Article

Investigating News Deserts on the Content Level: Geographical Diversity in Swiss News Media

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Abstract
With its diverse landscape of regional and local news media, Switzerland seems far from being a news desert. However, the centralization of editorial offices following the economic crisis of journalism has led to news outlets that share most of their content but appear under different names in different regions. This development has fostered fears about declining geographical diversity at the regional level in the news coverage of Swiss news media. We argue that this centralization by regional news outlets affects news content; it constitutes a specific process of news desertification, which is not aptly captured by news desert research's focus at the outlet level. With our explorative study, we aim to analyze news deserts at the content level. We apply an automated geoparser to a manually annotated dataset of local news media articles (n = 5,173) published by six regional news outlets of two news organizations between 2016 and 2021 to determine the extent and development of geographical diversity in Swiss regional news media. The geoparser uses a weighted gazetteer-based approach to determine the most relevant locations of news articles within Switzerland. We find early signs of news desertification. At the output level, we observe a declining number of articles published by the analyzed outlets. At the performance level, we see a declining number of unique place names in the articles and more mentions per article. However, the diversity of place names in the coverage remains stable.

Issue
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1. Introduction

The seminal project The Expanding News Desert, which has tracked the availability of local news in the US since 2016, defines a news desert as "a community, either rural or urban, with limited access to the sort of credible and comprehensive news and information that feeds democracy at the grassroots level" (Abernathy, 2020, p. 18). This definition highlights the vital function of news media for modern democracies, which includes positive effects on political knowledge (Ohme, 2020; van Erkel & Van Aelst, 2021) and political participation (Andersen et al., 2016; Kübler & Goodman, 2019; Strömbäck et al.,

2018). With their specific geo-social context, regional and local media form one particularly important type of news media that fulfills this function. The terms regional and local media are usually used interchangeably; nevertheless, while there is a large variety of structure, forms, etc. for the regional and local media, this type of media, unlike international and national news media, relates to a specific locality below the national level in its production and distribution (Gulyas & Baines, 2020). Regional and local media address communities with shared (and complex) understandings of geographical and symbolic spatial boundaries (Weber & Mathews, 2022). Regional and local media are particularly shown to be among

the primary sources of information for politics (Kübler & Goodman, 2019; Nielsen, 2015). Thus, by covering local news and events, the news media foster political knowledge and participation on the local level (Kübler & Goodman, 2019; Magasic & Hess, 2021).

However, local news media find it increasingly difficult to survive because of low audience traffic for local news (Hindman, 2018) and insufficient business models (Jenkins & Nielsen, 2020; Nielsen, 2015). Thus, an increasing number of communities or areas no longer have access to credible and comprehensive news about events in their region. Even though most people have access to an abundance of news beyond their region, provided by internationally renowned news brands, news aggregators, or social media, they might lack the necessary information to participate in political processes at the local level.

Especially in the US, concerns about the harmful effects of growing news deserts have been prominently articulated by scholars (Abernathy, 2020; Darr et al., 2018; Ferrier et al., 2016; Hayes & Lawless, 2018; Napoli et al., 2017). By contrast, countries beyond heavily commercialized media systems like the US, such as the smaller countries from democratic-corporatist countries in Western and Northern Europe (Hallin & Mancini, 2004), are thought to still offer relatively good conditions for local journalism. In Norway, for instance, the willingness to pay is quite high, and people rather frequently subscribe to various local news outlets (Newman et al., 2021). Similarly, Switzerland is often perceived as a country with a diverse landscape of regional and local news media and thus seemingly far from being a news desert. However, the closure of outlets and increasingly concentrated media ownership have also taken place in Switzerland and have accelerated in recent years (Vogler et al., 2020). As in other small media markets, such as Flanders (Belgium; Hendrickx & Ranaivoson, 2021), local news, in particular, is increasingly provided by centralized editorial offices, which has led to seemingly independent news outlets that share most of their content but appear under different names in different regions (Vogler et al., 2020). This development has fostered fears about declining geographical diversity at the regional level in the news coverage of Swiss news media, with adverse effects on the political process. Swiss politicians, for instance, have already articulated concerns that, in some regions of Switzerland, only one newspaper or news outlet exists. Compared to other countries, this might seem like a trivial complaint. However, the direct democratic system, with its frequent referendums on multiple levels (i.e., national, cantonal or state, and municipal), depends on a functioning infrastructure of local news brands that produce substantial local news coverage.

We argue that news desert research has often focused on the outlet level by identifying places without a dedicated regional newspaper (or with a regional newspaper with declining circulation) and that it might have

missed out on processes of news desertification at the content level. With our explorative study, we aim to analyze news deserts at the content level in Switzerland. We apply an automated geoparser to a manually coded dataset of local news media articles (n = 5,173) published by six regional news outlets between 2016 and 2021 to determine the extent and development of geographical diversity in regional news media in Switzerland. The selected outlets were independent in 2016 but were all integrated into two editorial offices during the period of investigation. Therefore, we investigate how media content concentration (Vogler et al., 2020) affects the geographical diversity in local news.

