

Tow Center for Digital
Journalism

A Tow/Knight Report

MANAGING A 21st-CENTURY NEWSROOM WORKFORCE: A Case Study of NYC News Media

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Executive Summary

In recent years, much has been made of the introduction of new skills into the modern newsroom. The modern business environment, including ongoing technological change, globalization, and the fluid movement of professional workers, has set the stage for significant change in industry practices. Today's professional newsroom worker is the latest iteration in the emergence of new skills that embody the ongoing reframing of the nature of the industry as a whole.

Thus, this research report examines the changing nature of the twenty-first-century newsroom workforce, focusing on the skills and job roles that exist in newsrooms today. In order to address the evolving skills and job roles, the researchers used a case study approach and examined thousands of job listings, employment postings, and company profiles for news media companies in the New York City metropolitan area. The analysis of the data utilizes social network analysis to assess the development of new genres of newswriters, specifically job roles that represent the intersection of traditional newsroom positions with **data**, **analytics**, and **platform-oriented** (herein referred to as DAP) job roles. As the nature of newsrooms continues to evolve, the current definition of newswriter and newswriter requires new thinking.¹ Specifically, the focus of this research is on understanding the employment trajectories of newswriters such as programmers, coders, data specialists, and those dedicated solely to producing content for social and mobile platforms, as opposed to traditional newswriters.

Key findings

The findings in this report demonstrate important differences with regard to employment patterns in the news media industry and the evolution of newswriters' skills. The findings in this study are divided into four key areas.

1. On average, employees working in broadcast were likely to have worked in a greater number of jobs compared to employees working for newspapers or online media. The results show that broadcast news employees

i. Newswriter is used to refer to employees who engage in the process of producing news (e.g., journalists, editors, publishers, programmers, data journalists, photographers, etc.). Newswriting, on the other hand, is the specific work produced by a newswriter.

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are more likely to move among companies, and to engage in a higher degree of job switching. This suggests that employee attrition is a more important issue for companies working in the broadcast news industry, and that other industries may look to broadcast companies as fertile ground for recruitment.

2. Although many print media companies continue to reduce headcount, newsroom employees account for fifty percent of employees in this analysis. Traditional newsroom employees continue to account for the majority of employment at print newspapers, but there is a slow shift toward focusing on digital skills. The newsroom job role is still central in these organizations, but it is unclear what impact this relative stability has had on the overall health of the organizations.
3. Data, analytic, and platform-based job roles have grown substantially in newspaper and online media companies, accounting for an estimated nine percent of all jobs in those companies. Specifically looking at digital, analytic, and platform-based employment in the New York City area, there is clear evidence that these skills are becoming more critical to the day-to-day functioning of news media companies.
4. The growth of digital, analytic, and platform-based job roles and skills within the news media industry is driven from within the industry, and not by outside influences or domains of expertise. Most new employment in the DAP-based category originates from within the news media industry, rather than drawing on employees from other industries such as technology.

Introduction

Employees in modern newsrooms in the United States are increasingly required to perform a diverse array of job tasks, which means having new digital, analytic, and platform-related skills to be successful in their roles. A 2016 report examining skills in modern newsrooms found that newsroom managers are more and more interested in hiring reporters who have skill sets that extend beyond the traditional basics of writing and research; advanced skills such as computational analysis, coding, and multi-platform knowledge are becoming critical.¹ While DAP-related roles requiring computational science, advanced analytic skills, and multi-platform experience each occupy a key place in the reinvented production and distribution of news media, the relative importance of these roles is unknown. A new area of professional expertise is emerging as these skills and traditional journalism routines are integrated into new roles, but it is unclear how predominant this transition is in the current news media industry.

In general, the industry continues to face ongoing challenges as many companies grapple with the transition from traditional news environments to a digital landscape, one dominated by mobile and social. In this context, practitioners and scholars alike have pointed to challenges relating to the increasing importance of algorithmic and data-driven journalism in news media. Despite the acknowledgement of the importance of new skills in the newsroom, and the importance of computational acumen, few studies have delved into this area from a quantitative approach,^{2,3} and none to date have focused on understanding changed hiring patterns at scale. In particular, one aspect of transformation that does not receive as much attention in the news industry is changes in the nature of newsroom workforces and the prerequisite experience for newswriters.

In response, this research identifies and explains new employment patterns within U.S. newsrooms in an effort to shed light on opportunities and challenges for both news media industry participants and academic researchers. To do so, it focuses on a case study of news media companies in New York City, and examines which companies actually inform and influence changes in hiring patterns and job roles across the news ecosystem. Findings from this study will help newsrooms understand how best to diversify employee pools and skill sets to better adapt to new technology and modes of news production. Findings further contribute to the practic-

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ing journalism community on a strategic level, as well as to the academic research community, by adding to the literature of news industry transformation. As such, this project provides a systematic analysis of modern journalism employment patterns, specifically highlighting the role of DAP-related roles, as well as their corresponding educational background and skills.

Study Motivation and Overview

New types of employment are quickly emerging in modern news media companies, and yet little is known about the nature of this critical shift in newsroom structure. Scholars have just recently begun to examine the transformation. For instance, Mike Ananny and Kate Crawford's 2015 study frames the development of news apps as the emergence of a "liminal press," and examines the relationship between programming and journalism.⁴ Seth Lewis and Nikki Usher similarly examine the perception of the role of programming within the journalism ecosystem.⁵ A number of related studies cover aspects of computational journalism, but to date none has quantified the changing roles and workforce composition within the news media industry. This research thus systematically analyzes the challenges facing managers of modern news media companies when hiring newswriters as newsrooms adapt to increasing complexity in the current landscape.

As noted, journalists are one particular type of newswriter, but arguably journalists are the newswriters that most people recognize. Traditionally, there is no licensing process for journalists to practice their craft, nor is there an explicit body of prerequisite knowledge that is required to gain entrance to the process. On the other hand, there are core skills such as reporting and writing that are generally identifiable. Introductory textbooks typically define a journalist as someone who reports and writes accurate information for dissemination to a wider audience.⁶ C. W. Anderson, Emily Bell, and Clay Shirky declare that the news media industry is no longer predictable, and that uniform editorial processes, revenues, and professional identities are elements of a past profession.⁷ The authors note, "The extent to which a journalist now needs to have in-depth knowledge about something other than journalism is increasing." In addition to storytelling skills, modern newswriters are called upon to be literate in navigating complex datasets, understanding metrics and audience behavior, and even the basics of coding.

For example, BuzzFeed self-describes its news media operation as having an "innovation-obsessed culture and structure of a venture-backed tech company with an engineering team focused on building the media platform for today's world, and the future."⁸ In contrast to this, New York *Daily News* describes itself as "an American newspaper based in New York City." In turn, it is not surprising our research finds that BuzzFeed recruits heav-

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ily from a diverse array of companies, including a number of traditional news media companies and interactive publishers (e.g., ABC News, Viacom, and Disney Interactive), whereas the New York *Daily News* draws from a far less diverse selection of companies within the news media industry and focuses hiring efforts on traditional news media outlets (e.g., *New York Post* and *The New York Times*).

