society as a whole.

We need to break out of this very small circuit and this world that only consumes itself. We believe that data journalism is the most important thing in the world because we are inside this world. Then we look outside it, nobody cares, or it is not as relevant as it should be. (I3)

This same practitioner added that there is a need to offer innovative news production with “the objective of breaking with this endogamy, i.e., to be able to make data journalism grow and become even more relevant than it is today” (I3).

Four data journalists said that they see “humanizing data” as a form of innovation and a way to disseminate the practice beyond the niches. For them, this means that data points need to be translated into a plain and simple story that can be easily “digested by audiences” (I13). According to the respondents, this can be achieved through several storytelling strategies, such as making sure charts and graphs are easy to understand, “using annotation in charts to characterize your data points, making a video, newsletters, and gamification” (I3). For example, I3 started producing a newsletter to get more people interested in data topics, including his own stories and those produced by others in the industry. Similarly, I21 mentioned his experience of bringing people living in peripheral neighborhoods of São Paulo onto the radio to share stories relating to data analysis. Another possibility, discussed by I3, I9, and I19, is introducing innovations in the way data storytelling is consumed, such as through videos.

Piauí has a tradition of telling humanized stories by focusing on a person, a character, or a scene in its magazine or website. Such stories follow an arc, with the person starting at one point and ending up at another, which also helps to summarize a larger story. “*Piauí’s* literary tradition, which is its strong point, is known internationally as something of excellence” (I19). The method uses the story of a specific character to tell the story of a whole population using data. This reflects scholarly findings that over the past two centuries, pictorial methods have used “human forms to visualize more abstract and numerical kinds of data” (Kostelnick 2019), and applying this to chronicle or more feature-based forms of journalism has been used as a method for engaging the public more effectively. Following this tradition, *Piauí* launched a section called *Igualdades* (Equalities), which applies this literary convention to data journalism, and more recently, this also evolved to include a video format:

[In the *Igualdades* section,] we started by producing infographics based on statistics. It began very simply and got more sophisticated with time. We transformed it into something that I had never seen anyone doing in Brazil, making those animated videos. We say that we are doing infographics with motion design [...] The spirit is to take a little piece of data journalism, perhaps, to a slightly larger audience. It does not go so far into the investigation aspect but tries to create a presentation that is more attractive to a larger audience. (I19)

I12 also argued that there is a need to humanize data. For this respondent, this could be achieved by “doing things a little differently, i.e., strengthening the exercise of making stories plus data, where the latter ultimately serves as a catapult to the stories” (I12). In her opinion, the community should not overlook the fact that datasets and numbers will

always tell a story, and “the key is that we know how to find [a story] to begin with, instead of the pure data” (I12).

Similarly, at *La Nación* (Costa Rica), “we are working on [the traditional practice] and moving away to generate more audience-centered stories and tools and to expose other topics of social issues through data journalism” (I25). Colombia’s *Rutas del Conflicto* also gives a voice to the audience as a way to humanize data. Dedicated to reporting on the ongoing armed conflict in the country, *Rutas del Conflicto* uses interactive maps and data-related products to tell the stories of people who have experienced violence in relation to the armed dispute between communist rebels and government forces that has been going on since the 1960s. These victims’ stories serve as a platform to demand their rights and to publicize the extent of the suffering. Furthermore, it is a “body [of knowledge] for younger generations about the effects of this violence” (I16). Driven by the COVID-19 pandemic, Argentina’s *La Nación*, which has a tradition of producing “large-scale journalism projects” (Palomo, Teruel, and Blanco-Castilla 2019) involving audience participation, told the stories of people who were not able to return to Argentina due to the restrictions imposed by the government which closed the airports, leaving thousands of people stranded abroad with no repatriation plan.

By looking at these examples that put audiences at the center of data journalism, which also leads to the incorporation of citizens into production processes, we can argue that creativity is a fundamental component of the initial phase of the innovation strategy, as it is about offering novel and useful concepts which, in turn, can be transformed into innovations (Koivula, Villi, and Sivunen 2020). The participants said that their inspirations come mainly from the Western world, but they always look at what their regional peers are producing. Therefore, networks influence each other through both local and global hierarchical structures, adding thematic or narrative value to stories as a form of innovation, just as the so-called “golden age” of statistical graphics has set new standards for data representation (Kostelnick 2019).

