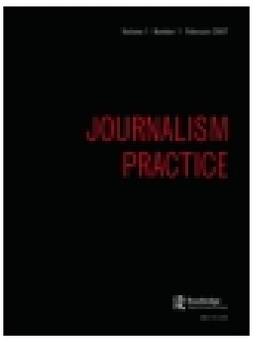

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LOCAL JOURNALISM AND THE INFORMATION NEEDS OF LOCAL COMMUNITIES
Toward a scalable assessment approach

Philip M. Napoli, Sarah Stonbely, Kathleen McCollough, and **Bryce Renninger**

This paper presents a three-level conceptual and methodological framework for assessing local journalism and the extent to which it meets community information needs. This research grows from frequent calls from policymakers, foundations, and advocacy groups for methods and measures to facilitate comparative analyses of the state of local journalism in different communities. Further, the goal here is to develop a methodological approach that can be realistically scaled to large numbers of communities in order to facilitate analysis of both the factors that affect the state of local journalism and the ways local journalism may affect the state of local communities. The methodological approach presented here focuses on infrastructure *(the availability of journalistic sources),* output *(the quantity of journalistic output from these sources), and* performance *(the extent to which this output is original, is about the local community, and addresses critical information needs). An exploratory application of this methodological approach is then presented for three communities. The results indicate substantial differences in the journalism infrastructure, output, and performance across these communities and suggest possible points of focus for future research.*

KEYWORDS content analysis; critical information needs; journalistic infrastructure; journalistic output; journalistic performance; local journalism

Introduction

As local journalism evolves in response to the many challenges posed by the technological changes that have taken place in the media sector (Anderson, Bell, and Shirky 2014; Downie and Schudson 2009; Fancher 2011; Picard 2014), one growing concern is that significant differences exist across communities in terms of the extent to which sources of journalism are serving people's information needs. Researchers have raised concerns that, in some communities, local journalism is essentially collapsing, with the decline and (in many cases) disappearance of traditional news outlets leaving massive unfilled gaps (what Stites [2011] has termed "news deserts"; see also Ferrier's [2013] analysis of "media deserts") that create greater opportunities for political and corporate corruption to flourish and that can undermine effective democratic participation (Starr 2009).

The extent to which this is the case may vary according to the particular characteristics (demographic, economic, political, technological) of individual communities (e.g., Pew Research Center 2015). One recent report noted, for instance, that large US cities

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such as New York, Washington, DC, and Los Angeles are employing an increasing proportion of the country's professional journalists, with smaller cities experiencing dramatic declines (Tankersley 2015). Such patterns suggest an emerging pattern of "journalism haves and have-nots" across the country. As the Knight Commission observed in 2009:

> Public testimony before the Commission showed the nation's vast information needs are met unequally, community by community. Some populations have access to local news and other relevant information through daily newspapers, radio, and television broadcasts, local cable news channels, hyper-local websites, blogs, mobile alerts, and services that connect to police reports and other sources of local information. Others are woefully underserved. (Knight Commission 2009a, 3)

However, anecdotal evidence like that presented in the Knight Commission report has yet to be accompanied by systematic empirical data on the state of local journalism that allows for analyses across multiple communities. Other areas of public interest, such as economic development, the environment, political participation, and community engagement, have reasonably well-developed methods and measures for assessing the health of local communities (e.g., Community Health Status Indicators Project Working Group 2009; Sustainable Jersey 2013). The same level of method and measure development has not been the case, however, for local journalism. As journalism researchers have recently noted, "our most pressing challenge is to provide comprehensive analyses of the current dynamics of news production, circulation and use in the digital public sphere" (Domingo, Masip, and Meijer 2015, 53).

This paper is an effort to address this challenge. In it, we develop and apply a multilevel methodological framework for assessing local journalism and the extent to which it addresses communities' critical information needs (CINs). The development of such a method, and the accompanying measures, would provide a valuable analytical tool for news organizations, funders of journalism initiatives, advocacy groups, citizens, and policymakers.

The first part of this paper contextualizes this analysis within a sequence of calls for methods and measures that could inform public and private efforts to strengthen local journalism. The second section presents a methodological approach that can produce scalable comparative indicators of the state of local journalism in individual communities. The third section presents the findings of an exploratory analysis that employs this methodology on three communities in New Jersey. The concluding section considers further steps in the development and application of this methodology, as well as the implications of these findings.

Local Journalism and the Need for Assessment Tools

Concerns about the state of local journalism have been widespread, as technological changes dramatically affect the economics of the commercial news business and the dynamics of how consumers access, share, and even produce journalism (see, e.g., Barnett and Townend 2015; Nielsen 2015). These concerns have been particularly pronounced in the United States, where there is often a greater reliance on the commercial model of news production than in virtually any other developed nation.

Reflecting the intensity of these concerns in the United States, the Knight Commission released a 2009 report identifying access to credible and relevant information as a

key requisite for healthy communities (Knight Commission 2009a). The report called for action on three levels: (1) maximize the availability of relevant and credible information; (2) strengthen the capacity of individuals to engage with that information; and (3) promote engagement with the information and public life of the community (3). As the Knight Commission emphasized, such actions required, among other things, systematically assessing the quantity and quality of information available to communities: "If activists, policy makers, and the general public had more concrete ways of describing, measuring, and comparing the systems of community news and information flow, it would be much easier to mobilize public interest around community information needs" (39).

Toward this end, the Knight Foundation developed a Community Information Toolkit, which provided a methodology for community members to assess the strengths and weaknesses of their information environment (Knight Commission 2009b). The scope of the Community Information Toolkit extended well beyond journalism to also facilitate the assessment of information provided by local government, health care, and public service providers, as well as an assessment of broadband infrastructure. However, the Toolkit remained somewhat superficial as much of the assessment process involved answering a series of yes or no questions.

The Knight Commission (2009a) report led to policy-related inquiries across various branches of the US government (see Napoli and Stonbely, forthcoming). The Federal Trade Commission initiated a proceeding on the continued economic viability of journalism (Leibowitz 2009). Congress also held hearings on the topic (see, e.g., U.S. Senate 2009). Most relevant to this analysis is the attention that the Federal Communications Commission (2009) devoted to the issue.