2. Conceptual Framework

Diversity in the news media is a multifaceted and multidimensional phenomenon (Loecherbach et al., 2020). From a normative perspective, diversity should occur not only at the structural level (i.e., a diversity of owners [and ownership] and brands) but also at the production level and the consumption level when it comes to media exposure and, above all, at the content level (Hendrickx et al., 2022). Research to date has been dominated by studies addressing news content diversity (Magin et al., 2023). Diversity in news coverage is essential for the media to fulfill its functions in modern democracies (Loecherbach et al., 2020; McQuail, 1992). By including a broad set of voices, topics, actors, or regions in their coverage, the news media contribute to a well-informed and participative citizenry (Andersen et al., 2016; van Erkel & Van Aelst, 2021), and by ensuring the representation of different parts of society, they also contribute to mutual understanding and integration (Masini et al., 2018; Vogler & Udris, 2021). A critical aspect of the diversity of news coverage is geographical, especially regional diversity, which is "rooted in the participatory liberal model of public discourse that emphasizes popular inclusion on different levels" (Humprecht & Esser, 2018, p. 1832). In spatial terms, to fulfill geographical diversity, news media should address a variety of places and spaces (e.g., cover international, national, and local news; Joris et al., 2020), and there should be diversity within each area (e.g., diversity of country mentions in foreign news coverage; cf. Wilke et al., 2012). This concept implies that news outlets, in their local news coverage, should not only focus on large and densely populated urban areas but should also include peripheral places in their coverage.

Diversity in the supply of local news is vital for local news to fulfill its functions for the political system, especially in countries with strong regional and municipal autonomy. However, the economic crisis of journalism threatens the diversity of the coverage, with local news being an area of particular concern (Finneman et al., 2022). Scholars have articulated concerns regarding the vanishing diversity of local news outlets under the terms "news desert" (Abernathy, 2020; Napoli et al., 2017)

or "local news crisis" (Toff & Mathews, 2021). In many media markets, local news outlets have been shut down or integrated into large media organizations with centralized editorial offices and a high degree of syndication or content sharing (Hendrickx & Ranaivoson, 2021; Sjøvaag, 2014; Toff & Mathews, 2021; Vogler et al., 2020). The decline of local news is shown to affect the political process negatively. Darr et al. (2018) demonstrate that newspaper closures in US counties foster polarized voting behavior. In their longitudinal study, Hayes and Lawless (2018) trace back reductions in citizens' political knowledge and participation to the declining coverage of congressional elections in local news.

One reason for the adverse effects of missing local news is the uniqueness of that news. At the national or international level, a variety of outlets often exists, but the local news in one region is often provided only by a single outlet. Therefore, diversity in local news must frequently be provided within an outlet. Kübler and Goodman (2019, p. 1) warn of "threats to local democracy via the territorial upscaling of media markets," as such upscaling usually includes a declining geographical diversity in news coverage. Even though a county or region might still have a local newspaper, certain parts of that region (e.g., its municipalities) might not receive any attention from the outlet. The affected communities will miss "the sort of credible and comprehensive news and information that feeds democracy at the grassroots level" (Abernathy, 2020, p. 18), thereby fulfilling the main criteria for living in a news desert.

Napoli et al. (2017) developed a threefold method of quantifying news deserts to account for the different dimensions of the problem, and their method can be scaled to analyze multiple communities. They suggest assessing the health of local journalism along the following dimensions (Napoli et al., 2017):

- Journalistic infrastructure: The number of local outlets in a community.
- Journalistic output: The number of articles produced by these local outlets.
- Journalistic performance: The qualitative aspects of the output.

As for the output and performance levels, Napoli et al. (2018) developed indicators for local journalism that addresses "critical information needs." Hence, they identified articles that could be considered local (as opposed to non-local) and that included certain topic areas (e.g., political life, environment and planning, or emergencies and risks but, for example, not sports). While it remains debatable which topics actually address critical information needs, this distinction points to the necessity of considering that not all local news is equally relevant. This relates to research on overall news performance, in which the topic or subject matter makes up an important dimension of either hard news or soft news (Reinemann et al., 2012). While soft news undoubtedly

can serve to reach and engage (local) audiences, it is the hard news, especially on political life, that links news to media users' rights and duties as citizens in their community. Against this normative background, media policy regulating local journalism is often designed. For instance, in Switzerland, regional TV stations are each assigned to one specific region and receive public funding to carry relevant local news; therefore, the regulator BAKOM in Switzerland regularly measures journalistic output and checks whether a news program carries at least 10 minutes of news per day that addresses the specific region and includes a hard news topic.