Discussion and Conclusion

Overall, this article argues that innovation can take the form of novel concepts, methods, or tools that do not necessarily involve technological solutions. In Latin America, the data journalism community faces uneven development, with widening gaps between certain countries (Borges-Rey 2019). In taking up these challenges and looking forward to disseminating data journalism practices in newsrooms across the region, a twofold innovative approach (non-technological, deterministic) has been embraced by the Latin American data journalism community. First, they have adopted a practice of collaboration between different organizations, such as media companies and civil society initiatives, to enhance and promote open data and data-driven storytelling in the region; and second, they have focused on making data stories simple and appealing to attract and engage a broad audience, inspired by chronicle and more feature-based forms of journalism.

The collaborative effort to develop projects is ground-breaking, as shown by the case of I21, who partnered with a radio network to enable people living in peripheral areas to tell their stories as a way to “illustrate” their data analysis. Using the motto “union is strength,” practitioners have developed projects together to overcome resistance to

change, the established institutional landscape, and insufficient funding. Furthermore, to embrace collaboration, journalists have moved away from a culture of competition toward a more complex culture of conscious collaboration (Carson and Farhall 2018).

Despite these efforts, our results demonstrate the strong effect that homophily and endogamy have on the relationships between these practitioners (McPherson, Smith-Lovin, and Cook 2001). There are two significant side effects of these social networks. First, many ties are established through mutual interests, such as friendship or previous experience of working together on projects or events, thus, these practitioners are actively choosing to maintain these relationships, which can mean that newcomers are left out of those alliances. This bubble phenomenon resulting from the social distance between insiders and outsiders may negatively influence dissemination and the future of data journalism across the region. Access to social networks is clearly uneven across the region; for example, Paraguay and Panama were not mentioned by our interviewees when we used the snowball approach to find more participants. Scholars have emphasized that collaborative journalism, by its nature, behaves like other complex networked structures, in that organizations at the top become powerful hubs that dictate interaction patterns, and consequently benefit from them. Consequently, collaborations that focus only on a limited range of topics can mean that important topics are left out of the news agenda (Alfter and Căndeia 2019).

Second, the homophilous and endogamous aspects of these networks also create patterns of social structures where certain groups are persistently dominant (Lambert and Griffiths 2018). In other words, those leading the development of data journalism practice are likely to establish a particular state of inequality in the distribution of resources, allowing them to decide what audiences want to consume without considering or consulting them. Also, as social stratification often results from inequalities reproduced over time (Lambert and Griffiths 2018), this is likely to lead to a situation where niche content is prioritized, and most of the public is overlooked. Moreover, these dominant actors have the power to dictate a form of “cultural capital,” which can serve as a model with significant influence over the industry (Loosen 2021).

To surmount this, some data journalists stressed the need to bring an audience-centered perspective to storytelling innovation. If practitioners consider these limitations and ensure that they work together with less-developed organizations, data journalism will be better positioned to expand across Latin America (de-Lima-Santos and Mesquita 2021b). In the same vein, long before the COVID-19 pandemic, there were growing calls from the data journalism community to reformulate the practice into a sustainable system, exploring its full potential for innovation and creativity to reach wider audiences. We have shown that practitioners understand “humanizing data” as an innovation that can produce desirable outcomes through a series of dynamics, mechanisms, means, and changes in the news production process (Kostelnick 2019).

This finding provides evidence for ongoing transformational change in the news industry that can be understood as incremental innovation in existing norms, practices, and routines. Indeed, technologists have had a significant influence in disrupting traditional workflows, such as through the collaborative mindset, which is typical in the data journalism industry (Lewis and Usher 2013; Kosterich 2019), and as nodes of knowledge dissemination, as in the case of the data evangelists who promote the data journalism practices in their newsrooms.

The approach used was limited because our data was collected using a snowball sampling method based on referrals, meaning that peripheral nodes area in this network might not have been considered by our initial interviewees. Moreover, these experiences have only been considered from practitioners' perspectives; audiences should also be considered and surveyed to understand their needs. Future studies could fruitfully explore this issue by interviewing and conducting focus groups with the public.

We believe that apart from considering these innovations, future research should explore the tensions between traditional journalists and data journalists that are emerging in newsrooms. Furthermore, an interesting topic for future work would be investigating how data journalism can thrive in an environment where knowledge scarcity is a problem that is yet to be solved.

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