Picking up on the Knight Commission's work, in 2009 the Federal Communications Commission initiated a comprehensive assessment of how community information needs are being met in the broadband era. This proceeding ultimately produced a 468-page report, *The Information Needs of Communities: The Changing Media Landscape in a Broadband Age* (Waldman 2011). Among the conclusions of the Federal Communications Commission's report was a call (echoing the Knight Commission) for a thorough accounting of the journalism provided at the community level.

In 2012, the Federal Communications Commission followed their report by commissioning a second report from a consortium of scholars that comprehensively reviewed the literature on the CINs of the American public, how local media ecosystems were meeting those needs, and barriers to content and services addressing CINs (Friedland et al. 2012). The report identified CINs as

> those forms of information that are *necessary* for citizens and community members to live safe and healthy lives; have full access to educational, employment, and business opportunities; and to fully participate in the civic and democratic lives of their communities should they choose. (Friedland et al. 2012, v, italics in original)

The report's Recommendations called for a "multi-level analytical framework that could be employed in assessing local communities … to understand the emerging patterns of information production, distribution, and consumption that are developing both within and across media platforms" (Friedland et al. 2012, 87). Again, we see a call for methods and measures for assessing local journalism that could inform policy deliberations.

In 2013, the Federal Communications Commission acted on these recommendations, commissioning a study by research firm Social Solutions International, Inc. that would

provide a "multi-market study of critical information needs" (Social Solutions International 2013). The study included content analysis of journalism from a range of media, including television, radio, newspaper, and internet, analyzed in terms of the extent to which it covered the CINs identified in the earlier Federal Communications Commission report. However, the proposed research produced a firestorm of controversy, on the basis of concerns that the research represented government intrusion into newsrooms (see Pai 2014). Congressional hearings ensued, as well as threatened legislation to kill the research (Eggerton 2014). As a result of these pressures, the Federal Communications Commission first scaled back and then ultimately canceled the entire study (Flint 2014).

More recently, the Pew Research Center (2015) has produced a thorough analysis of the local news ecosystems in three US communities of different sizes. Extending upon earlier ecosystem research on the flow of news in Baltimore (Pew Research Center 2010), this study included inventories of local media outlets, surveys of news consumers, and analysis of social media data. While incredibly useful, the scope and depth of this analytical approach comes with costs that prohibit scaling up to analyze a much larger sample of communities, which would enable more extensive comparisons and, potentially, more generalizable findings.

Indeed, detailed case studies examining the state of local journalism in a single community, or in a very limited number of communities, are commonplace (Durkin and Glaisyer 2011; Durkin, Glaisyer, and Hadge 2010; Gloria and Hadge 2010; Morgan 2011, 2013; Pew Research Center 2010; Ramos et al. 2013; Ryfe et al. 2012). This is most likely a reflection of the challenges associated with developing a methodology that could be applied to a larger sample of communities at a manageable cost. In research in which larger samples of communities are analyzed, the analytical framework is typically limited in terms of focusing on a single platform (e.g., television, newspapers, hyperlocals, or citizen journalism aggregation sites), and/or focusing on a particular issue or type of news (e.g., local government, state house, or election reporting) (see, e.g., Becker and Yanich 2015; Fico et al. 2013; Holt and Karlsson 2015; Karlsson and Holt 2014; St. John, Johnson, and Nah 2014; Williams, Harte, and Turner 2015). This is often because the primary unit of analysis in such research is typically the individual media outlet or platform type, or the individual news story, rather than the community as a whole.

In sum, then, there remains a gap in terms of a robust, but reasonably simple and scalable, analytical approach to broadly assessing local journalism across communities, platforms, and issues that could be utilized by foundations, policymakers, researchers, and industry professionals to evaluate large numbers of communities. This study represents a first step toward filling this gap. Specifically, the objective here is to present and pilot test a methodology for assessing the robustness of local journalism that could be scalable to allow for the assessment of large numbers of communities, in order to facilitate comparisons across communities or within communities over time.[1]

Method

For this analysis, the assessment of local journalism has been broken down into three connected conceptual dimensions: (1) the journalistic *infrastructure*, (2) journalistic *output*, and (3) journalistic *performance*, each with an associated methodological component. This analytical approach borrows from, and modifies, the well-known *structure–conduct–performance* theoretical framework from industrial organizational economics (see, e.g.,

Caves 1992). This framework presumes causal relationships between the structure of markets (as represented by the number, size, and characteristics of market participants), which in turn affects the conduct of firms in these markets, which in turn affects firms' market performance. For this analysis, the notion of infrastructure refers to the number, size, and characteristics of media outlets within a community; output refers to the volume of journalistic output produced by these media outlets; and performance refers to some fundamental qualitative dimensions of this journalistic output (see below). The goal here, though, is less about exploring relationships between the three conceptual dimensions of local journalism ecosystems than it is about offering a reasonably comprehensive empirical framework for assessing the state of local journalism in ways that can facilitate comparative analyses across communities and/or over time, and for (ultimately) facilitating research that identifies those community characteristics that are useful for explaining the state of local journalism in individual communities.[2]

The exploratory application of this analytical approach has been conducted on three New Jersey communities (Newark, New Brunswick, and Morristown). These communities were selected in an effort to maximize the diversity of types of communities represented in this analysis, within the obvious confines of being limited to three communities within a single state. These communities are substantially different from one another in terms of their size, demographic composition, and geographic location within the state. Generally, Newark is the largest, poorest, and most ethnically diverse of the three communities, while Morristown is the smallest, wealthiest, and least ethnically diverse. New Brunswick falls somewhere in between, but its overall demographic profile is somewhat closer to Newark than it is to Morristown.

Assessing Journalistic Infrastructure

A key dimension of any local journalism ecosystem is the basic footprint of local journalism, in terms of the number of outlets capable of producing/disseminating local news and information. A fundamental premise of democratic theory-based approaches to journalism is the notion that the democratic process and an informed citizenry are enhanced via the presence of a diversity or plurality of sources of news and information (see, e.g., Baker 2002). This perspective can encompass very basic indicators, such as the number of sources serving a community; or, it can delve deeper into the nature of these sources, including criteria such as market shares or ownership characteristics (see, e.g., Napoli 2001). Reflecting this theoretical perspective, this methodological approach begins by examining the journalistic *infrastructure* in a community.

