

ABSTRACT

TRIGOBOFF, DANIEL. Digital Switching: A Case Study of Innovation in Local Television. (Under the direction of Dr. Melissa Johnson).

The late 20th and early 21st centuries proved to be a time of historic change in an industry that chronicles change. A confluence of government, innovation, economic, and cultural forces converged to reshape the medium of television into numerous separate and related media, and to reshape operations and workflow. Local television faced the challenges of extraordinary technological innovation—not only in the federally mandated means of broadcast transmission, but also in the means of producing, storing, and distributing television content.

The promised efficiencies and improved performance from digital technology made conversion from analog to digital equipment highly likely, if not inevitable, in a technology-driven industry that constantly seeks new efficiencies and new parameters. Digital technology's expanding capabilities factored into the profound changes in local television operations, particularly news. It also helped expand the ability of a media company to communicate across markets, across nations and oceans, and even across its own facilities, locally and internationally.

But the direction of local television's digital migration was not always clear. The choices and strategies employed in that diffusion of innovation drew substantial influence from the rapidly changing deregulatory and business environment at the time. Where television stations and station groups had routinely replaced broken or worn equipment or upgraded for greater performance and efficiency, digital technology presented different challenges, including cost, compatibility, and competition among vendors. End users had to be careful in their selection of approaches and gamble with little to no direct product experience to guide them. Where analog and other equipment had been purchased on a station-by-station basis, following deregulation

and industry consolidation, groupwide purchases--even when staggered over time—made sense both for operating and for exploiting gains in market power and economies of scale.

This is a case study examining a local station's and newly enlarged station group's transition to digital technology. It addresses the regulatory, economic, cultural, and innovative forces, and fills a gap in academic literature. The story of the choices and challenges regarding digital migration at a mid-market station in a prominent station group is told through interviews with key executives, engineers, staffers, and others, and through documentary and archival evidence.

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Digital Switching: A Case Study of Innovation in Local Television

by
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DEDICATION

For Deb:

“Give me a boat
that can carry two
And both shall row,
my love and I.”

-- Scottish folk song, “The Water is Wide” (various attributions).

BIOGRAPHY

A New Yorker by birth, Dan Trigoboff moved to New England for college. He earned a bachelor's degree from Boston University, and joined the *Taunton Daily Gazette*, where he reported on government, police and fire departments, and features.

After covering courts and justice issues for *The San Diego Daily Transcript*, Trigoboff earned a juris doctor degree from the University of San Diego. Specializing in law and business, he was a staff writer and editor at *The Los Angeles Daily Journal*, *Legal Times*, San Francisco's *Recorder*, the Bureau of National Affairs, Baltimore's *Daily Record*, and the *Fayetteville Observer*. He has also worked in radio and television.

His work has won numerous awards, and has appeared in numerous venues, including the *American Bar Association Journal*, *Ohio Law*, *Orange Coast*, *The National Law Journal*, *San Diego Reader*, *USAir Magazine*, *Warfield's*, *CityView*, *Greensboro News and Record*, United Press International, Associated Press, Reuters, and *USA Today*.

Several years as senior editor for *Broadcasting & Cable* magazine led to an opportunity to join the faculty at Elon University, and later at Methodist University. He pursued a master's degree at the University of Memphis, and later taught there as an adjunct. He taught as a lecturer at N.C. State while completing his PhD there.

Trigoboff lives in Eastover, N.C., with his wife, a nurse-practitioner at Duke University Medical Center. They have two adult children.

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For all my years as a professional writer and editor, I do not have the words to express my gratitude to my adviser and committee chair, Dr. Melissa Johnson, for her extraordinary insight, direction, and patience. Her contributions were immeasurable.

My parents spent much of their working lives in New York City's school system. My mother was an administrative secretary who went above and beyond in helping students, teachers, and administrators. My father was a teacher, coach, guidance counselor, and administrator. They flew across the country years ago for my law school graduation, and I know what this degree would mean to them. Their commitment to education is part of my own, and part of me.

As will be discussed, this paper grew in part from my work as a journalist, and several of the case study interviewees had been sources of information prior to the study. I appreciate their input and cooperation, and all of the participants' engagement and candor. They were essential.