Up to now, local public spheres in general (Fischer et al., 2021), and news deserts in particular have mainly been quantified at the infrastructure level and rarely at the output and performance levels. Research on the temporal development leading to news deserts—which we refer to as news desertification—is even less common. Thus, the diagnosis of news deserts is usually based on the absence of a dedicated local news outlet in an area. Recently, news deserts and the crisis of local news have been studied more extensively, leading to a broader understanding of the phenomenon (e.g., Ferrucci & Alaimo, 2020; Mathews, 2022; Mathews & Ali, 2022). However, many of these studies focus on single cases (i.e., mostly clear cases without a dedicated newspaper). Thus, the research might miss nuances in the diagnosis, the evaluation of effects, and possible solutions and prevention of news deserts.

The absence of local news coverage or the shrinking diversity within local news coverage may also result from processes that are not visible at first glance, and not necessarily in the (very) small (hyper) local news media. In many media systems, slightly larger regional newspapers constitute important pillars of media ecosystems, as they provide citizens with a whole range of information on international, national, and local news. Examples include the *St. Louis Post-Dispatch* in the US, the *Birmingham Mail* in the UK, *Rheinische Post* in Germany, *Ouest France* in France, or *Berner Zeitung* in Switzerland (Umbricht & Esser, 2016). In her book on the role of place in journalism, Nikki Usher (2021) highlights the importance of "Goldilocks newspapers," which offer a "one-stop 'news report' available for their geographic region" and which are:

> Not big enough to claim national audiences but still big enough to serve a vital role in the larger national news ecology by being the authoritative voice of a city or region, surveilling a geographically specific part of the country. (Usher, 2021, p. 11).

Importantly, Usher (2021) reminds us that these types of newspapers are big enough to produce highly professional journalism, even in the regions, but they remain too small to really make ends meet in the digital attention economy that favors only the largest, usually truly national (or even international) players. Given

these economic constraints, one effect Usher (2021) observed is that cost-cutting leads these outlets to pull back from the more rural and suburban areas to focus on concentrated urban areas, thereby reducing geographical diversity in local journalism. Developments in other slightly smaller media markets, such as Germany, Belgium, and Switzerland, point in a similar direction. The sharing of content in regional outlets that centralized editorial offices deliver leads to a reduced number of individual new articles (declining journalistic output) and an increasing media content concentration (declining journalistic performance; Dogruel et al., 2019; Hendrickx & Ranaivoson, 2021; Vogler et al., 2020). However, the literature also suggests that the amount of regional or local journalism produced and the diversity within (the remaining) local news coverage depends on the ownership and business models of the relevant media company (Jenkins & Nielsen, 2020) and the specificities of local markets (Radcliffe & Ali, 2017; Usher, 2021). Thus, research ideally takes a comparative perspective by analyzing different local news outlets in different markets.

Overall, we argue that focusing on the infrastructure alone is not sufficient, as a diversity of brands might still exist, and by definition, these regions would not constitute deserts. We call for a broader perspective that focuses on the output and performance levels, where local news might be more visibly on the decline. We argue that focusing on regional diversity in news coverage helps detect early indicators of news desertification. We thus follow the approach advocated by Napoli et al. (2017) and analyze news deserts at the output and performance levels. Following the recent events in media markets outlined above, we see possible early warning signs of news desertification in our case of Switzerland. Therefore, we ask:

RQ1: How has the number of articles on local news developed over time?

RQ2: How has geographical diversity in local news developed over time?

RQ3: Are there differences in geographical diversity between local hard and soft news coverage?

3. The Swiss Case

In addition to being segmented into four language regions, Switzerland is a country with strong autonomy in its sub-national units, such as cantons (states) and municipalities. Historically, as in Scandinavian countries and other countries with a democratic-corporatist media system model (Hallin & Mancini, 2004). In the process, the boundaries of local and regional markets and audience groups shifted, along with the content offered by the news outlets. Today, outlets exist on several levels. At the national level, which tends to be the same as the language region

level, the public service broadcaster SRG SSR is the dominant player, together with the tabloids and cost-free papers (e.g., *Blick* and *20 Minuten* in German-speaking Switzerland), all of which provide a comprehensive diet of international and national (and some regional) news. At the local level, (hyper)local print and online news outlets focus only on single (or very few) communities and do not include national or international news; in many cases, even their local news output is limited (e.g., only weekly publication), thereby reducing their importance. More important are the news media at the more regional level, namely the commercial radio and TV stations that have a license to broadcast in a specific region, and, above all, daily regional newspapers, as they focus not only on one community but also a slightly larger region (e.g., a metropolitan area or one or two cantons; Künzler, 2013). These regional newspapers, such as *Aargauer Zeitung*, *Luzerner Zeitung*, *St. Galler Tagblatt*, or *Tages-Anzeiger*, offer a mix of international, national, and local news and represent a very important source of news in general, and of local news in particular, for a large part of the population, both in their printed and online editions (Newman et al., 2021).