A starting point for assessing a local journalism infrastructure involves identifying each source of journalism within a particular community.[3] Such an activity has become more complicated than it once was. The increased volatility of this sphere, brought about by the rapid technological and economic changes discussed above, is a critical factor. Keeping pace with the profile of any local journalism ecosystem is much more challenging in this time in which various journalistic initiatives are rapidly entering and exiting this space.

Given the inadequacy of available data sources (such as the directories of local media outlets that existed in the pre-internet age; see, e.g., Barnett and Townend 2015), any effort to create an inventory of the sources of local journalism serving a community is, to some extent, an *ad hoc* endeavor. When one looks at previous research in this vein, relatively

little concrete methodological detail is provided as to exactly how the inventory of local journalism sources was constructed, which is a reflection of the somewhat improvisational, somewhat impressionistic nature of the process.

However, for this analysis, we established—and outline in detail here—a concrete, multi-stage data-gathering protocol, in order to provide as much clarity and transparency about the process as possible. The process draws from—and to some extent combines—approaches employed in previous research. It involves consultation with the most authoritative relevant directories available, and supplements these consultations with a systematic search and discovery process that involves both online searching and engagement with members of the communities being studied.

Even something as simple as defining and identifying a source of local journalism is a more complex and challenging process than it once was, and any efforts to do so can be critiqued as being too narrow or too expansive. The definitional approach we employed leaned toward being expansive. First, we did not employ any criteria based on the presence of minimum levels of journalistic content, because, at this very local level, we wanted to include both dedicated and what we might term *tangential* or *potential* sources of journalism. Thus, for instance, local radio stations would be included regardless of their format as part of the journalistic infrastructure of a community; with the journalistic distinction between a news and music station being made in the analysis of journalistic output and performance dimensions (see below). So all community-based media outlets (defined as television stations, radio stations, print/online newspapers, and community and hyperlocal news websites) were included in the infrastructure level of analysis. Our search protocol then sought to identify other potential online journalism sources (such as blogs) that might not meet the more formal organizational criteria of a media *outlet.* However, in an effort to impose some boundaries on the abundance of content available online, such an online source needed to exhibit evidence on its home page of addressing one or more of the CINs described below. Such community news and information-focused blogs failed to materialize in any significant way in our search protocol, perhaps due to limitations in our protocol, or perhaps due to the absence of such community-centric individual blogs within the selected communities.

It is important to re-emphasize that the focus of this research is on *local* journalism, which we defined in terms of the geographic boundaries of the communities being studied. Thus, this analysis is focused on the journalistic sources that reside within, and are oriented around serving, the selected communities (Lin and Song 2006; for resistance to this analytical approach, see Hess and Waller 2014). Operationalizing these parameters meant excluding larger regional, county, or state-level outlets that may cover the local community (e.g., the *New York Times* given its coverage of Newark), but that are not geographically based in the community and primarily focused on the community.

We recognize that a more expansive local journalism ecosystem analysis can—and should—look beyond geographic boundaries of individual communities to explore how journalism flows across these boundaries. Indeed, the infrastructure, output, and performance of local journalism outlets may be a function of the infrastructure, output, and performance of neighboring or larger journalistic ecosystems. However, for the purposes of this analysis, the analytical focus excludes journalistic sources based and/or focused elsewhere, or more broadly, which are accessible within these communities.

The search process for identifying relevant journalistic sources was conducted in three stages.

Stage 1: Consult relevant media directories. A number of print and online data sources are available to identify media outlets at the local level. Because research has shown that many such directories (including those offered by commercial providers or government agencies) tend to be incomplete, multiple directories were consulted.[4] In each case, searching by the relevant communities (Newark, Morristown, New Brunswick) was relatively straightforward.

Stage 2: Supplement directory data with manual search. In order to supplement the data gathered from the directories, the second stage of data gathering involved a manual search for relevant journalistic sources. Following the approach employed by Ramos et al. (2013; see also Karlsson and Holt 2014), this process involved keyword searches via search engine and then visiting those sites produced by the search queries to identify links to other relevant sources. Further, those sites that were linked to by the original site were subsequently examined to determine whether they contained links to any additional relevant sites. Keyword searches employed the name of the town, county, and region, along with associated media terms such as "news," "blog," "radio," "television." In addition, in instances in which a community is known by a particular nickname (e.g., "Brick City" for Newark), that terminology was employed in the search process as well.

Stage 3: Targeted interviews with community members. In order to identify additional potential sources not identified by Stages 1 and 2, a final step involved conducting targeted interviews with community members in positions to be well-informed about the journalistic sources serving the local community (see Morgan 2011). Specifically, three to five interviews were conducted with individuals in the following categories: (1) local government; (2) local news media; (3) activist organizations; and (4) ethnic community organizations.

The Stage 3 interviews are meant to act as a confirmation of Stages 1 and 2 and to capture any local outlets that may not have been detected. Through this process it is possible to create an inventory of the available sources of journalism in a community[5] and to identify the owners of each outlet. However, ownership data were not gathered and analyzed as part of the preliminary analyses presented below, but such data could be integrated into larger-scale analyses, in which more meaningful conclusions about the relevance of ownership could be drawn.

Controlling for Population Size

In order to facilitate comparisons across the three communities to which the methodology has been applied, controls for population size were employed for the measure of total journalism sources. Larger communities generally can—and should—support larger, more robust journalism ecosystems than smaller communities. Thus, utilizing population data, we computed the number of outlets identified per 10,000 capita to produce a comparative measure of the prevalence of journalistic sources in a particular community. This approach draws from similar approaches employed in nutrition research that have examined the availability of food sources in particular communities (e.g., Powell and Bao 2008). Work in this vein also has been an important source of inspiration for "media deserts" research (e.g., Ferrier 2013).

Food and news, of course, are very different products. News, unlike food, is a public good. This leads to ease of sharing, underproduction, and tremendous economies of scale

in news production (see Hamilton 2004). Therefore, we should not expect a perfectly linear relationship between the size of the population of a community and the quantity of news sources or news content available in the community. The relationship between population size and quantity of journalism sources/output is most likely curvilinear; though no research has yet offered any specifics in this regard (this is something that the application of this methodology to a much larger sample of communities could presumably determine via multivariate analysis). From this standpoint, our population-size controls are an imperfect solution to the problem of developing meaningful comparative metrics for communities of different sizes.

Of course, when the methodology is applied to a large sample of communities, such a computation would be unnecessary, as population size could simply be employed as an independent control variable as part of a multivariate analysis seeking to identify those community characteristics that are related to the infrastructure, output, and performance of local journalism (see below).