As the BuzzFeed example illustrates, our analysis emphasizes the means by which media organizations adapt to new skills and integrate DAP-related roles and expertise into their newsrooms in an effort to produce new modes of news production and distribution. The growing DAP category is reflected in the data analysis process, through which an increasing presence of these positions emerged toward the end of the examined time period. The DAP category thus reflects the rise of big data, editorial metrics, mobile product development, and social media.

Broadly, this work interrogates the employment networks that exist in today's news ecosystem and aims to better understand hiring practices geared toward bringing new skills into media companies. More specifically, the study looks to examine the degree to which common employment histories are represented in the hiring patterns of modern news media companies. Moreover, we discuss the degree to which histories and job roles differ by company type. The following sections first provide an overview of the data and methods utilized in this research, and subsequently delve into specific findings pertaining to company and job histories.

Data and Methods

This research leverages statistical analyses to map newsworker employment networks by focusing on a case study of companies in the New York City news media market. Employment data were collected to recreate the employment patterns of individuals working for those news media companies in the metropolitan area. This approach enabled us to provide insight into the organizational, educational, and skill set trajectories of modern newsworkers. At a high level, this analysis provides a better understanding of the integration and impact of data, analytic, and platform-related roles and expertise within the newsroom.

The diversity of the New York City news media ecosystem makes it an ideal setting for an initial study of changes to employment patterns in the industry. By some estimates, New York City has more than fifty newspapers (counting weeklies, monthlies, and niche publications) and countless digital-only ventures, including notable companies such as BuzzFeed and Mic. Inherently, restricting the examination to companies headquartered in New York City imposes some limitations on the findings of this study, but the overall results provide context and insight for understanding cutting-edge shifts in employment within news media companies.

This study focused on a random sample of news media companies in New York City, and the analysis then homed in on the workforces of those companies. A sample set of companies was generated via CisionPoint, a global commercial media database with more than 1.6 million records.⁹ Prior research has utilized the CisionPoint media database, for example, to explore journalists' use of social media,¹⁰ as well as to evaluate differences among journalists' attribution standards.¹¹ CisionPoint allows for the search and filtering of news media companies by a variety of variables. Data were collected between February and August of 2016.

A CisionPoint search for U.S. newspapers, television networks, and websites headquartered in the New York City area covering news and publishing on a daily and/or continuous basis resulted in a list of sixteen news media companies that also have a company LinkedIn profile page. LinkedIn is a social networking site, which claims to operate the largest professional networking site in the world, with more than 467 million users in January of 2017.¹² In addition to LinkedIn, the American Society for News Editors

Newsroom Employment Census projections were used to better understand employment trends for companies included in this research.

Based on the aforementioned approach, the sample of sixteen news media companies for this study include: ABC News, TheBlaze,ⁱⁱ BuzzFeed, CBS News, The Daily Beast, Fox News, Huffington Post, Mic, MSNBC, NBC News, New York *Daily News*, *The New York Times*, NowThis News, Patch Media, Slate, and *The Wall Street Journal*. These companies all perform important news functions, but they are not all traditional news companies. In other words, some of the companies included in this sample represent print newspapers; others are broadcast outlets, and some are digital-only news ventures. In aggregate, this sample represents a cross-section of companies providing news in the New York City metro market.

Tracking Employment Histories

Employment histories of individuals working for target companies were created by aggregating public data from LinkedIn. A number of prior studies have used a similar approach to data collection.^{13 14} A search was conducted for each of the companies in the dataset, and employee histories were recorded by hand in a separate database. A team of graduate and undergraduate students worked to code the data; data collection was cross-verified by having coders overlap in their data collection and then verify the accuracy of the data entered in each database. In addition, the overall data collection approach was validated by comparing numbers across data sources (see Appendix I for details on data verification).

Information was collected on prior work histories of employees within each company. The employment histories that were collected contain rich information, valuable for research on labor markets and professional workforces, such as prior employers, jobs, skills, and education.¹⁵ Researchers have previously utilized data sources such as LinkedIn to examine the technological professionalization of political campaign workforces,¹⁶ and to analyze the robustness of the information on workforce mobility as compared to patent information.¹⁷ In fact, Chunmian Ge and colleagues found

ii. At the time of data collection, TheBlaze was still based in New York City; however, its current headquarters is in Irving, Texas.

that some social media websites such as LinkedIn proved to be a more reliable source of career histories than patent tracking, with a ninety percent accuracy rate as compared to seventy percent.¹⁸

Coding

Any data that were collected were de-identified during the collection process; this analysis is focused on broad trends and not on specific individuals. The process for data collection was approved by the respective university Institutional Review Boards.ⁱⁱⁱ In addition to the previous data, companies and positions in the dataset were categorically coded in order to summarize the data. Companies were coded by industry, and positions were coded by general function. The industry of each work history was based on each company's LinkedIn page. In addition, researchers visited the company's corporate webpage and an industry code was assigned based on common missions as envisioned on the website and LinkedIn page of the company. Role codes for jobs were created through an iterative process of code generation, undertaken by the lead researchers and verified through interviews with newswriters (see Appendix II for the complete listing of codes).

Each job in an employee's work history was coded to reflect the general function of the job. Job coding was done on two levels. First, coding was done by the researchers, based on media industry expertise and knowledge, to reflect general roles such as producer, reporter, writer, editor, etc. The second level of coding was done to better understand the evolution of DAP-related jobs across the news media industry. News media jobs were assigned one of two codes: traditional and digital publishing roles or DAP. The category of traditional and digital publishing roles encompasses those digital editorial and journalist jobs reflected by online journalists and support roles related to publishing on the web. The DAP category reflects the rise of big data, editorial metrics, mobile product development, and social media.

Jobs that were coded as DAP include those that generally focus on the

iii. University Institutional Review Boards are responsible for oversight of research ethics and research protocols; the protocols and methods used in this study were submitted to and reviewed by a panel of peer researchers from within Rutgers University.

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following types of functions: audience analysis, data, engagement, mobile technology, platforms, products, and social media. On the other hand, traditional journalism jobs include jobs with key terms such as: broadcaster, copywriter, copyeditor, design, producer, programmer, programming, publisher, reporter, writer, and operations, among others. A category of “other” jobs was created to include positions with key terms such as: CEO, consultant, COO, development, finance, human resource, lawyer, and others.

Several job roles needed to be reviewed individually in order to verify the correct coding. For instance, jobs originally coded as analyst (a notably large category) were looked at again on an individual basis and categorized accordingly. For example, contributing analyst was categorized as traditional, while social media analyst and analytics innovation were categorized as DAP. Jobs such as marketing analyst and business analyst were categorized as other.

Social Network Analysis

Social network analysis was used to understand the shift in hiring patterns between companies. In this case, social network analysis (SNA) helped to examine connections between two companies based on an employee having worked at them both. Social network analysis visualizations are offered in subsequent sections to provide a visual overview of the data. In addition, an analysis was run to look at the degree to which various companies were more important, or more central, in this network than others. In network terminology, a high degree of centrality generally indicates companies that are likely to be more important or influential within a network. There are different types of centrality. In this case, betweenness centrality was used to measure the degree to which a company acted as a bridge between other companies; that is, the company was one through which a large number of employees passed through in the course of their careers.