Over the years I have been blessed with great colleagues and mentors as a journalist and as an academic. I am especially grateful to my former dean at Elon, Paul Parsons, my department chair Don Grady, and associate dean—now Elon President—Connie Book, for giving me the opportunity to become a college professor. My legal education proved useful for me as a journalist and teacher; but at Elon, with encouragement from numerous faculty colleagues, I began to consider further communication study. I also enjoyed encouragement and help from

friends and colleagues during my years at Methodist University; thanks go to Eric See, Bill Watt, Wendy Vonnegut, Warren McDonald, and Mark Kendrick. And I am grateful to my many students, who have taught me so much.

My older brother Nathan earned a doctorate in education years ago, and his experience helped prepare me for my own. The many accomplishments of my wonderful children, Jacob and Lindsay, have brought me great joy, and I'm happy to share this with them. And I would be remiss if I did not mention our dog Milo. Always a great companion, the pet I didn't want nuzzled at my feet or outside my office during long months of research and writing. I've never been so glad to have been so wrong.

My wife Debra was already on her way to an outstanding career as a nurse and nurse practitioner when we married. Neither of us realized what an exceptional scholar she would become. As usual, she was ahead of me. In scholarship, as in all things, I am nothing without her love and support.

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CHAPTER 1

Introduction

In December 1998, technical workers and television executives battled in boardrooms, in the media and on picket lines, ostensibly over benefits. But a major market TV station executive who had been meeting with workers' representatives told a leading business-to-business journal that the real issue was the inevitability and impact of digital technology. Digital technology, he said, would eventually and profoundly change and likely reduce the role of technical workers in local television.

The executive noted the stations' busy control rooms, full of producers, directors, audio technicians, and others. All those functions would ultimately merge, and fall to a producer, a director, and a computer, he predicted.

"Automation and digital technology are going to reduce the work force drastically over time," he said. "Look at how fast technology has moved. Look how cheap it is. That's what's going to happen to the TV industry. It's on its way" (Trigoboff, 1998, p. 28)

Because the executive was involved in negotiations with the unions—the National Association of Broadcast Employees and Technicians and the broadcast department of the International Brotherhood of Electrical Workers—he worried that his comments might be perceived as antagonistic. At the time, Hank Price was president and general manager of WBBM-TV, the CBS owned-and-operated station in the nation's third-largest market.

But even the striking technical workers recognized the incursion of technology. Another story in the magazine's cover package said that "[O]stensibly, the dispute is about medical benefits, but it is really about how and where those workers fit in the world of digital TV" (McClellan, 1998, p. 26-28).

In an interview, Price acknowledged his comments, which not only helped frame the magazine's cover story and its focus on labor issues, but also predicted key developments in TV station planning, development, and operation.

This project has roots in that conversation.

Viewed from a distance—the very definition of “tele-vision”—the conversion to digital seemed inevitable, as Price predicted, in a technology-driven industry that constantly seeks new efficiencies and new parameters. But the direction was not always so clear; the migration to digital technology required not only money and intention, it called for research, networking, planning, and selection among other requirements—and all within a newly deregulated industry and dramatically different corporate ownership schemes.

A review of the literature shows a long history inextricably linking television, technology, and government. Articles, books, and documentaries detail that history, largely focused on the inventors, innovators, regulators, and captains of industry. But little has been written in academic journals about the issues and implementation bringing about digital conversion in the medium that produces and distributes local commercial television content. Researchers can glean information regarding the various transitions from analog to digital technology among television stations from vendor marketing and from trade publications, and from comment and continuity from key personnel at the station and group under study. Case studies can further fill that research gap, and offer insight beyond headlines, unveilings, and product promotion. A case study can chronicle the choices and challenges that brought local television into the then-new 21st century.

There are nearly 1,400 commercial television stations in the United States (FCC, 2019). Each has its own story of digital conversion; an understanding of what is typical may best

emerge through more case studies of more stations. WXII's market size, demographics, and terrain, its large and prominent station group, and especially its stable and accessible management positioned the Winston-Salem, N.C. station as an instructive model, and as a compelling, if not representative, narrative of sweeping technological change in an industry's form and function.