These regional media in Switzerland usually dedicate most of their local coverage to one canton and its municipalities. This focus is congruent with the level of political decision-making at the level of cantons, which have comparably large autonomy in federally organized Switzerland. Following the economic crisis of journalism in Switzerland, many regional outlets were taken over by the two largest private media companies, TX Group and CH Media. These two companies emerged as the two leading players in the regional news business in German-speaking Switzerland's media market (Vogler et al., 2020). They produce regional media that often share international and national news but have separate regional and local coverage. At TX Group, the regional newspapers from three of Switzerland's five largest cities now produce the same international and national news content: *Bund* (Bern), *Berner Zeitung* (Bern), *Basler Zeitung* (Basel), and *Tages-Anzeiger* (Zurich), and there are even more brands from smaller cities and regions (e.g., *Thuner Tagblatt*) with shared (inter)national content. The same goes for CH Media in cities and regions: *Aargauer Zeitung* (Aarau), *Luzerner Zeitung* (Lucerne), *Tagblatt* (St. Gallen), etc.

Consolidation and concentration thus imply an ambivalent (or dual) business strategy in terms of target audiences. On the one hand, these two media companies "go national" by centralizing domestic news production among individual outlets, possibly in the hope of cutting costs in news production and increasing economies of scale. On the other hand, aware of the value of local audiences, both companies still run their outlets under individual local brands that have local editorial offices and only cooperate for national and international news. This strategy was an important argument used to justify the takeover to their readers and policymakers

concerned about the negative effects of the merger. Instead of shutting down the newspapers, this model allowed continued coverage of regions that would, by definition, become news deserts if the outlet disappeared. Thus, local or regional outlets, such as *Aargauer Zeitung* or *Tages-Anzeiger*, increase their importance on the national stage through centralized news production, while they also remain the dominant players in their respective regions.

This centralization strategy is apparent even though TX Group and CH Media operate with slightly different business models. TX Group is a relatively large media company traded on the stock market, with a turnover of more than USD 900 million. It has diversified its business activities, both within and outside journalism. TX Group produces not only regional and local brands but also more national brands, above all the cost-free, advertising-based paper *20 Minuten*, Switzerland's dominant print and online brand. It also owns important digital marketplaces, such as job and car engines, and a media advertising and marketing company. Compared to TX Group, CH Media is a smaller media company with a turnover of more than USD 400 million, and is focused more on journalism as a core business. CH Media is made up of two media companies, AZ Medien and the regional part of NZZ Mediengruppe, which, in 2018, joined forces to produce regional brands. Unlike TX Group, CH Media does not engage in digital marketplace activities but is instead rather heavily involved in the business of regional radio and TV stations, for which it also receives some public funding.

4. Methods

4.1. Data Collection

We combined a large manually annotated dataset of news articles with automated geoparsing to investigate the development of geographical diversity in the coverage of Swiss news media from 2015 to 2021. The overall dataset consists of the full coverage of six printed regional newspapers on five randomly sampled days per year (*n* = 15,254). The outlets are based in six different cantons and belong to two media companies. Three outlets belong to the TX Group and three to CH Media.

They were all integrated into centralized editorial offices during the investigation period (for an overview of the sample, see Table 1). We rely on printed regional newspapers, as they are still consumed equally as often (or in some cases, even more often) as their online counterparts (Newman et al., 2021).

4.2. Manual Content Analysis

The articles were drawn from a larger project on media quality (Forschungszentrum Öffentlichkeit und Gesellschaft, 2022). We selected two variables from the main project for our analysis, which were manually annotated by trained coders. They first analyzed the article's main topic and distinguished between hard news (politics, economy, science, and culture) and soft news (sports and human interest stories). Second, the coders decided whether the article's focus was local or regional (considered here as one level), national, or international. Intercoder reliability was tested using 525 unique articles, which three coders manually coded. Krippendorff's Alpha for the topic variable (0.90) and the geographical focus (0.85) were very satisfactory. For this study, we only analyzed local news coverage (*n* = 5,173). This manual content analysis allowed us to determine the volume and share of local news.

4.3. Geographic Data

We gathered a list of place names in Switzerland and around the world for use in spatial analysis. For domestic place names, we used the Swiss Federal Office of Topography's dataset SwissBoundaries3D. This was divided into 26 canton-level, 134 district-level, and 2,174 municipality-level administrative units. This dataset was manually edited to include alternate spellings not listed in official sources.

While this analysis focused on Swiss locations, it was still necessary to include international locations to facilitate disambiguation between locations with the same name in multiple countries, such as the Swiss and German cities of Freiburg. We also included data from the Natural Earth Data open-source dataset, with 231 countries and independent territories, 4,589 provinces, and 7,342 populated places such as

Table 1. Newspapers examined with article counts.

Outlet	Owner	Canton	Circulation	Articles in a total sample	Articles on regional topics
Aargauer Zeitung	CH Media	Aargau	56,202	2,736	1,172
Luzerner Zeitung	CH Media	Luzern	97,151	2,224	788
St. Galler Tagblatt	CH Media	St. Gallen	95,496	2,731	1,148
Basler Zeitung	TX Group	Basel	36,644	2,637	742
Berner Zeitung	TX Group	Bern	72,674	2,347	793
Tages-Anzeiger	TX Group	Zurich	106,382	2,579	530

Note: Only articles on regional topics were examined.

cities. Natural Earth Data gathers place names in different languages from Wikipedia metadata, and we used both English and German place names. In total, this resulted in 13,012 unique place names representing 14,496 locations.