Additional details regarding measures used in the social network analysis are given in Appendix II.

Overview of Findings

The following section provides a summary of the data collected and then highlights key findings. As previously noted, this study focused on a subset of sixteen news media companies. With the exception of TheBlaze, which has since moved its operations, all companies are headquartered in New York City. Eleven of the companies are public, while the rest operate under some form of private structure. The founding dates vary; the average age of the companies was forty-four years, although seven were founded after 2000 and *The New York Times* dates back to 1851. Additional summary data is provided in Table 1 as an overview of the companies.

Table 1. Overview of Sample Companies

Outlet	Function	Website	Year	HQ	Corp. Makeup
ABC News	Broadcast	abcnews.go.com	1948	NY, NY	public
TheBlaze	Online	theblaze.com	2016	Irving, TX	private
BuzzFeed	Online	buzzfeed.com	2006	NY, NY	private
CBS News	Broadcast	cbsnews.com	1927	NY, NY	public
The Daily Beast	Online	thedailybeast.com	2008	NY, NY	public
Fox News	Broadcast	foxnews.com	1996	NY, NY	public
Huffington Post	Online	huffingtonpost.com	2005	NY, NY	public
Mic	Online	mic.com	2001	NY, NY	private
MSNBC	Broadcast	msnbc.com	1996	NY, NY	public
NBC News	Broadcast	nbc.com	1939	NY, NY	public
ABC News	Broadcast	abcnews.go.com	1948	NY, NY	public
New York <i>Daily News</i>	Print	nydailynews.com	1919	NY, NY	private
<i>The New York Times</i>	Print	nytimes.com	1851	NY, NY	public
NowThis News	Online	nowthisnews.com	2015	NY, NY	private
Patch Media	Online	patch.com	2007	NY, NY	private
Slate	Online	slate.com	1996	NY, NY	public
<i>The Wall Street Journal</i>	Print	wsj.com	1889	NY, NY	public

Employment data were collected and aggregated for each company. These data are provided in Table 2, giving a snapshot of the data that were collected as part of this research. The summary presented in Table

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2 accounts for employees in all roles—including positions such as finance, marketing and operations—extending beyond the walls of the traditional newsroom. In turn, the overview gives a characterization of the company as a whole, based on the data available when this research was conducted.

Across the board, the male-to-female ratio was 1:1. Our data estimate indicates that on the high end, the New York *Daily News* had a male-to-female ratio of 1.56 men employed for every one female. On the other end, Huffington Post employs an estimated 0.56 men for each female employee. In general, fourteen percent of employees at focal companies had a journalism degree and nine percent held graduate journalism degrees. Only seven percent of employees on average were in freelance roles associated with each company, although twenty-six percent of all Patch employees were in freelance roles (which aligns with the company's general business model).

When looking at the number of prior jobs worked by an employee, there were some significant differences across the industry groups.

Key Finding 1: On average, employees working in broadcast were likely to have worked in a greater number of jobs compared to employees working for newspapers or online media.

Broadcast employees worked an average of 4.7 prior jobs, while employees working in online media worked an average of 3.8 prior jobs, and employees working for newspaper companies worked an average of 3.7 prior jobs, representing a statistically significant difference when comparing broadcast to the other two sectors.

As a point of comparison with the examination of the full news media company staff, we took an alternative snapshot of the data looking only at employees who were currently in jobs that were identified as directly involved in the writing, editing, and reporting process (traditional news-

Table 2: Overview of Our Sample Employment Data

Outlet	Est. Full-Time	Avg. # Prior Jobs	M:F Ratio	U-Grad J-Degree	Grad J-Degree	Freelance
ABC News	852	3.90	1.06	15%	8%	5%
TheBlaze	26	5.15	0.86	8%	0%	4%
BuzzFeed	223	4.75	0.56	17%	10%	1
CBS News	767	3.47	1.22	16%	9%	3%
The Daily Beast	65	6.77	0.97	11%	12%	12%
Fox News	816	3.84	0.93	9%	1.5%	5%
Huffington Post	760	3.41	0.56	9%	8%	10%
Mic	101	3.89	0.68	19%	12%	2%
MSNBC	315	4.50	1.30	18%	9%	4%
NBC News	541	3.66	0.87	16%	12%	3%
<i>New York Daily News</i>	264	2.67	1.56	18%	8%	5%
<i>The New York Times</i>	726	3.47	0.96	17%	15%	9%
NowThis News	34	5.00	1.00	9%	12%	3%
Patch Media	76	2.43	1.11	17%	4%	26%
Slate	49	5.55	1.04	10%	12%	14%
<i>The Wall Street Journal</i>	542	3.59	0.92	17%	18%	3%
Average	362	4.11	1.0	14%	9%	7%

workers), including reporters,^{iv} broadcasters,^v editors,^{vi} online editors,^{vii} and online reporters.^{viii} Across the board, this category accounted for an average of thirty percent of company staffing based on the data available.

iv. Sample job titles include correspondent, reporter, freelance journalist, photographer, and contributing reporter, among others.

v. Sample job titles include anchor, correspondent, on-air anchor, and on-air contributor, among others.

vi. Sample job titles include assignment news editor, senior editor, assistant editor, and political editor, among others.

vii. Sample job titles include web editor, digital news editor, associate web editor, and multimedia editor, among others.

viii. Sample job titles include web journalist, reporter, multimedia journalist, and digital reporter, among others.

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On the high end, sixty-one percent of employees at *The Wall Street Journal* indicated that they worked in primarily newsroom job roles. At the low end, nineteen percent of ABC News employees were employed in a newsroom function, and only nine percent were in such roles at NowThis News. In general, the male-to-female ratios skewed toward more male-dominated newsrooms. When comparing the overall news media gender ratios, CBS News was an exception, employing more women in the newsroom.

Table 3: Overview of Our Sample Employment Data within the Newsroom^a

Outlet	Employed in Newsroom Function	% of Total Employees	M:F Ratio	U-Grad J-Degree
ABC News	165	19%	0.81	17%
BuzzFeed	89	40%	1.70	18%
CBS News	191	25%	0.63	15%
The Daily Beast	27	42%	0.93	22%
Fox News	132	20%	0.81	13%
Huffington Post	149	20%	1.87	17%
Mic	31	31%	1.73	10%
MSNBC	46	15%	1.81	7%
NBC News	99	18%	0.81	11%
New York <i>Daily News</i>	85	32%	0.47	14%
<i>The New York Times</i>	383	53%	1.04	20%
Patch Media	32	42%	0.88	19%
<i>The Wall Street Journal</i>	329	61%	1.03	18%
Average	1781	30%	1.14	17%

^a. TheBlaze, NowThis News, and Slate were omitted from this table due to the low numbers of newsroom employees represented in the dataset.