Digital technology's expanding capabilities obviously factored into the profound changes in local television operations in the late 20th and early 21st centuries. But they were not the only factors; government, business, and individual actors contributed to the overhaul of an industry. Because of the profound changes brought by government policy to the overall map of television station ownership, this case study necessarily addresses the increased role of the Hearst station group—newly and considerably expanded—in bringing digital technology to its North Carolina station. The study addresses not only technological changes and impact, but also the human change agents at various levels of station and group management. It reviews the relevant history of the station, of the station group, of the industry, and of the technology and offers insights from station and group personnel. The overall purpose of this research is to chronicle these challenges posed by change, and the way they were addressed, largely in the words of those who addressed them.

Deregulation and economics

The promised greater efficiencies and promised performance improvements made a migration to digital technology highly likely if not inevitable for television stations. However, the choices and strategies employed in that migration drew substantial influence from the rapidly changing deregulatory and business environment at the time. Deregulatory change favored growth in station groups, and Hearst grew significantly. As this case study demonstrates, the

reshaped environment would centralize company resources, including purchasing, consulting, and diffusion strategies. Therefore, in order to study the adoption of digital technology at this television station, it was necessary to address the changes in group structure and management during this period.

Deregulation and station consolidation spurred tremendous movement in the late 1990s, but it did not begin there. After decades of broadcast ownership regulation, the FCC changed course. In 1985, it lifted a longtime cap on TV station ownership from seven (and seven AM and seven FM radio stations) to 12. Other raises in the cap followed (Howard, 2006). By 2019, after three decades of deregulation, two groups topped 100 stations, including multiple stations in several markets (Miller, 2019).

Earlier, there had been calls for greater regulation and more self-policing from some of the most prominent figures associated with media. In a well-known 1958 address to the Radio-Television News Directors Association (now Radio-Television Digital News Association), broadcast news icon Edward R. Murrow called for television to be socially responsible--not merely a conduit for anything that is legal and commercially viable (Murrow, 1958). Murrow famously worried that television would become nothing but "wires and lights in a box." A few years later, Federal Communications Commission Chair Newton Minow--even more famously--warned of a "vast wasteland" (Minow, 1961).

Three decades later, one of Minow's successors, Reagan-appointee Mark Fowler, would be instrumental in leading policy toward deregulation. In contrast to Murrow's and Minow's grander vision for television, Fowler called television "just another appliance. It's just a toaster with pictures" (Boyer, 1987, p. C15).

Journalists and commentators cautioned at the time that the newly enlarged structure of large groups, built on rich station groups growing after making sizable offers to smaller groups, would have deeper effects. They warned that by raising the limits on broadcast station ownership smaller market and individual stations and smaller groups—including minority-owned groups--would not be able to compete—for advertising, for syndicated programming, and in influencing network programming--if the big got so much bigger (Holland, 1996; Gay, 2001).

Analyst Niraj Gupta cited the advantages of larger scale in competing for programs, advertisers, and viewers as of 1998. A broader station and advertising base made larger operating groups less vulnerable to economic shifts, and it gave the larger groups valuable negotiating clout with networks and program suppliers, he said. Gupta predicted, accurately, that the Federal Communications Commission would further lift the ownership cap and allow duopolies—ownership of more than one station in a market (Mermigas, & Lafayette, 1998). All large station groups, including Hearst, own duopolies.

Technology costs were among the factors that forced smaller groups into larger groups, according to Verne Gay, who covered television for *Newsday* and *TVWeek* (formerly *Electronic Media*). Gay said the federal mandate for digital transmission would be “an immensely expensive conversion that would force less profitable stations into the arms of giants.” Gay cited a recent deal in which “[t]he Ackerley Group recently was forced to sell its 18 TV stations to Clear Channel, citing the overwhelming costs of trying to keep its head above water in an ocean dominated by leviathans.” The authors of the 1996 Act, he said, “didn't seem to take into account were the vicissitudes of the present” (Gay, 2001). The Ackerley group sold for more than three-quarters of a billion dollars in cash and assumed debt. Neither the group nor the sale would be considered small in most industries, but Ackerley confirmed that the mergers and consolidation

that had overtaken broadcasting left it with two choices: get bigger or join forces with an industry giant. “We’re not that big a company,” CEO Barry Ackerley said (Batsell, 2001, para 4”).