Incorporating Social Media Platforms

In the contemporary journalism ecosystem, social media play a vital role in facilitating interconnectedness and sharing of journalistic content (e.g., Pew Research Center 2013). From this standpoint, a basic assessment of the social media presence for each journalistic source has been incorporated into the assessment of journalistic infrastructure, as well as output and performance (see below). Facebook and Twitter have emerged as the most prominent news sources in social media (Pew Research Center 2013). Thus, for this level of analysis, each journalistic source is evaluated in terms of whether it has a presence on each of these two platforms. It is important to emphasize that the primary unit of analysis for this research is ultimately the community as a whole, rather than the individual outlet. Thus, aggregate measures are calculated for each community. For instance, a community with 15 journalism sources would have a maximum potential raw score of 30 (number of sources on Twitter + number of sources on Facebook). The total count is then divided by the maximum potential score to determine the proportional presence of the community's journalistic sources on social media.

Discussion. We recognize that this assessment of local journalism infrastructure does not account for other potentially relevant dimensions of local journalism sources. For instance, it would be ideal to include information on market shares for the various media outlets (and/or owners of those outlets) within each community. Similarly, it would be useful to incorporate aggregate budgets and personnel resources for all of the local journalism sources identified within a community, in order to gain a sense not just of the prevalence of journalism sources in a community, but also their financial resources. However, at the local level at which we are focused, such information is difficult, if not impossible, to comprehensively or accurately obtain.[6] That being said, the analysis of journalistic output and performance that is part of this methodology (see below) represents alternative—and arguably more direct—means of tapping into the robustness of the journalism sources serving local communities and the extent to which local journalism is dominated by relatively few sources.

Assessing Journalistic Output

The logical question that arises from the *infrastructure* assessment described above is how much journalistic output does the infrastructure generate? Thus, the *output* component is focused on assessing the aggregate journalistic output within a selected community, within a specified period of time. The question here is one of quantity (the qualitative dimension is addressed in the *performance* dimension), as it would seem that a reasonable indicator of the health of a local journalism ecosystem is the amount of journalism that is produced for and within the community. Ultimately, though, this assessment of journalistic output serves as a vital intermediate step toward conducting the more substantive assessment of journalistic performance (see below).

For this analysis, a one-week sample of website home pages[7] and social media platforms (Twitter and Facebook)[8] for each journalistic source was content analyzed to determine the overall volume of journalistic output available on these sites.[9] For home pages, stories were counted/coded for each sample day only if they were posted on the sample day. Thus, for instance, if the home page on the analyzed day of February 9, 2015 contained stories dated earlier than February 9, those stories were not included in the analysis. The goal here was to aggregate and analyze the news output produced on each selected day.

Using this approach, a total of 1028 Web stories and 1651 social media posts were analyzed across the three communities. Population controls (per 10,000 capita; see above) were employed for these output measures to account for variations in the size of the communities, under the logic that larger communities should generate more newsworthy activity (i.e., more stories). Here again we emphasize that we employ this control with the understanding that we should not assume a linear relationship between population size and the quantity of journalistic output.

Also, measures of concentration were calculated, using the well-known Herfindahl-Hirschman Index (HHI), to determine the extent to which journalistic output is dispersed across available sources or highly concentrated within a select few.[10] This measure reflects the historical significance of source diversity in the journalistic sphere (see above), as well as the frequent use of the HHI as a tool for assessing diversity in media (see Napoli 2001). From this standpoint, the extent to which journalistic output is concentrated within a few sources seems an important comparative indicator of the health of local journalism ecosystems. It is important to emphasize that the utility of the HHI in this context is purely comparative. While in economics variations in the HHI have been found to be associated with variations in the behavior of firms (thus, an HHI of 1300, for instance, has a specific meaning), here the HHI is being used as a comparative metric, with the individual values having no inherent interpretation.

The methodological approach employed for the output dimension—and the performance dimension that follows—relies on the journalistic content available online, regardless of the outlet's "native" platform. Thus, the journalistic outputs of daily and weekly newspapers, magazines, radio stations, television stations, and local cable channels all were assessed via their online content offerings, in the same way that the outputs of online news sources such as community journalism sites were assessed.

This approach (which is a reflection of the effort to create a realistically scalable methodological approach) runs counter to the common assertion that certain types of legacy media (e.g., local weekly print publications, ethnic media outlets) remain slow to utilize the internet as a means of disseminating their content. We believe that we are at a point

in the evolution of legacy media and their place within the broader media ecosystem that this generalization likely no longer holds true. The economic and strategic pressures and incentives to have an online presence, combined with the inherent economic imperative to distribute content production costs across as broad an audience base as possible (Hamilton 2004), suggest that the content available online can serve as a reliable *indicator of the relative journalistic output* across individual outlets, regardless of their "native" platform. The key term here is *indicator*, as we are not seeking to produce a comprehensive inventory of journalistic output, only a set of indicators that are conceptually and methodologically robust and that can be employed in comparative analyses across communities or over time; and that could be scaled to multiple communities at reasonable cost.[11] It is worth noting that data gathered on the three selected communities revealed only one journalistic source in each community that did not have a corresponding online presence. Further, a preliminary analysis of the websites for radio stations serving the three communities found that the quantity of journalism available on these sites varied in a way that reflected the stations' journalistic orientations (i.e., news/talk radio stations' websites contained much more original journalistic output than did music stations).

Assessing Journalistic Performance

At the *performance* level, the goal is to delve deeper into the journalistic output to provide measures of the extent to which this output is serving the information needs of local communities. Thus, we focused on three criteria: (1) whether the content was original; (2) whether it was about the local community; and (3) whether it addressed communities' CINs.

These criteria are clearly rough and superficial indicators of the complex notion of the "quality" (Lacy and Rosenstiel 2015) of the journalism being produced within communities. We recognize that the notion of defining and measuring quality in journalism is both complex and contentious. This analytical approach does not delve into many of the qualitative dimensions of journalism (e.g., prevalence of accountability reporting; number/diversity of sources utilized in news stories; story length, etc.) that have been prominent in prior research assessing journalistic performance (Lacy and Rosenstiel 2015; see also Holt and Karlsson 2015; St. John, Johnson, and Nah 2014). However, these criteria provide a relatively simple, economical, straightforward, and replicable set of indicators of journalistic performance; and they do address the fundamental concern about whether journalistic sources are addressing communities' CINs. Moreover, we hope that in the application and presentation of each of these criteria individually and in combination (see Figures 1–6), we are able to accommodate a range of normative perspectives and priorities in relation to the important characteristics of local journalism.