The data in Table 3 provide a starting point for understanding the nature of employment today at news media companies. The fact that newsroom employees comprise an average of thirty percent of the workforce in this sample is a good reminder of the diverse set of job roles required to al-

low a newsroom to operate on a daily basis. However, traditional newsroom roles appear to be more dominant in print companies. In print news companies, newsroom roles accounted for an average of forty-nine percent of the workforce. In online media, newsroom roles accounted for twenty-nine percent of the workforce; and in broadcast newsroom roles, just nineteen percent of the workforce.

Key Finding 2: Although many print media companies continue to reduce headcount, newsroom employees account for fifty percent of employees in this analysis.

As the goal of this study is to explore the ways in which modern newsrooms are adapting to new technologies, the next section details the degree to which DAP-oriented skills and job roles are becoming prominent in news media companies.

The Increasing Presence of Digital, Analytic, and Platform-Based Skills

Research quantifying the shift in newsroom skills is relatively limited. In a 2008 study examining the changing nature of skills in the modern newsroom, Konstantinos Saltzis and Roger Dickinson found that although there was a broad recognition of the importance of digital skills, the concept of a multimedia journalist was slow to take root as a job role.¹⁹ Likewise, a 2014 Poynter white paper examining skills needed for the future of journalism observed that the media industry was lagging behind other industries with regard to the way it valued multimedia and other digital storytelling skills.²⁰

A 2014 analysis of mobile skills in newsrooms analyzed U.K. and U.S. job postings and found that the number of mentions of mobile skills as a prerequisite qualification increased from two percent in 2010 to twenty-seven percent in 2012.²¹ References to experience with mobile apps increased from ten percent in 2010 to forty-two percent in 2012 in the same study. A subsequent 2016 survey reinforced a focus on traditional skills within newsrooms,²² despite an ongoing recognition of the growing importance of new DAP-related skills.

In turn, we focused specifically on the growing importance of job skills pertaining to DAP-focused job roles, which once again is a category that reflects the rise of big data, editorial metrics, mobile product development, and social media. The general categorization scheme was verified through multiple interviews with professional newsroom managers. Table 4 provides a summary of the increasing importance of DAP skills. The chart examines new job roles in broadcast media, newspaper, and online media companies.

The analysis focused on the job titles, and each job title was categorized as either a traditional job role, a DAP job role, or other. The analysis considered only jobs that employees started in a given year—not all jobs that existed in that period. From 2010 to 2015, there were more than 8,000 jobs started by the individuals included in this analysis.

Examples of “other” job roles include employees working in roles outside of traditional newsroom production of the final product. These roles include positions such as marketing and sales (e.g., vice president of marketing, publicist, head of sales, account coordinator). Examples of traditional job roles are those that are considered traditional to the newsroom. This category includes jobs titles such as reporter, contributing writer, as-

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sistant editor, and others. Broadly, the roles in this category account for traditional and online reporters and editors.

Finally, the DAP category focuses on new types of skills and job roles emerging in the newsroom. Examples of DAP roles include jobs such as data journalist at *The Wall Street Journal* or senior social media strategy editor of audience development at *The New York Times*.

The results presented in Table 4 highlight the changing importance of DAP roles across the period of analysis. The percent given indicates the relative number of jobs started within a given industry in a given year. For example, in 2015, three percent of the jobs started in the Broadcast Media category fell within the DAP category.

Table 4: Summary of New Job Roles in Broadcast, Newspaper, and Online Media, Per 2010–2015 Sample Data

Media Type	Job Type	2010	2011	2012	2013	2014	2015
Broadcast	DAP	1%	1%	2%	1%	2%	3%
	Traditional	93%	92%	87%	88%	88%	90%
	Other	6%	7%	11%	10%	10%	7%
	Total Roles	574	690	692	930	884	842
Newspapers	DAP	2%	3%	5%	5%	8%	7%
	Traditional	89%	88%	86%	83%	80%	74%
	Other	9%	9%	10%	12%	11%	19%
	Total Roles	208	233	263	354	335	318
Online	DAP	0%	3%	1%	2%	5%	6%
	Traditional	93%	93%	95%	89%	85%	87%
	Other	7%	5%	4%	9%	10%	7%
	Total Roles	148	215	281	328	430	490

During the period from 2010 to 2015, job roles changed considerably, both across each news media sector and within the DAP category. First, the total number of jobs increased forty-three percent across the six-year period. The majority of the growth was from 2010 to 2011 and from 2012 to 2013. There was a significant increase in hiring activity from 2012 to 2013, which aligns with broader hiring trends before and after the most recent recession.

The results show several common patterns across the industry sectors. For example, the percent of traditional job roles decreased across sectors. In online media, new traditional jobs decreased eight percent relative to

other job roles; in newspapers, nine percent; and in broadcast media, five percent. On the other hand, there was a notable increase in the presence of DAP roles within both the newspaper and online sectors. The growth of DAP roles is specifically shown in Figure 1.

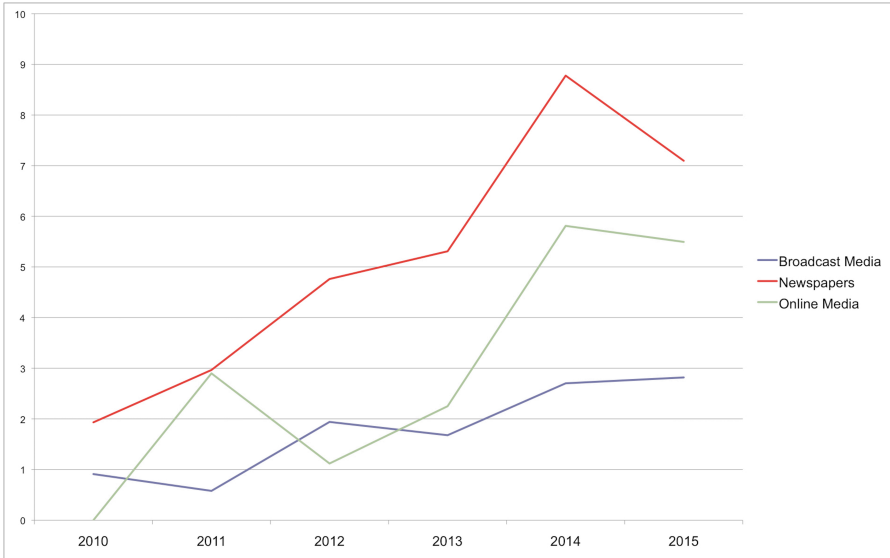


Figure 1: Percent of new roles categorized as DAP.

In general, in both online and print companies, there was an upward trend with regard to the presence of DAP-related job roles within New York City newsrooms.

Key Finding 3: Data, analytic, and platform-based job roles have grown substantially in newspaper and online media companies, accounting for an estimated nine percent of all jobs in New York City news media companies.

The increasing importance of DAP roles is more apparent when examining the specific nature of the positions. In 2010 and 2011, there were only eighteen new DAP roles listed in newspaper and online media companies.

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The majority of these roles were social media editors and social media coordinators. In 2014 and 2015, there were ninety-seven new DAP roles listed.