Hearst Television is headquartered in the massive Hearst Tower, which lists two street addresses in a central part of Manhattan. Hearst entered broadcasting in 1928 with the acquisition of WSOE radio, and by 1935 had added two large properties in Pittsburgh and Baltimore. Hearst subsequently added television stations in those cities, and the group has grown significantly since. Although Hearst lacks the overall major market coverage of the broadcast-network owned-and-operated station groups and a few other large station groups, it is nonetheless among the nation’s largest and includes large metropolitan areas—including Boston, Baltimore, Kansas City, and Pittsburgh (Miller, 2019).

It is among the largest independent (network-affiliated, but not network-owned) station groups. In *TVNewscheck*’s compilation of the largest station groups, Hearst ranked 11th in revenue, with 32 stations in 27 markets covering 19 percent of the country (Miller, 2019).

The largest group, Nexstar, owns 141 stations in 114 markets covering 63 percent of the country. Nexstar grew significantly with the 2019 acquisition of Tribune runner-up Sinclair, which owns 116 stations in 89 markets covering 39 percent of the nation. Sinclair failed to win regulatory approval to purchase Tribune in 2018. Nexstar posted \$3.66 billion in revenue; Sinclair, \$2.64 billion; and Hearst, \$1.19 billion (Miller, 2019).

Hearst’s revenue per station is among the highest of the largest groups. This could be attributable to numerous factors, including the popularity of its network and/or local programming, efficient management and sales staff, or stations’ market size. Each group’s listed revenue is the total of advertising and of fees paid by cable and satellite providers to carry their programming.

Federal law addressed retransmission consent since 1992, but stations got more aggressive in the 21st century, altering significantly the business model for local television. Nexstar founder and CEO Perry Sook credited the fees with keeping local television thriving. "Without retransmission fees," Sook said, "we'd look more like the newspaper business rather than TV business." (Yu, 2013, para 4).

Hearst's migration to digital technology demonstrated that deregulation-related consolidation brought new economies of scale for enlarged television station groups, but obviously less localism. Station groups have been able to combine various operations, including research, sales—particularly national sales—and engineering. They have gained negotiating power with content distributors regarding retransmission fees (see Chapters 3, 4, and 5), and greater purchasing power when looking at programming equipment--from cameras to desktop systems to satellite trucks (although technology has reduced their use). Longtime observers credit Hearst stations with greater attention to localism than most groups, and with resisting technology temptations toward one-person news crews (see below), but overall, the corporate benefits of technology can expand the reach of news departments, while adding to the skill sets, and arguably, the burdens, of staff (Ostrow, 2008).

The digital environment

Television did not exist at the beginning of the 20th century, but by the beginning of the 21st century, it was a dominating medium. Television had supplanted radio mid-century as the primary in-home storyteller and entertainment source, just as the ubiquitous telephone had earlier supplanted the revolutionary telegraph for long distance communication. But as the end of the century neared, the accelerating pace of technological change had industry leaders looking precariously toward the future.

By the 21st century, mass media no longer followed strictly the geographic, technological and economic paths that had come before. For television--the dominant medium for much of the 20th century--the deliberative forces of government and industry, and the often-ungovernable force of technology had converged to blur the medium's very definition. Driven by cable and the Internet, broadcasting increasingly competed with a narrower cast, not only for audience, but also for advertising.

The adoption of digital technology at TV stations like Greensboro-Winston-Salem-High Point's WXII brought about predicted improvements in video and sound quality through new, streamlined digital production and transmission processes, and through larger, yet lighter and less cumbersome receivers eventually adopted by viewers. Digital technology clearly contributed to redefining television—set, content, and all. In 2020, terms that formerly carried clear meanings and inferences—television, station, programming, audience—appear vague and imprecise. Digital technology immeasurably expanded the audience for what we know as local television content, across countries, continents, and new media platforms. The act of watching television no longer requires a television set, and has not for years.