The notion of CINs has been central to the ongoing discourse about the performance of local journalism (Knight Commission 2009a; Waldman 2011). The approach employed here draws upon this discourse, and the research it has inspired (e.g., Becker and Yanich 2015; Friedland et al. 2012). Specifically, each story/social media post was content analyzed to determine whether it fits into one or more of the CINs categories identified in a comprehensive review of the relevant literature by Friedland et al. (2012) that was prepared for the Federal Communications Commission. Friedland et al. (2012) provide eight categories of community CINs. These categories are as follows (see Friedland et al. [2012] for the more detailed descriptions that served as the basis for the coding criteria for each of these categories):

1. Emergencies and risks.
2. Health.
3. Education.
4. Transportation systems.
5. Environment and planning.
6. Economic development.
7. Civic information.
8. Political life.

These are intended as universal categories and do not reflect the fact that communities certainly differ in terms of the relative importance of each of these categories. These categories provided a comprehensive and relatively straightforward schema for content analyzing local news stories/posts in a way that could certainly be used to explore differences in CINs across communities and differences in the extent to which local journalism sources are addressing specific CINs.

Each story/post was also coded for whether it was *original* (i.e., produced by the journalism outlet rather than reprinted, linked, retweeted, or shared from elsewhere), and whether it was *about the local community*. The emphasis here on original stories is intended to separate aggregation, linking, sharing, retweeting, and re-publication activities, in an effort to determine the amount of original journalism output being produced (e.g., Pew Research Center 2010). This measure is intended to tap at the robustness of local journalism sources by determining how active they are in *producing* news stories. A website story was considered "original" if it had a byline by an outlet's reporter, or if it had no indicators that it was a reposting of content originally produced elsewhere.[12] In terms of social media posts, posts were coded as original if they were *not* shares or re-tweets of content produced elsewhere.

The emphasis on locality is employed to analyze the extent to which the output of local journalism sources is focused on the local community. This measure is intended to address the extent to which local journalism is truly local, providing community members with news and information about, and directly relevant to, their communities. This measure is a reflection of the long-standing *localism* principle, which has featured prominently in democratic theory perspectives on media, and in media policymaking (see Napoli 2001). From this perspective, the extent to which citizens are engaged with, and capable of informed democratic participation in their communities, is a function of the availability of local news and information about their communities (see, e.g., George and Waldfogel 2006). For this variable, we opted for a strict geographic definition of community, where we identified an item as about the community only if the subject was an issue/event oriented around the specific town (i.e., Morristown, rather than Morris County).

Together, these three variables of focus were employed in order to reflect some of the primary concerns about the state of local journalism today: (1) that the economic pressures on local journalism create overwhelming incentives to aggregate and repurpose existing content rather than engage in original reporting (see, e.g., Anderson, Bell, and Shirky 2014; Doctor 2010); (2) that the changing technological dynamics for news distribution and consumption are exacerbating the extent to which large-market or out-of-market news can infiltrate local communities (George and Waldfogel 2006); and (3) that the increasing challenges associated with attracting and retaining an audience for news are compelling news outlets to neglect substantive topics in favor of an emphasis on "soft" news, celebrity, and sensationalism (see, e.g., Patterson 2013). For these reasons, we

think these particular variables of focus represent a useful set of top-level indicators of how well local journalism is fulfilling its central purpose of facilitating informed participation and engagement in local community affairs.

Content analysis of the online news stories and social media posts was conducted by three trained coders. Pilot tests for both the website and social media content analyses were conducted in order to identify data-gathering challenges and difficulties interpreting or applying the coding categories. Google Translate was used to facilitate coding of foreign-language content (both Spanish- and Portuguese-language content were part of the analysis). Subscriptions were obtained for any sites whose current content was contained behind a paywall.

For the website and social media content analysis, intercoder reliability scores were calculated. For the analyses reported below, the small number of stories/posts that were coded as "unclear" for the Original and About Community variables were recoded as "yeses" for these categories; thus the "yes" and "unclear" coding categories were collapsed for the purposes of calculating intercoder reliability. Similarly, because the analyses below utilize the CINs variable in a binary capacity (i.e., yes or no), the eight CINs categories also were collapsed into a single "yes" category for the purposes of calculating intercoder reliability.

For the social media analyses, the average pairwise agreement across the three coders was 81 percent for the CINs and About Community variables; and 100 percent for the Originality variable. For the website analyses, the average pairwise agreement across the three coders was 79 percent for CINs, 89 percent for About Community, and 81 percent for Originality. According to Neuendorf (2002), agreement levels of 80 percent or greater are generally acceptable, with levels in the 70 percent range appropriate for exploratory studies of new indices (as is the case here).

As was the case with the *output* dimension, concentration across journalistic sources was calculated using the HHI to determine the extent to which news stories meeting the various classification criteria emanated from many or few local sources. Once again, population controls (per 10,000 capita) were employed in order to compare the extent to which the communities differed in terms of the relative availability of news stories and posts meeting the various criteria.

Results

Here, we present the results of the pilot test of the application of this methodology to three communities. The goal here is to provide a sense of how the different measures that emerge from this methodology can be used to gain a comparative sense of the journalistic infrastructure, output, and performance in different communities.

Infrastructure

Table 1 presents some general descriptive data about each of the three communities, such as population, per capita income, and percentage of the population classified as minorities. In addition, this table contains infrastructure robustness metrics, such as the number of journalism sources identified, the number of sources per 10,000 capita, and the social media presence scores for each community's journalism sources. These data speak to the relative health of the *infrastructure* dimension of local journalism in each community.