The variance in roles is more notable and indicative of a stronger presence within the organizational structure of each company. For example, *The Wall Street Journal* hired both a mobile editor and a director of social media and engagement. *The New York Times* accounted for twenty-four hires in this category during this period; for example, hiring for mobile editor, news application developer, lead growth editor, and director of audience development. Similar positions were created at Fox News (social media director) and BuzzFeed (social media editor), among others.

Finally, homing in on the later years in this sample, there were 144 new DAP roles from 2014 through 2015, of which forty percent were filled by employees who previously had not been working in news media companies, suggesting a migration from other areas of expertise. Hiring across industries is not uncommon, nor is it unusual to hire for new types of job roles.

Employment Patterns and News Media Companies

Between 2010 and 2015, there was a clear shift in the job roles reported by employees in the news media industry. Particularly within online news and newspaper companies, there was a move away from traditional job roles and an increased emphasis on data, analytic, and platform-based jobs. In order to better understand the growing importance of DAP-related skills, we looked at how employees migrated between New York City news media companies.

Employment Ecosystem and Social Network Analysis

Social network analysis was used to examine the overall employment ecosystem and the flow of employees between companies. In practical terms, this is a helpful approach because it allows practitioners to understand how training and best practices are shared between companies. For example, if Employee A works for *The New York Times*, and then in 2014 leaves *The New York Times* to go work for Huffington Post, we recorded a connection between *The New York Times* and Huffington Post based on the movement of an employee from one company to the other. In this example, for instance, the employee moving from *The New York Times* to Huffington Post brings knowledge learned at the *The Times* to their job role at Huffington Post.

Data are aggregated at the company level in order to protect anonymity of individuals. See Appendix II for additional information regarding the social network analysis conducted as part of this research.

Figure 2 provides an overview of the employment network based on movement of employees between companies from 2010 through 2015. A company was included if an employee who worked at a focal company (e.g., *The New York Times*) also worked at a given company (e.g., Google) during his or her work history experience. In total, this subsample of the larger network includes 6,570 companies representing 14,589 instances where an employee left one company and went to work for another.

The visualization in Figure 2 shows the overall employment network for the key period and provides a quick snapshot of the companies that controlled the majority of the hiring flow, as well as those that occupied

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a more peripheral role. Companies such as ABC News, Huffington Post, and *The New York Times* occupy central positions, as many employees passed through these companies during their careers working in New York City news media. Others such as Clear Channel Media and Thompson Reuters also occupy important positions at the center of this network. These companies function as training grounds, providing many employees with early on-the-job education that serves to shape subsequent years of their careers.

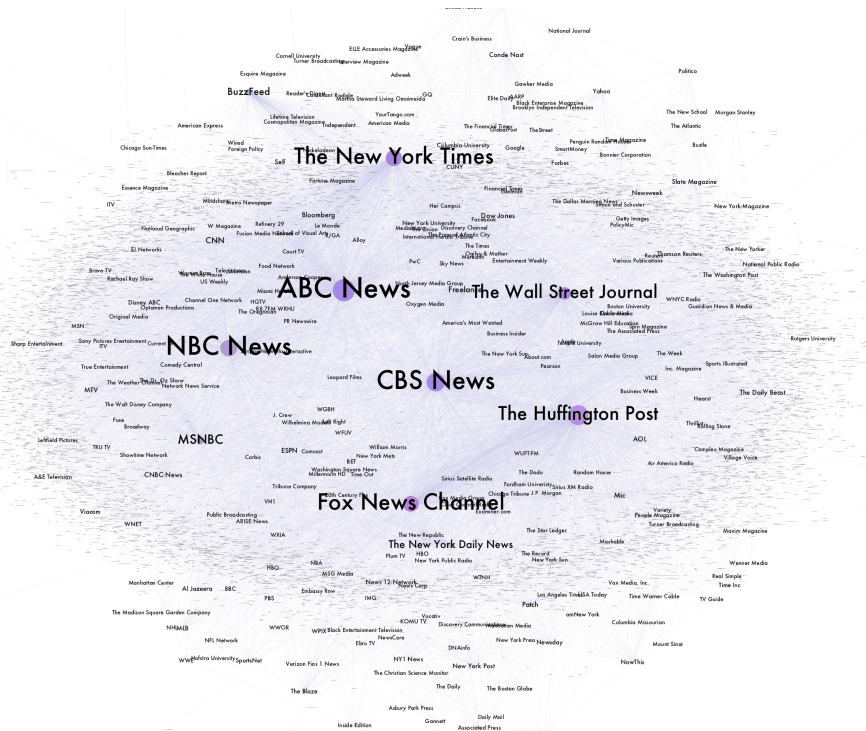


Figure 2: Overview of the employment network, 2010–2015.^{ix}

ix. All visualizations were created in Gephi using the MultiGravity Force Atlas algorithm, and using the parameter controls to dissuade hubs in order to improve readability. The darkness and thickness of a line is correlated to the number of employees moving between those two companies. Companies are included in the visualization if twenty or

Figure 3 provides a closer look at the center of the network. This view shows the focal companies in the employment network from 2010 to 2015.

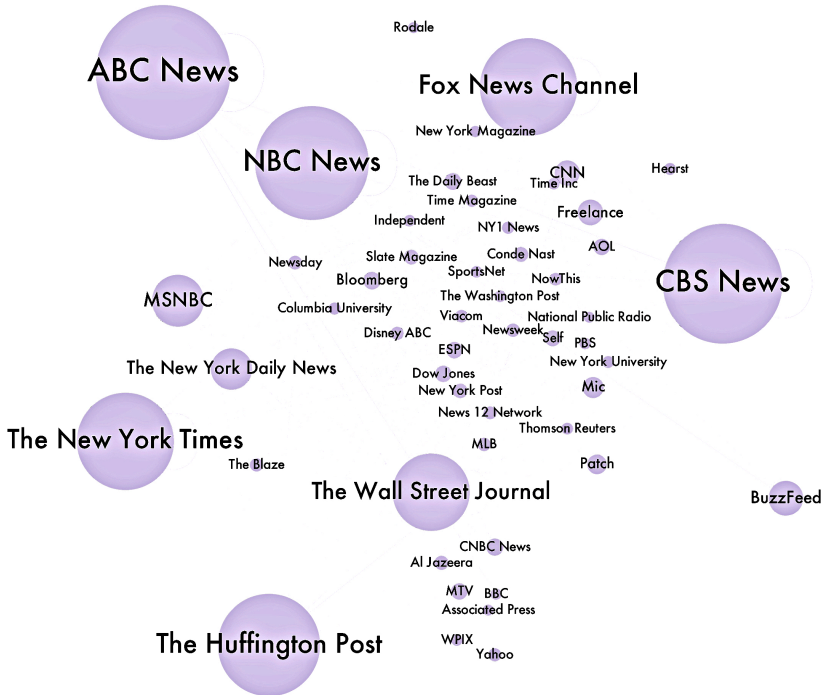


Figure 3: View of the hub of the employment network, 2010–2015.