4.4. Geoparsing

To analyze the geographical diversity in Swiss news outlets, we extracted every mention of place names in each text and associated them with real-world locations through a process known as geoparsing. This allowed us to determine the relative number of times a place is mentioned in the news and to detect any blind spots in the coverage. Ultimately, then, we assume that the simple mentioning of geographical places tells us something about geographical diversity. We are aware that journalists and media users might also construct spaces and boundaries more subjectively and not necessarily with concrete place names (e.g., "in my local community"; cf. Weber & Mathews, 2022). Still, especially given the normative demands for local public spheres according to political institutions, we would claim that mentioning concrete place names, in the long run, is necessary to denote these boundaries.

This form of automated content analysis is commonly done in one of two ways: a gazetteer-based approach, in which words in a text are compared to a pre-gathered list of place names, or a natural entity recognition (NER) approach, which uses machine learning models trained on cues in the text to determine whether a word is likely to be a place. Geoparsing techniques are very well-developed in English, to the extent that researchers have even advocated machine translating documents to English and then geoparsing the result (Chen et al., 2019). As we focus on very granular Swiss locations, developing a localized approach is more appropriate.

The process can be divided into two sub-tasks: toponym recognition and toponym resolution (Pouliquen et al., 2006). Toponym recognition involves deciding which phrases in a text relate to a geographic entity (e.g., whether Champagne refers to the region in France or the sparkling wine). The second step, toponym resolution, involves deciding which geographic location a given phrase refers to (e.g., Paris, France or Paris, Texas). We handle these two tasks separately, using a pre-trained NER model, a gazetteer for toponym recognition, and a weighted approach for toponym resolution.

For each of the texts, we first combined the title and body of the text into one block and searched for each of the place names in the texts, resulting in a list of potential place names. To filter out false positives, the pre-trained NER pipeline in the Stanza NLP package (Qi et al., 2020) was used to identify place names within the text. This was then matched up with the gazetteer list. Along with Stanza, we also tested SpaCy's NER model (Honnibal & Montani, 2017), and a simple gazetteer-based approach, finding the Stanza model to be most accurate for this spe-

cific task. This general method is not novel and has been used, for example, as a baseline for the EUPEG geoparsing testing framework (Hu, 2018). The procedure gave us a list of place names, but further work was needed to correlate them with exact geographic locations. Our data sources included data on the population and administrative level of a location, which we used as a basis for a scoring mechanism for choosing the correct location. In addition, if a place was mentioned within the context of a larger place, this was also given a higher score. We allowed multiple place names per article to be extracted if they were in the gazetteer, were identified as places by the NER model, and scored above the threshold. Many places in Switzerland use the same name for different administrative levels. For example, Luzern could be mentioned in texts without indicating whether it refers to the canton or the city contained within. When it is unclear whether the larger or smaller administrative unit is meant, and no contextual clues are evident, then the geoparser defaults to the more granular one.

4.5. Data Output

The resulting dataset contained 8,267 place names, with all but 11 in Switzerland. This was expected, as we had already selected local news for this study. Of the Swiss news articles, 6,777 of the place names found were in our cantons of interest, and 2,323 were in other cantons (see Figure 1). For this study, the closely linked cantons of Basel Stadt and Basel Landschaft were considered to represent one unit (e.g., the two cantons together have only one seat in the Council of States). For each of the publications examined, we recorded all place names, regardless of the canton. As expected, each regional publication focused most heavily on its home canton.

5. Results

First, we looked at the space dedicated to local coverage in the analyzed news outlets, finding that the number of local news stories an outlet publishes per day declined over time (see Table 2). In 2016, the investigated outlets published 37 news articles on local matters on average per day, but in 2021 only 20 such stories were released per day. However, the relative importance of local events within the newspapers remained the same. In 2016, local news made up a share of 35.4%. In 2021, the share of local news was almost the same (35.8%). Still, from a diversity perspective, in 2021 less space was afforded for local news in absolute terms; thus, competition was higher among places for coverage.