One point worth noting in this table is the substantial variation in the number of sources per 10,000 capita across these three communities. As the table indicates, the

TABLE 1
Descriptives/infrastructure

Town	Population	Per capita income ($)	Percent minority	Number of journalism sources	Sources per 10,000 capita	Social media presence score
Newark	277,000	$13,009	74	16	0.58	80
New Brunswick	55,000	$16,395	55	13	2.36	81
Morristown	18,000	$37,573	37	11	6.11	68

smallest, wealthiest, least diverse community (Morristown) has, proportionally, substantially more journalism sources than the largest, lowest-income, most ethnically diverse community (Newark), with New Brunswick situated between these two communities in terms of population, per capita income, ethnic diversity, and sources per 10,000 capita.[13] As was noted above, we should not expect a city the size of Newark to have, proportionally, the same number of journalism sources as smaller cities such as New Brunswick or Morristown, given the public good nature of news and the economies of scale inherent in news production. However, it does seem reasonable to question whether the fact that a smaller, wealthier community such as Morristown has over 10 times as many journalism sources per 10,000 capita than a larger, lower-income, more ethnically diverse city like Newark represents an appropriate and acceptable differential. Similarly, when we look at communities that are more comparable in terms of population size (i.e., Morristown and New Brunswick), it seems reasonable to ask whether the 2.5 times differential in journalism sources per 10,000 capita that we found between Morristown and New Brunswick is simply a reflection of economies of scale, or whether other factors such as income and/or ethnic composition of the communities may be playing a role.

Output and Performance

Next, we look at the overall levels of journalism activity across the three communities. We look first at our analysis of stories available on the journalism sources' home pages. We then turn to the journalistic output on social media platforms.

Home pages. Figure 1 depicts the journalistic output across the three communities, focusing on the news stories that were present on the home pages of the sources located

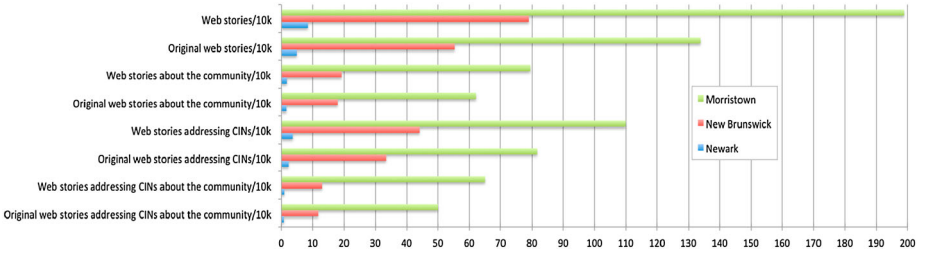

FIGURE 1
Journalistic output per 10,000 capita across three New Jersey communities (websites)

within each community. This graph provides breakdowns across each individual coding category, as well as all combinations of coding categories. Thus, as should be clear, this methodological approach produces a range of metrics about journalistic output and (when we go beyond raw number of stories) performance. At the output level (the top category in the graph)—stories per 10,000 capita—we can see that Morristown journalistic sources presented nearly 200 stories per 10,000 capita in the sample week, compared with less than 10 for Newark and approximately 80 for New Brunswick. It is interesting to note that the magnitude of the difference between Morristown and Newark in terms of journalistic output (a differential of greater than 20 times) far exceeds the magnitude of the differential between the two communities in terms of journalistic infrastructure (approximately 10 times; see above). This pattern suggests that the differences at the infrastructure level are exacerbated at the output level, with Morristown journalism sources producing substantially more content than their Newark counterparts. In contrast, the magnitude of the difference between Morristown and Newark at the output level remained the same (2.5 times).

Moving down the graph, we see the results of different approaches to filtering the content according to the three primary variables employed to assess performance. So, for instance, we see that Morristown journalism sources produced over 130 stories per 10,000 capita that were coded as Original, compared with just over 50 for New Brunswick and less than 10 for Newark. At the very bottom of the graph, we focus on stories that met all three of the coding criteria (stories that were original, about the community, and that addressed a CIN). When these filtering criteria are all applied, Morristown journalism sources produced 50 stories per 10,000 capita, compared with just over 10 for New Brunswick and less than 1 for Newark.

Another way to examine journalistic performance is in percentage terms. That is, what proportions of the stories being produced in these communities meet the various criteria? This measure accommodates comparisons across communities without the complications associated with controlling for population size (see above), though it does not take into consideration the volume of journalism being produced. Figure 2 shows the proportion of the stories available on the home pages of the journalism sources in each community that met each coding category (individually and in combination). As we can see in Figure 2, some of the patterns seen in Figure 1 persist, though not to the same extreme

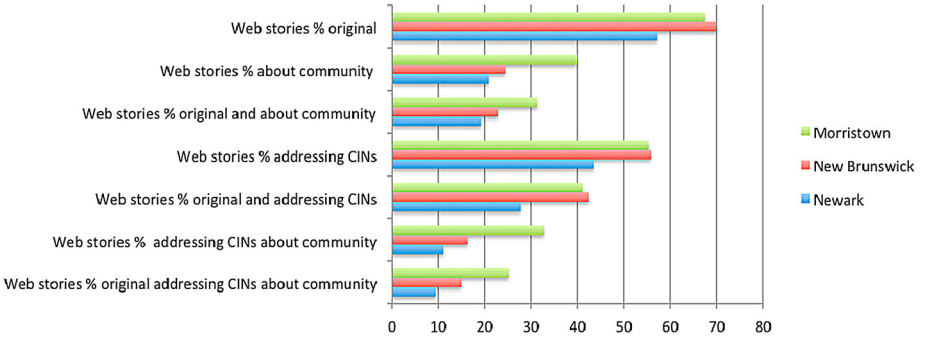

FIGURE 2
"Quality" of journalistic output across three New Jersey communities (websites)

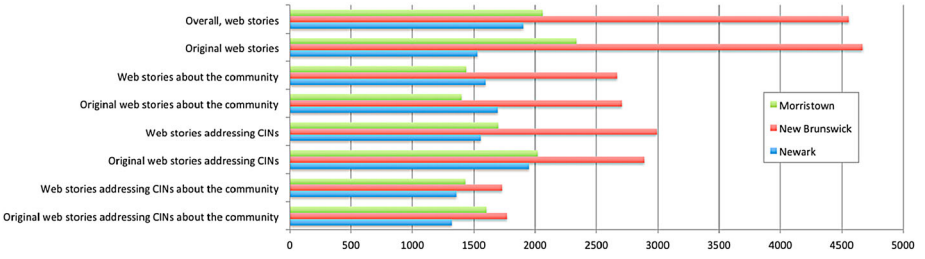

FIGURE 3
Concentration of website stories across three New Jersey communities

degree. Morristown journalism output tends to perform better on each of the evaluative criteria than Newark journalism output. New Brunswick journalism output approaches or exceeds that of Morristown in some instances (e.g., "% original"; "% original and addressing CINs").