Companies such as *The New York Times*, ABC News, MSNBC, Fox News, and *The Wall Street Journal* are most important in this network; however, Figure 3 also reveals unexpected intermediaries. For instance, companies such as Yahoo!, CNN, ESPN, and Bloomberg occupy important roles. These companies are not at the center of the network, but they exert influence because a notable number of employees pass through them.

Table 5 provides a summary of the top five most central companies,

more employees either started or left a job at the company during the focal period of 2010 to 2015. In addition, a connection between two companies is shown if three or more employees moved between the company during the period of analysis. Unless otherwise noted, the same parameters were used for subsequent visualizations.

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based on betweenness centrality. Scores are normalized to control for network size and to allow for comparison.

Table 5: Betweenness Centrality for Top Five Companies, 2010–2015

All Job Roles	DAP Job Roles
ABC News	0.22
<i>The New York Times</i>	0.27
Huffington Post	0.21
<i>The Wall Street Journal</i>	0.18
CBS News	0.18
Huffington Post	0.17
NBC News	0.15
BuzzFeed	0.13
<i>The New York Times</i>	0.15
ABC News	0.12

Broadcast companies occupy significant roles as “pass-through” companies, meaning that employees are likely to move between these companies. This reinforces the finding from the prior section indicating that there is greater movement of employees in broadcast compared to other industries. One exception is Huffington Post, which also has a high degree of betweenness.

There are notable differences when looking at the DAP category. In the case of DAP roles, *The New York Times* dominates the New York City media landscape. The high betweenness score indicates that a large number of employees worked in DAP roles at *The New York Times*, and then went to work for other companies. The same can be said of *The Wall Street Journal* and Huffington Post. This does not mean that these companies are subject to high turnover; rather, the numbers suggest these employees are heavily recruited by other companies.

Another perspective involves looking at in-degree centrality. In-degree centrality demonstrates the most central, or influential, companies based on their hiring activity.

The top five companies in each category are relatively similar. The numbers, however, show that for DAP hiring, companies such as *The New York Times* are essentially training grounds for employees looking for DAP skills.

Table 6: In-Degree Centrality for Top Five Companies, 2010–2015

All Job Roles		DAP Job Roles	
ABC News	0.09	<i>The New York Times</i>	0.06
CBS News	0.08	<i>The Wall Street Journal</i>	0.03
Huffington Post	0.07	Huffington Post	0.03
NBC News	0.07	ABC News	0.02
<i>The New York Times</i>	0.07	Fox News Channel	0.02

Implicitly, these companies may be viewed as industry leaders (and the presence of DAP job roles at these companies reinforces the point).

Companies that led in DAP-related job roles are active in hiring new employees, but also train their employees well, allowing them to move on to other companies.

Finally, Figure 4 gives an overview of employment for individuals working in DAP roles from 2010 through 2015. Companies were included in this network if they hired an individual in a DAP role or if they hired an individual from a DAP role. In total, 736 companies were included in the network, and there were 1,071 cases where employees moved from one company to another.

In Figure 4, mainstream online media and print companies are at the center. Companies such as *The New York Times* and *The Wall Street Journal*, as well as Huffington Post and Fox News Channel, are important influencers in this network. Notably, there is not a significant influx of employees from outside industries. High-tech companies such as Google are present in the network, but they are not central, nor are they influential. This leads to our fourth main finding.

Key Finding 4: The growth of data, analytic, and platform-related job roles and skills within the news media industry is driven from within the industry, and not by outside influences.

Reinforcing this point, Tables 7 and 8 provide a snapshot of where the top newspaper and online media companies in our sample were hiring from in a given year.

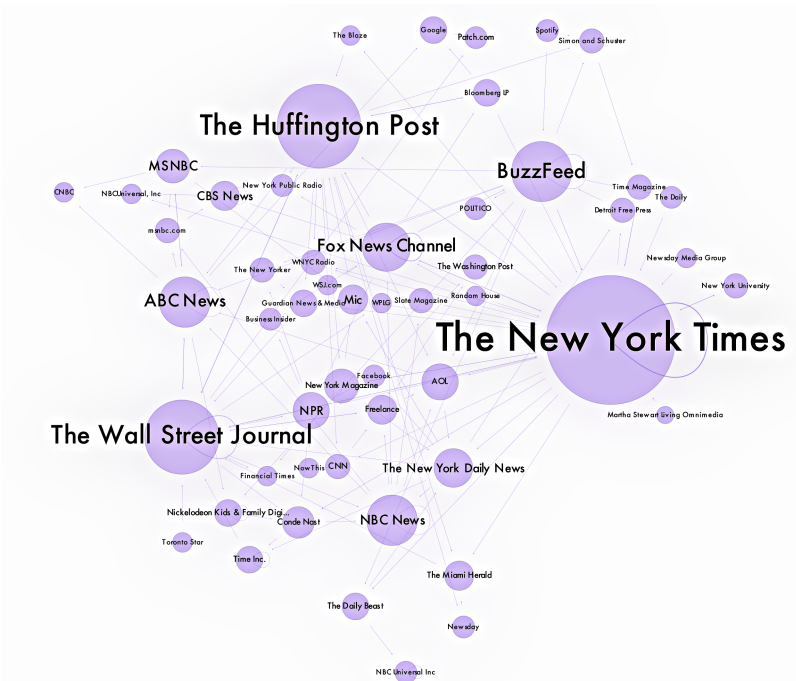


Figure 4: Overview of the DAP Employment Network, 2010–2015^x

Table 7 shows the percent of employees hired in each year who came from a newspaper company.

Table 7: Percent Hiring from Newspaper Companies (Top Five Overall Based on the Number of Hires, per 2011–2015 Sample Data)

Outlet	2011	2012	2013	2014	2015
<i>The Wall Street Journal</i>	35%	36%	20%	24%	20%
<i>The New York Times</i>	15%	12%	17%	12%	14%
<i>New York Daily News</i>	8%	19%	27%	13%	28%
BuzzFeed	-	0%	43%	34%	19%
Huffington Post	6%	1%	5%	3%	9%

x. The visualization shows any company that had at least three employees in a DAP role.

Not surprisingly, newspaper companies hire from other newspaper companies. However, there was a notable increase in hiring activity on the part of BuzzFeed as it sought to gain a foothold in the industry. In turn, Table 8 shows the percent of employees hired in each year who came from a technology company.

Table 8: Percent Hiring from Technology Companies (Top Five Overall Based on the Number of Hires, per 2011–2015 Sample Data)

Outlet	2011	2012	2013	2014	2015
<i>The Wall Street Journal</i>	0%	7%	0%	3%	0%
<i>The New York Times</i>	1%	4%	2%	3%	1%
New York <i>Daily News</i>	0%	0%	0%	12%	8%
BuzzFeed	-	0%	0%	3%	10%
Huffington Post	8%	5%	2%	7%	4%

In this table, it is clear there is only a small undercurrent of hiring from technology companies. Overall these data continue to reinforce that news media companies—print and online—generally focus on hiring from within the industry, rather than drawing on expertise from outside the industry in other arenas such as technology.