RQ2 focuses on geographical diversity and its temporal development. We looked at the number of place names per canton over time but only include places in the cantons related to the analyzed outlets ($n = 6{,}777$ place names). We did not count multiple mentions of the same place in an article but relied on unique men-
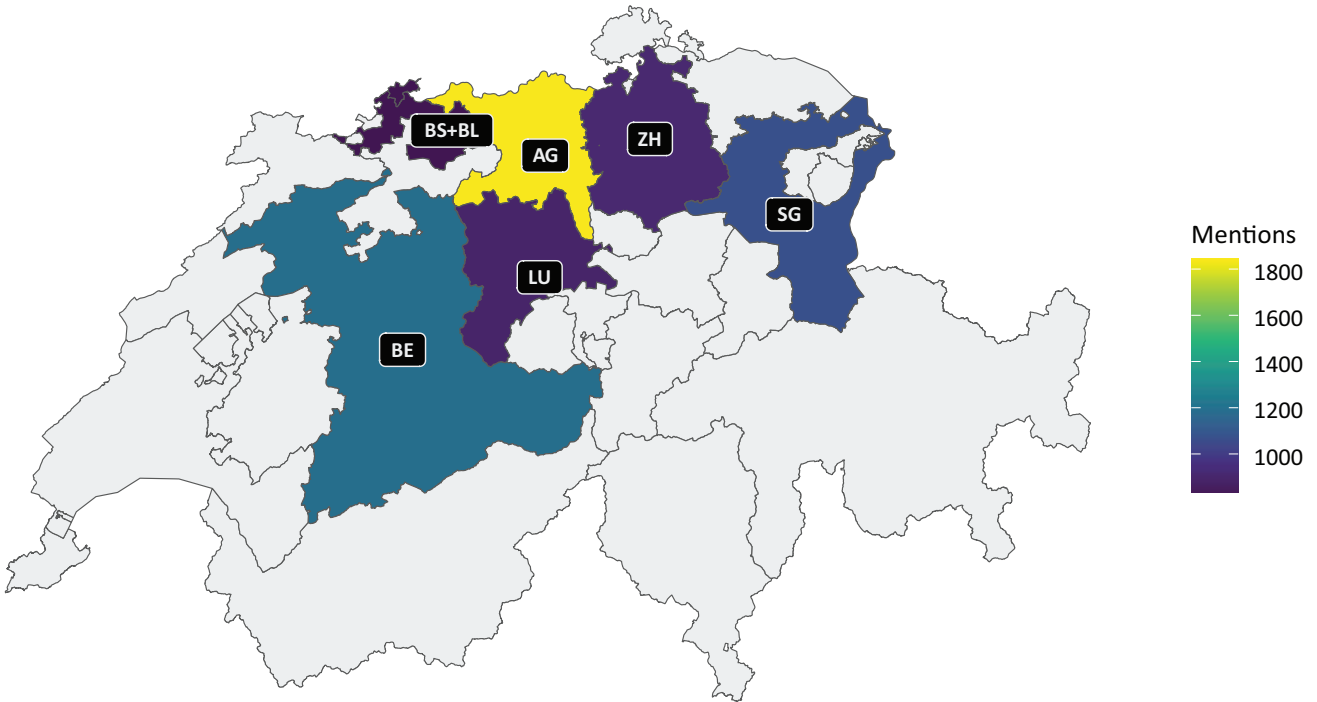
Figure 1. Number of place names in local coverage per canton. Notes: Only cantons of interest were included in this diagram; the acronyms mean AG = Aargau, BE = Bern, BS+BL = Basel, LU = Luzern, SG = St. Gallen, and ZH = Zürich.

tions per article. The density of place names in the local news declined over time (see Figure 2 and Table 3). However, we can observe some differences between the cantons. The canton of Aargau received the most mentions, and the number of mentions remained stable over time. We observed a general decline in place mentions in the other five cantons, especially St. Gallen and Zurich.

Similar to the number of articles, the number of mentions of places also declined over time (see Table 4). In 2016, we identified 1,312 place names in the news articles with our geoparser, and only 856 in 2021. At the same time, the place names per article increased from 1.18 in 2016 to 1.44 in 2021. Thus, we found a two-fold reduction in diversity. First, the number of place names decreased. Second, multiple places tended to get covered in the same article. In addition, we captured a growing number of places that did not receive any mentions. As we used a random sample of articles, this does not mean that these places did not receive any mentions throughout the year. However, when we used 2016 as the benchmark, we observed that the number

of places without coverage increased from 487 to 645 in 2021. Finally, we looked at the distribution of the place names mentioned in the news coverage. For this assessment, we used the Shannon Diversity Index in its standardized version (evenness). This procedure allowed us to compare cases with different numbers of place names (i.e., large cantons with many places and small cantons with fewer places). The more evenly the places are mentioned in the analyzed outlets, the higher the Shannon Index. For this diversity assessment, we calculated the evenness for every outlet individually and only for place names from the canton in which the outlet was based. The average evenness remained fairly stable over time. In conclusion, we observed fewer place names in coverage, more place names per article, and more places without coverage, but only slight changes in the distribution of place names.

RQ3 asked about differences in geographical diversity between hard and soft news coverage. From a democratic perspective, hard news about politics, the economy, and culture is of higher relevance than soft news

Table 2. Amount and share of local news for all newspapers by year.