But the very digital technology television stations and networks intended to improve television's competitive position diverted some of its benefits--including the advertising dollars that follow audiences already fragmented from cable TV. Even as dominant multimedia powers strengthened their hold on local television and followed advertisers' and their own dollars to the new platforms, competition nonetheless emerged on the new platforms for news, information, and entertainment.

Television stations had no choice in adopting high-definition television transmission, although the industry was clearly instrumental in bringing it about (Brinkley, 1997). The federal

government mandated that all broadcasts meet the new broadcast standard, in a series of delayed deadlines that eventually became final in 2009. Many stations, including WXII, and station groups were broadcasting in high-definition long before the deadlines and even as they simultaneously broadcast with the established standard signal. And between the time government and industry first discussed the standard and the final deadline, new technology had taken hold, changing not only the way television was broadcast, but also the ways in which programming was produced and received.

Long before digital broadcasting extended to all viewers, TV stations had extended their brand to Websites--with mixed success and continual re-design. By the end of the millennium's first decade, digital broadcast technology contributed to changes not only in the ways American homes received and viewed their programs, but also in the ways television stations produced and marketed them. Digital technology would contribute to restructuring the internal operations at TV stations, helping to facilitate unprecedented industry consolidation and debt, which were already driving massive personnel reduction and cost-cutting (Starr, 2002).

By the time of the 1998 labor action, digital technology was already taking hold in television, with much of the attention going to the communication between stations and homes. The U.S. industry and the U.S. government had targeted television's future in 1987, after Japanese manufacturer NHK developed an impressive high-definition television (HDTV) broadcast system. After a successful presentation of NHK's Muse system in the U.S., at the invitation of the Federal Communications Commission, executives at the Japanese company were baffled as to why their system did not become the American industry standard.

Muse wasn't perfect. While the images were clear, it was also clear the estimated \$35 thousand initial cost of a working receiver was prohibitive (Brinkley, 1997). Although NHK

remained optimistic and made additional efforts, including steps to develop a system that could be launched from a broadcast tower and not only from a satellite, Muse would not become the American industry standard. By that time much of the consumer electronics industry had been lost to Japanese companies (Brinkley, 1997). Over more than 20 years, the government and a “Grand Alliance” of usually-competitive U.S. component manufacturers would pursue developing and implementing high-definition television, eventually resulting in an FCC-ordered transition from analog to digital broadcasts both in TV sets and in TV broadcasts (Brinkley, 1997; Book, 2004; Cianci, 2007).

In mid-1996, WRAL-TV in Raleigh, N.C. launched high-definition television operations on an ultra-high frequency (UHF) channel under an experimental HDTV license, the first of its kind. The Federal Communications Commission further experimented in North Carolina in 2008, when the topographically flat designated market area (DMA) of Wilmington, N.C. became the first in the nation to broadcast entirely in digital format. Subsequently, on June 13, 2009—after numerous delays—full power television stations in the U.S. were required by Congress to broadcast exclusively in a digital format (DTV). WXII in Winston-Salem began broadcasting in high-definition in 2000, well ahead of the eventual federal mandate, and shut down its analog signal a day before the federal deadline in 2009.

The signal transition would prove only a part of local television’s unprecedented overall digital transformation. Digital technology offered new ways for the workflow of a television station’s product, turning tape into file--files that did not require physical carriage from room to room or workstation to workstation, but could be transferred digitally, and be accessible to multiple users. Subsequently, the maturing of online streaming a few years into the millennium

presented new opportunities for a business that produces new video each day, and can interact with a video-receptive, and video-responsive audience.

Despite competitive interests, the high-tech Grand Alliance ultimately developed more architecturally open standards that would allow compatibility with computers (Cianci, 2007; Book, 2004; Brinkley, 1997). Before long, emerging digital platforms offering competitive content forced station and group management to confront a digital revolution in which laptop computers, tablets, and smart phones threatened to diminish the connection between audience and a product and brand built over decades.