Implications

In recent years, the digital transformation of journalism has challenged the fundamental notion of what it means to be a journalist.²³ When industries begin to transform and adapt, change is often seen first at the professional level, where the nature of work alters in response to broader changes influenced by social, economic, technological, and political forces.²⁴ The key findings in this study indicate a core transformation in the news media industry, as companies shift to integrate technical skills into the newsroom workforce. As with much evolution in the news media industry, this change continues to be gradual, but it is nonetheless significant.

This study examined thousands of employee histories and used multiple data sources to investigate the changing nature of the modern newsroom workforce. In summary, the key findings from this study are as follows:

- On average, employees working in broadcast were likely to have worked in a greater number of job roles compared to employees working for newspapers or online media.
- Although many print media companies continue to reduce headcount, newsroom employees account for fifty percent of employees in this analysis.
- Data, analytic, and platform-based job roles have grown substantially in newspaper and online media companies, accounting for an estimated nine percent of all jobs in those companies.
- The growth of digital, analytic, and platform-based job roles and skills within the news media industry is driven from within the industry, and not by outside influences.

In response to significant shifts in the ways that audiences find and consume news, there is clear evidence that news companies are integrating data and analytic, as well as social media and processes related to digital intermediaries, into their own formal business models. As this analysis has demonstrated, the change has been particularly notable in online media and newspaper companies, in which hiring of workers with DAP skills has spiked in the past three years.

Broader Implications

The shift in skills is not unique to the news media industry. Indeed, many technology-centric companies have worked to integrate news media skills into their companies. For example, in 2015 Facebook announced a partnership with several U.S. news companies (e.g., *The New York Times*, *The Wall Street Journal*, and others) in an effort to host news content directly within the technology company's platform, as opposed to linking outside to the news company's website.²⁵ The landscape continues to change, and a high degree of digital agility is needed to keep pace with advances. Even digital-native news companies such as BuzzFeed and Vox, once considered startup competitors to legacy companies, are moving toward including more digital and data-centric roles into their newsroom workforces. BuzzFeed, for example, has separate divisions dedicated to data science and data journalism.²⁶ Elsewhere, Vox created a team solely focused on creating content for the social media messaging application Snapchat.²⁷

The changing nature of professional newsrooms, particularly in response to data, analytic, and platform-related developments, is significant for the news media industry and society at large. Digital, technological evolution has had an ongoing disruptive effect on the news media industry, resulting in a reconfiguring of production, consumption, and distribution of news. In light of this transformation, the established professional practices of newsroom workers were destabilized and necessitated a shift toward adoption and integration of new newsroom jobs based on new skills and competencies. While there is no lack of scholarship on the implications of technology, the particular role of data and interrelated concepts in newswork is only just being considered. In addition, few bodies of research have looked at the specific transformation of job roles and required skills as outlined in this research report. As such, this work has attended to the specific transformation of job roles and necessary skills. The cumulative findings underscore the nature of this transformation, but also point toward future hiring paths that will both help to reinvigorate the industry and accelerate the transformation.

Appendix I: Data Verification

Data sources such as LinkedIn and the American Society for News Editors provide data that can be used to estimate the number of employees working for a company. With regard to LinkedIn, data that were collected included current employer as well as any public information available about prior employers. Other data that were collected through a number of sources included location, gender, education, and self-described skills. Data were collected for each employee of each company in the sample and recorded in a spreadsheet format, with separate databases created for each news company.

The number of employees listed was cross-referenced with the Cision-Point database, as well as secondary documentation about the company (e.g., news coverage and Pew research reports). Table A1 presents information regarding data verification on collecting employment numbers with LinkedIn compared to other data sources.

Table A1: Data Verification for Utilizing LinkedIn to Collect News Media Employee Numbers

Outlet	LinkedIn	CisionPoint	2016 Pew Data
ABC News	857	201	-
TheBlaze	26	9	-
BuzzFeed	246	124	170
CBS News	773	247	-
The Daily Beast	65	54	50
Fox News	816	233	1272
Huffington Post	761	159	575
Mic	102	44	13
MSNBC	315	102	600
NBC News	633	220	-
New York <i>Daily News</i>	264	102	-
<i>The New York Times</i>	733	659	3588
NowThis News	34	5	-
Patch Media	76	46	50
Slate	49	50	50
<i>The Wall Street Journal</i>	568	484	-

In general, there is alignment across the data sources, although there are some important discrepancies. For instance, the employment numbers reported by Pew for Fox News, MSNBC, and The New York Times Com-

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pany are reported for the company based on their annual reports. In turn, it is difficult to disentangle employment numbers for a single asset, such as MSNBC, from the company as a whole (e.g., for the NBC News Division). In general, however, the data presented in Table A1 provide another point of support for the validity of this data collection approach.

Appendix II: Industry and Role Codes

Industry codes include broadcast media, consulting, education, entertainment, finance, government, health, human resources, law, marketing, newspapers, nonprofits, online media, publishing, research, retail, technology, self-employment, and other.

Position codes include actor, administration, advisor, analyst, audience, audio, blogger, broadcaster, camera, communication, consultant, copy editor, copy writer, creative, curator, data, design, developer, development, director, doctor, editor, editor, engagement, fellow, finance, founder, health, human resources, lawyer, manager, mobile design, mobile developer, mobile editor, mobile manager, mobile producer, online administrator, online analyst, online broadcaster, online camera, online communication, online consultant, online copy editor, online copy writer, online creative, online data, online design, online developer, online director, online editor, online engineer, online fellow, online finance, online manager, online operations, online producer, online reporter, online research, online sales, online strategy, online writer, operations, owner, partner, platform, producer, programmer, programming, reporter, research, sales, self, search engine optimization, strategy, teacher, technology, writer, and other.

Appendix III: Employment Ecosystem and Social Network Analysis

As noted in the body of this study, employment ecosystem data were recorded in a social network format. The focus of the analysis was on companies. A tie, or connection between two companies, was recorded if an employee had worked at both companies.

One-Mode versus Two-Mode Network Data

The network data collected in this study represents a two-mode network. In network terminology, nodes are the vertices and ties are the connections between those vertices. A one-mode network contains one type of vertices (e.g., companies), whereas a two-mode network contains two types of vertices (e.g., companies and individuals).

We created our network by mapping out the companies where individuals had worked. The two-mode network consists of individual employees and companies where those employees worked. That said, it is possible to create a one-mode projection from a two-mode network, using matrix multiplication to extract the network of companies connected to companies. Thus, a connection between company A and company B then exists if an employee moved from company A to company B.

Data Analysis

Most of the network analysis conducted in this study was done using the open source R framework. The RStudio open source package was utilized, and a number of social network packages were used—specifically *igraph*^{xi} and *statnet*.^{xii} Both packages allow for a wide array of network functions and generally use the same calculations. Betweenness centrality and in-degree centrality were calculated using the centrality routine in *igraph*.

xi. For information on *igraph*, see <http://igraph.org>.

xii. For information on *statnet*, see <http://statnet.csde.washington.edu>.