Year	The average number of articles on local news	Share of articles on local news
2016	37	35.4%
2017	32	33.3%
2018	28	31.8%
2019	29	32%
2020	26	36.1%
2021	20	35.8%
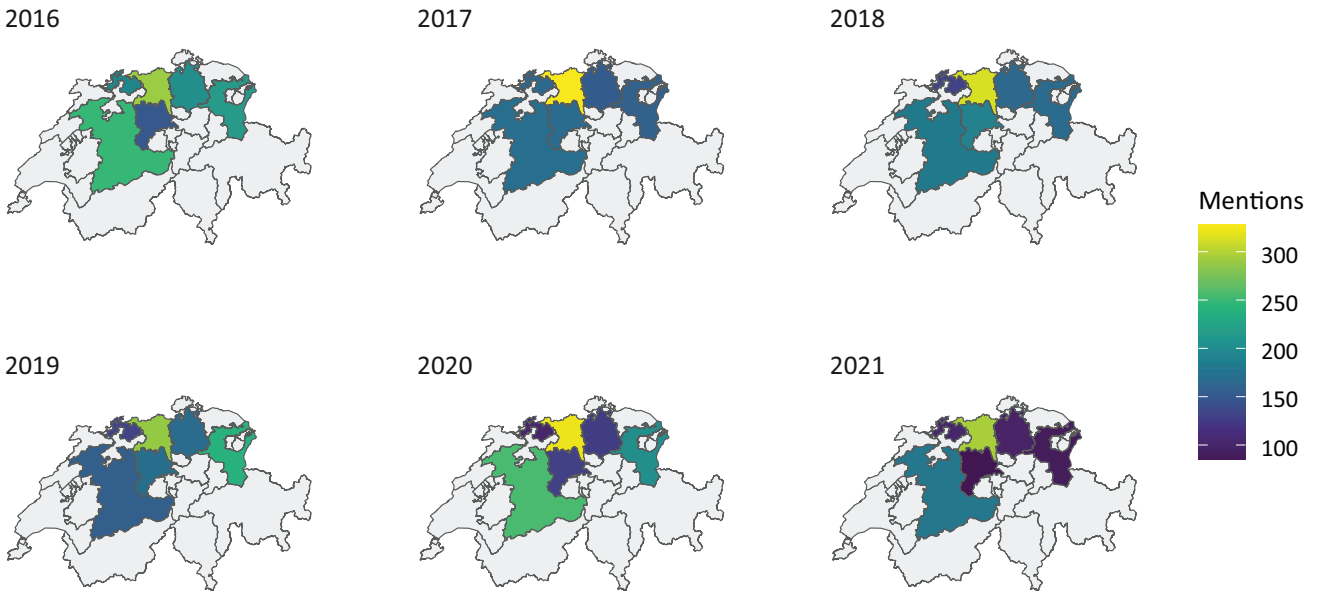
Figure 2. Number of place names per canton over time. Note: Lighter colors indicate high density, and dark colors are low density.

in the domains of sport or human interest. Given the frequent possibilities for political participation on the municipal and cantonal levels in Switzerland, a politically well-informed citizenry in the local realm is especially important. Therefore, we calculated indicators for the distribution of place names for articles in hard news and soft news coverage separately, using the manually coded topic variable. We observed a decline in place names, increasing place names per article, and more places without coverage for both hard news and soft news. There was also a pronounced decline in diversity in local soft news in 2021 (see Table 5). Apart from this, the evenness score was relatively stable for hard and soft

news. Besides the temporal development, which was similar to the overall results, we also saw an interesting difference between the two areas. In hard news, geographical places were mentioned more often than in soft news, leading to more mentions per article.

6. Discussion and Conclusion

In this article, we analyzed the geographical diversity in local news in Switzerland to investigate news deserts—or processes of news desertification—on the content level. Even though our analysis shows that Switzerland is far from being a news desert, we find early signs of

Table 3. Mentions of place names per canton for all newspapers by year.

Year	Aargau	Basel	Bern	Luzern	St. Gallen	Zürich
2016	292	198	250	150	217	205
2017	328	164	171	168	159	155
2018	315	132	184	193	168	165
2019	290	133	157	173	240	168
2020	323	102	257	131	205	128
2021	297	104	181	85	90	99
Total	1,845	833	1,200	900	1,079	920

Table 4. Coverage of places for all newspapers by year.

Year	Place names	Place names per article	Places without coverage	Diversity (evenness)
2016	1,312	1.18	487	0.64
2017	1,145	1.19	552	0.62
2018	1,157	1.37	478	0.63
2019	1,161	1.32	556	0.58
2020	1,146	1.48	584	0.62
2021	856	1.44	645	0.59

Table 5. Coverage of places per year for hard news vs. soft news for all newspapers by year.