Starting at the top of the graph, for instance, the percentage of news stories produced by Morristown journalism outlets that was original approached 70 percent. In terms of originality, the proportion of news stories produced by New Brunswick journalism sources meeting this criterion was slightly higher (exactly 70 percent). For Newark, the proportion was just under 60 percent. As Figure 2 also indicates, while over 30 percent of the Morristown news stories analyzed were about the community and addressed CINs, this was less than 20 percent for New Brunswick and just over 10 percent for Newark.

Finally, we look at the concentration of the journalistic output found on the home pages for the local journalism sources. As Figure 3 indicates, New Brunswick exhibited consistently higher levels of output concentration than either Newark or Morristown across all of the content coding categories. So, for instance, New Brunswick's HHI for Web story output was 4559.18, compared with 2062.20 for Morristown and 1902.58 for Newark. The levels of output concentration in Newark and Morristown tend to be similar. These patterns suggest that, compared to Morristown and Newark, a substantially larger proportion of the journalistic output in New Brunswick is produced by fewer sources.

Social media. We turn next to social media output. Figure 4 presents the same breakdown as Figure 1, with the focus this time on social media posts rather than stories available on the sources' home pages. As should be clear from Figure 4, the same pattern that was found for home page output persists when we focus on the social media output of these journalism sources. The social media output of Morristown's journalism sources far exceeds that

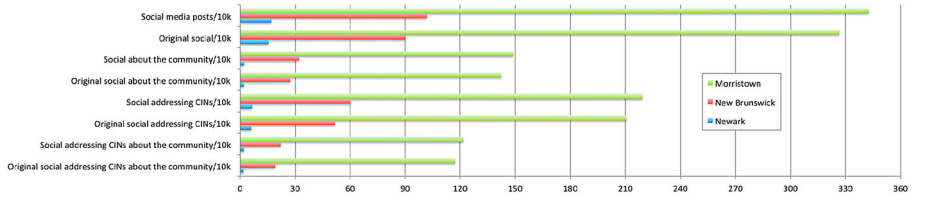

FIGURE 4
Journalistic output per 10,000 capita across three New Jersey communities (social media)

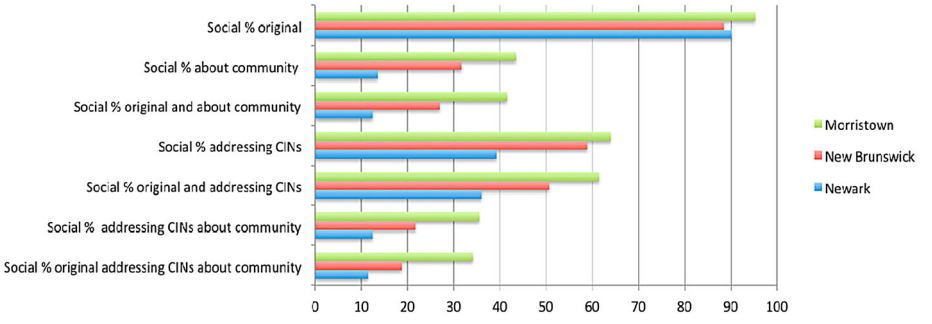

FIGURE 5
"Quality" of journalistic output across three New Jersey communities (social media)

of Newark and (to a lesser extent) New Brunswick across all of the coding categories, ranging from the broadest (posts per 10,000 capita) to the narrowest (original posts about the community addressing CINs per 10,000 capita). For instance, Morristown journalistic sources produced over 200 posts per 10,000 capita addressing CINs during the measurement period, compared with 60 for New Brunswick and less than 10 for Newark.

To some extent this pattern persists (though is not as extreme) when we shift our analytical focus from social media posts per 10,000 capita to the proportion of social media posts meeting the various coding criteria. As can be seen in Figure 5, the journalistic sources in the three communities were roughly comparable in the extent to which their social media posts met the originality criterion (all in the 90 percent range). However, when additional criteria were applied to these postings (whether they were about the community, or addressed CINs), the Morristown–New Brunswick–Newark high-to-low pattern re-emerged.

Finally, we turn to measures of journalistic output concentration in the social media context. As Figure 6 indicates, there is a substantial amount of variation across the communities in terms of their relative social media output concentration across the various coding categories. Thus, for instance, while Newark exhibits substantially higher output concentration than either Morristown or New Brunswick in terms of overall social media posts and in terms of original social media posts, when the focus is on posts about the community, or on any of the combinations of content categories, Newark's output concentration is

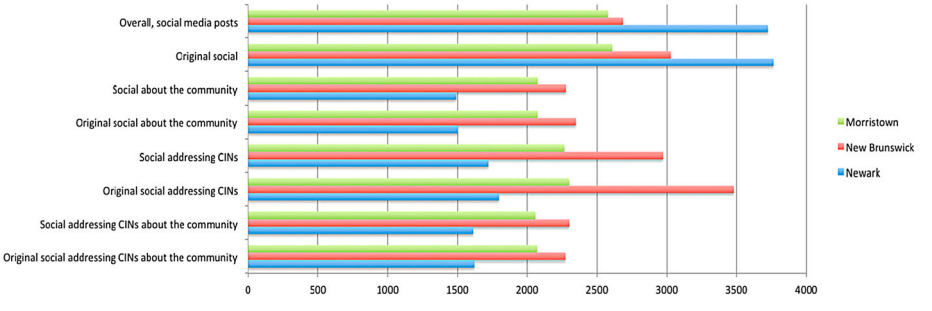

FIGURE 6
Concentration of social media output across three New Jersey communities

by far the lowest. New Brunswick tends to exhibit the highest levels of social media output concentration across all of these other categories.

Conclusion

In this paper we have presented a method for producing meaningful and scalable measures for comparatively analyzing local journalism across multiple communities and/or within communities over time. This methodological approach has taken into account the quantity of journalistic sources located within a community (infrastructure); the quantity of news stories/social media posts produced by these sources, along with the degree of concentration in story/social media post production (output); and, finally, the extent to which these stories/social media posts meet basic "quality" indicators, such as originality, local orientation, and addressing recognized CINs (performance).