Data Visualization

All network visualizations were produced using the Gephi^{xiii} network analysis package. As noted, MultiGravity ForceAtlas was used as the primary visualization routine. Hubs were dissuaded in order to make the visualization easier to read. Node size was correlated to degree centrality, and tie darkness and width were correlated to tie strength.

xiii. For information on Gephi, see <http://gephi.org>.

Citations

1. Mark Stencel and Kim Perry, "Superpowers: The Digital Skills Media Leaders Say Newsrooms Need Going Forward," Tow-Knight Center for Entrepreneurial Journalism, 2016, <http://towknight.org/research/superpowers/>.
2. Gillian Doyle, "Re-Invention and Survival: Newspapers in the Era of Digital Multiplatform Delivery," *Journal of Media Business Studies*, no. 4 (2013): 1–20, <http://www.tandfonline.com/doi/abs/10.1080/16522354.2013.11073569>.
3. George Sylvie and Peter Gade, "Changes in News Work: Implications for Newsroom Managers," *Journal of Media Business Studies*, no. 1 (2009): 113–148, <http://www.tandfonline.com/doi/abs/10.1080/16522354.2009.11073481>.
4. Mike Ananny and Kate Crawford, "A Liminal Press," *Digital Journalism*, no. 2 (2015): 192–208, <http://www.tandfonline.com/doi/abs/10.1080/21670811.2014.922322>.
5. Seth Lewis and Nikki Usher, "Code, Collaboration, and the Future of Journalism," *Digital Journalism*, no. 3 (2014): 383–393, <http://www.tandfonline.com/doi/abs/10.1080/21670811.2014.895504?tab=permissions&scroll=top>.
6. Jane Singer, "Who Are These Guys? The Online Challenge to the Notion of Journalistic Professionalism," *Journalism*, no. 2 (2003): 139–163, <http://openaccess.city.ac.uk/3468/>.
7. C. W. Anderson, Emily Bell, and Clay Shirky, "Post-Industrial Journalism: Adapting to the Present," Tow Center for Digital Journalism, 2014, http://towcenter.org/wp-content/uploads/2012/11/TOWCenter-Post_Industrial_Journalism.pdf.
8. About page, BuzzFeed, <https://www.buzzfeed.com/about>.
9. Cision, <https://www.cision.com/us/>.
10. Agnes Gulyas, "The Influence of Professional Variables on Journalists' Uses and Views of Social Media: A Comparative Study of Finland, Germany, Sweden and the United Kingdom," *Digital Journalism*, no. 2 (2013): 270–285, <http://www.tandfonline.com/doi/abs/10.1080/21670811.2012.744559>.
11. Norman P. Lewis and Bu Zhong, "The Root of Journalistic Plagiarism: Contested Attribution Beliefs," *Journalism and Mass Communication Quarterly*, no. 1 (2013): 148–166, <http://journals.sagepub.com/doi/abs/10.1177/1077699012468743?journalCode=jmqc>.
12. LinkedIn Corporate Communications Team, "LinkedIn Announces Third Quarter 2016 Results," LinkedIn, October 27, 2016, <https://news.linkedin.com/2016/linkedin-announces-third-quarter-2016-results>.
13. Li-Wei Chen and Peter Thompson, "Skill Balance and Entrepreneurship Evidence from Online Career Histories," *Entrepreneurship Theory and Practice*, no. 2 (December 14, 2015): 289–305, <http://onlinelibrary.wiley.com/doi/10.1111/etap.12220/abstract>.

14. Daniel Kreiss, *Prototype Politics: Technology-Intensive Campaigning and the Data of Democracy* (New York: Oxford University Press, 2016).

15. Prasanna Tambe, "Big Data Investment, Skills, and Firm Value," *Management Science*, no. 6 (2014): 1452–1469, <http://pubsonline.informs.org/doi/abs/10.1287/mnsc.2014.1899>.

16. Daniel Kreiss and Christopher Jasinski, "The Tech Industry Meets Presidential Politics: Explaining the Democratic Party's Technological Advantage in Electoral Campaigning, 2004–2012," *Political Communication*, no. 4 (2016): 544–562, <http://www.tandfonline.com/doi/abs/10.1080/10584609.2015.1121941>.

17. Chunmian Ge, Ke-Wei Huang, and Ivan P.L. Png, "Engineer/Scientist Careers: Patents, Online Profiles, and Misclassification Bias," *Strategic Management Journal*, no. 1 (December 15, 2015): 232–253, <http://onlinelibrary.wiley.com/doi/10.1002/smj.2460/abstract>.

18. Ibid.

19. Konstantinos Saltzis and Roger Dickinson, "Inside the Changing Newsroom: Journalists' Responses to Media Convergence," *Aslib Proceedings*, no. 3 (May, 2008): 216–228, https://www.researchgate.net/publication/27248098_Inside_the_changing_newsroom_Journalists'_responses_to_media_convergence.

20. Howard Finberg, "Journalism Needs the Right Skills to Survive," Poynter, April 9, 2014, <https://www.poynter.org/2014/journalism-needs-the-right-skills-to-survive/246563/>.

21. Debora Wenger, Lynn Owens, and Patricia Thompson, "Help Wanted: Mobile Journalism Skills Required by Top U.S. News Companies," *Electronic News*, no. 2 (2014): 138–149, https://www.researchgate.net/publication/270675717_Help_Wanted_Mobile_Journalism_Skills_Required_by_Top_US_News_Companies.

22. Henrik Örnebring and Claudia Mellado, "Valued Skills among Journalists: An Exploratory Comparison of Six European Nations," *Journalism*, July 8, 2016, <http://journals.sagepub.com/doi/abs/10.1177/1464884916657514>.

23. Bob Franklin, "The Future of Journalism in an Age of Digital Media and Economic Uncertainty," *Journalism Practice*, no. 5 (2014): 469–487, <http://www.tandfonline.com/doi/abs/10.1080/1461670X.2014.930254>.

24. Daniel Muzio, David Brock, and Roy Suddaby, "Professions and Institutional Change: Towards an Institutional Sociology of the Professions," *Journal of Management Studies*, no. 5 (June 13, 2013): 699–721, <http://onlinelibrary.wiley.com/doi/10.1111/joms.12030/abstract>.

25. Vindu Goel and Ravi Somaiya, "Facebook Begins Testing Instant Articles from News Publishers," *The New York Times*, May 13, 2015, <https://www.nytimes.com/2015/05/13/technology/facebook-media-venture-to-include-nbc-buzzfeed-and-new-york-times.html>.

26. Dao Nguyen and Ky Harlin, "How BuzzFeed Thinks about Data Science,"

BuzzFeed, September 24, 2014, <https://www.Buzzfeed.com/daozers/how-Buzzfeed-thinks-about-data-science?>.

27. K.C. Iffeanyi, “Why ‘Snapchat Producer’ Is Now a Legit Job,” *Fast Company*, September 30, 2015, <http://www.fastcompany.com/3051760/innovation-agents/why-snapchat-producer-is-now-a-legit-media-job>.