Year	Place names		Place names per article		Places without coverage		Diversity (evenness)	
	Hard news	Soft news	Hard news	Soft news	Hard news	Soft news	Hard news	Soft news
2016	785	527	1.28	1.05	273	273	0.63	0.63
2017	674	471	1.28	1.09	310	276	0.57	0.66
2018	541	616	1.33	1.40	306	253	0.58	0.65
2019	573	588	1.28	1.35	355	267	0.52	0.61
2020	695	451	1.57	1.36	291	291	0.59	0.62
2021	571	285	1.48	1.36	294	347	0.59	0.47

news desertification by focusing on the output and performance level (Napoli et al., 2017) of regional newspapers, which are still the main entry points for citizens to receive their wholesale diet of international, national, and local news. At the output level, we observed a declining number of local news articles published by the outlets analyzed. This development reflects the overarching crisis of news journalism, with declining resources and a diminishing output. Second, at the performance level, we see a declining number of unique place names in the news articles and more mentions per article. The output and performance levels are strongly interrelated when it comes to diversity. A declining amount of space dedicated to local matters leads to higher competition among local news stories to make the news. Political news, which is essential for some communities, might not have enough news value for a large audience; therefore, it might be neglected, especially when events take place in peripheral regions. The increased media concentration also gives editorial offices high power over the local news agenda. From this perspective, the stable development of the diversity of place names in the coverage is a positive sign. Even though the number of place names declined, their distribution in coverage remained diverse overall and for coverage of hard news as well as soft news.

By taking a procedural perspective and analyzing news deserts at the content level, the article links the increasing body of literature on media content concentration (Hendrickx & Ranaivoson, 2021; Vogler et al., 2020) to the concept of news deserts. In times when the concentration of media ownership is on the rise, and few news organizations operate large news networks by providing content for many outlets through centralized editorial offices, this perspective will gain importance. Automated geoparsing allows us to scale the analysis of one of the main qualitative dimensions of news deserts, a prominently articulated research desideratum (Napoli et al., 2017). The analysis of geographical diversity as a means of grasping news deserts could also be applied to the content of digital-born start-ups or social media content, thereby remedying one of the deficits of current news desert research (Toff & Mathews, 2021).

The longitudinal analysis of six regional outlets that were incorporated into two supra-regional news networks with centralized editorial offices during the period

of investigation offers an insightful perspective. Our results mirror the strategy of the media companies that own the analyzed outlets. When they rolled out the centralized editorial offices, the local offices remained independent. Thus, the central office provided international and national news, whereas regionally based journalists provided the local news in independent offices. This model, which differs from fully centralized outlets that have individual brands but share all their content, can maintain geographical diversity in local news coverage to a certain degree. However, this requires dedicated publishers who are willing and able to invest resources in local journalism. The ongoing crisis of journalism instead points to further budget cuts, declining resources, and centralization. In Switzerland, TX Group recently announced that it would also establish centralized editorial offices for local news, and CH Media closed some of its editorial offices in peripheral regions. Therefore, the geographical diversity in Swiss regional news media will supposedly diminish in the near future.

This study has some limitations. The focus on content analysis serves our exploratory purposes with open research questions. A larger sample of news media with more structural variation would allow for a more explanatory approach, which would also include testing the effect of media companies' business models. In this light, interviews with media managers or journalists would be a welcome addition to explain why and how structural conditions affect news output. Of course, the findings are specific to the Swiss case and are not generalizable. We also looked at a relatively small media sample that included only the most important outlets from the regions investigated. Especially in urban areas, such as Zurich or Basel, other legacy outlets from the print and broadcasting sector exist that produce local news. Our study also does not account for digital-born start-ups (Toff & Mathews, 2021). Furthermore, our case selection was guided by the media outlets and not by the regions. The six outlets covering six different cantons were integrated into centralized editorial offices; thus, they make a compelling case for investigating whether centralization in journalism contributes to news desertification. For a comprehensive diagnosis of the media market in Switzerland, we would have to consider more cantons, such as rural regions like the cantons of Grisons or Valais. We should also bear in mind that a healthy local

public sphere does not only (or does not necessarily) include legacy news media, but also includes digital community platforms, where citizens exchange news (Usher, 2023) and public infrastructures, such as public libraries (Fischer et al., 2021). Thus, any diagnosis of news deserts from our dataset must be drawn carefully, as studying the volume and quality of local news offered by media companies is the first, but certainly not the last, step in a holistic analysis of local public spheres in modern democracies.

In terms of measuring geographical diversity in local news, we focused on mere mentions of municipalities and cantons but did not further investigate the characteristics of these mentions. In light of research showing that journalists working in centralized editorial offices tend to miss out on peculiarities of peripheral regions (Gasher, 2007), distinguishing articles with substantial coverage of a place from articles where the name is merely used to indicate the location where events take place would be relevant. The geoparsing method used does not track the relative importance of the places mentioned; places that are the focus of a news article and those mentioned in passing will be given equal standing with this method. As we found more places per article after the integration of newspapers into centralized editorial offices, this raises opportunities for further research into the relative importance of each place mentioned. Furthermore, even though mentioning a location belongs to practices of the journalistic profession, the place names are only a proxy for diversity in local news. Geographical diversity is not limited to mentioning place names but includes the diversity of local topics, voices, and actors. In-depth analyses of the content would be a promising line of research for further investigation of news deserts at the content level.

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Conflict of Interests

The authors declare no conflict of interests.

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