We recognize that this methodological approach is, in some ways, superficial in its analytical approach to infrastructure, output, and performance; and that it foregoes some means of digging deeper into each of these constructs. However, this sacrifice of depth in order to facilitate breadth is a reflection of the larger objective of this research—to develop a methodological approach that could realistically and practically scale to facilitate analyses of 50 or 100, or even 200 local communities, and thereby address the persistent calls from foundations, policymakers, and researchers for a methodological approach that could be applied to large numbers of communities and that would produce metrics that would facilitate comparative analyses of the state of local journalism in different communities. Ultimately, the goal here was to develop a set of basic *indicators* of the health of local journalism in the spirit of the kind of high-level indicators that long have been employed to assess the state of the environment, education, or the economy in local communities. Such indicators have been lacking in the journalistic field, despite repeated calls for their development.

Should this methodological approach be applied to a much larger sample of communities, it would be possible to develop more generalizable findings about those community characteristics that relate to the health of local journalism, which could help to focus subsequent research that seeks to dig deeper into the nature of these "at-risk" communities, as well as help focus philanthropy, activism, and policymaking activities directed at strengthening local journalism. This exploratory application of the methodology to three different communities produced findings that raise significant questions about whether community characteristics such as per capita income and ethnic diversity might be related to the infrastructure, output, and performance of local journalism. Research examining a significantly larger sample of communities could potentially determine whether, when controlling for factors such as population size, ownership characteristics, and proximity to large media markets, this is indeed the case.

Ultimately, the method and measures developed here could help researchers, foundations, advocacy groups, and policymakers understand not only where local journalism is underserving its community, but also why. That is, what are the characteristics of individual communities that determine how well they are being served by local journalism? Further, this method could be employed to examine possible relationships between the state of local journalism and other community characteristics such as civic engagement, political participation, or government transparency.

Finally, the method and measures developed here could interconnect with research examining the demand and consumption dimensions of local journalism (see, e.g.,

Hindman 2011; McCollough, Crowell, and Napoli, forthcoming). As we noted previously (see Note 2), the methodology presented here does not account for the demand-side of local journalism due to shortcomings in available data. However, if these data challenges could be overcome, the CINs measurement could be employed to analyze the extent to which the journalism being produced in an individual community corresponds with the issues that community members find most important.

More generally, it would be possible to determine the nature of the relationship between the consumption and production of local news. In particular, it would be useful to investigate one working hypothesis that we have drawn from the findings presented here (and from background interviews we conducted with local news outlets in advance of this research)—that the quantity and quality of local news available in a community may be less a function of demonstrated demand and more a function of the fact that in more prosperous communities there are more individuals/organizations in the position financially to engage with journalism as a non-profit (or even money-losing) community service, and/or that are able to make a long- or short-term investment in a high-risk business venture such as a local journalism initiative. That is, the economic infrastructure to support a public service model of journalism is likely stronger in wealthier communities. This may ultimately exacerbate what may be a developing journalism gap between wealthier and poorer communities as the traditional economic models of journalism continue to erode. This is speculation that could presumably be verified in future research.

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NOTES

1. It should be noted that the research presented here was conducted on a very modest budget and within a very short timeframe, suggesting that the methodology could be scaled up to a much larger sample of communities in a way that is both affordable and timely. Funders for this pilot study have recently agreed to fund an application of this methodology to a sample of 100 communities across the United States.

2. It is worth noting that in the original formulation, there was a fourth dimension—*consumption*—in this conceptual model, reflecting our hopes of assessing both the supply and demand sides of local news. However, comprehensive news consumption data at the local level at which we are focused are spotty, at best. Recent research shows that even many local news sites themselves have incomplete information about the size and consumption patterns of their audiences (see Barnett and Townend 2015). We do, however, believe that there is still tremendous value in the application of the supply-side analysis developed and presented here.
3. Lin and Song (2006, 370) describe a similar effort to catalogue the relevant outlets within a geographically defined area as a "media census."
4. A list of the media directories consulted can be found at http://mpii.rutgers.edu/appendix-b-search-protocol-for-identifying-local-journalism-sources/.
5. The sources identified for each community studied here are available at http://mpii.rutgers.edu/appendix-c-journalism-sources/.
6. Budgetary information is often proprietary. Even developing an accurate count of the number of employees/contributors to a news outlet is difficult now, given the extent to which such work/contributions is often a part-time, informal, or *ad hoc* endeavor. For these reasons, we chose not to attempt to integrate such data into our infrastructure assessment; though with greater resources to support comprehensive survey research (see, e.g., Barnett and Townend 2015), such data might be able to be gathered to fortify the basic news outlet information being gathered here.
7. Using website home pages as representative content builds on the tradition of sampling a newspaper's front page, which is at once the most likely to be seen by readers, and also represents the news outlet's judgment as to the most important news it has to offer (e.g., Benson 2013). For this analysis, time constraints prohibited against the preferred "constructed week" sampling process; thus a contiguous week of content was analyzed (February 9–15, 2015).
8. Inconsistencies in the archiving of older social media posts by the two major social media platforms prevented producing a constructed week from the entirety of a calendar year. Therefore, a limited "constructed week" sampling approach was employed. Specifically, seven days of the week (Monday through Sunday) were randomly selected for the month of January 2015. The specific days selected for analysis were January 2, 8, 11, 14, 17, 20, and 26.
9. The sampled week of home pages was February 9 through February 15, 2015.
10. The HHI involves summing the squared shares of each firm in a market to produce a measure of concentration. It is expressed as follows: $H = \sum_{i=1}^{N} s_i^2$. In the case of this analysis, shares of total journalism output within a community (whether in terms of news stories on the Web or social media posts) are used in place of market shares.
11. It is when moving into the realm of comprehensively content analyzing all content across all available platforms that previous approaches to assessing local journalism lose the capacity to be scaled to large samples of communities, due to the costs associated with this type of analysis.
12. We encountered some instances of stories with no byline and no indicators of being reposted from elsewhere. In such instances our coding policy was to assume originality, which may lead to overestimations of the number of "original" stories.
13. It is important to note that there are a number of radio stations licensed to the city of Newark, but many of these stations' studios and transmission towers are based in

New York City, and the stations essentially operate as New York City-focused radio stations. These stations (e.g., WQXR, WNSH, WHTZ) were not included in this analysis as local journalism sources for Newark.

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