The purpose of this dissertation is to provide insight through an inside look at the response within an important medium to technological, regulatory, economic and cultural changes. Chapter 2 is an overview of relevant literature. Chapter 3 summarizes the methodology used in the study. Chapter 4 focuses largely on the Hearst station group's strategies for purchasing and implementing new technology in its newly deregulated and enlarged station group. Chapter 5 focuses mostly on the implementation and impact of new technology and new platforms at the station level, with input from station personnel as well as group executives. A final chapter summarizes the study, its findings and limitations, and suggests future research.

CHAPTER 2

Review of Literature

Adoption of new technology at television stations has been, like television itself, largely viewed from a distance. This review will offer numerous studies of technology emergence—focusing on those addressing television. It will note the relationship between technology's advance in television and government action or, at times, its intentional inaction or withdrawal. Although extensive case studies dealing with the conversion from analog to digital technology at a local commercial broadcast television station in the United States have not been found in the literature, the profound impact on local television, and those who operate it, from changes in technology, processes, and culture have not been ignored. This review cites related case studies, surveys, and other studies addressing similar issues in local television.

Local studies

Among the themes emerging from this case study is the effect on local television from government deregulation and the new environment created by the resulting growth and consolidation of restructured, larger station groups. Although a non-manager sportscaster and producer were interviewed, most of the data collected came from longtime Hearst managers.

A handful of studies have examined changes in local television. For example, Swift (2013) studied the impact of that deregulation and industry consolidation on attitudes within local television journalism. Swift surveyed 10 journalists, unidentified by agreement, in three large markets. Their responses reflected lower morale, and they said personnel had been diminished following reductions in local ownership following deregulation diminished resources. Some reported pressure to learn how to shoot their own video, and generally do more with less (Brian Bracco and Hank Price insist in Chapter 5 that was not the intent with Hearst stations'

technology adoption). Prior to joining the academy, Swift said, he was a journalist at Hearst's Pittsburgh station WTAE, where he had observed changes in management approach, consistent with this study. "A company that previously owned a small number of stations was now running things on a corporate level and the changes were happening very quickly," he said. Swift also noted that for all that has been written on the changes in media ownership and economics, "What is clearly and almost completely missing from the literature is how all of these changes have affected practitioners of local broadcast television news" (Swift, 2013, p. 13).

Similarly, Grant, Brown and Nachlinger's article (2010) is not an individual case study of a single television station. But in its exploration of the diffusion of nonlinear editing in local television, it addresses many of the same themes as the present study. They collected data from small market stations in a southern state in 2003, 2005, and 2008, initially to advise a sponsoring university. A common pool of technical talent for stations, mutually dependent relationships with vendors, and the likelihood of newly enlarged groups replacing aging technology for all stations, they wrote, suggest an interdependence of organizations which affects patterns of adoption of innovations in that industry (Grant, Brown & Nachlinger, 2010).

Grant, Brown and Nachlinger began their study seeking practical information on television stations, applying practical implications of their findings to direct educators on the future of video editing. They applied collective action theory with diffusion theory to explore and predict eventual 100 percent adoption of nonlinear video editing in television stations.

Van Der Haak, Parks, and Castells (2012) also pondered new economic realities in journalism and observed that the decreasing viability of established business models, including television's advertising model, had led to a perceived crisis in journalism. Competition for audience had increased, they noted, and advertising followed audience. But while they

recognized an industry crisis of profitability, they concluded it was not necessarily a crisis of journalism and saw some of the shifts away from established models as opportunities to extend journalism beyond newsrooms and commercial media. They acknowledged that news audiences have become more fragmented, news organizations' have reduced staff, and that the diminishing number of professional journalists in traditional news media face increasing competition from Websites, free-lancers, advocates, and a "stunning" increase in participation from unpaid citizen journalists using mobile phones equipped with cameras (Van Der Haak, Parks, & Castells, 2012, p. 2923-2924).

If established media expressed anxiety over these changing conditions; these authors did not. "Although these developments present serious challenges to professional journalism," Van Der Haak, Parks, and Castells separated "the profitability crisis of media companies from the crisis of journalism itself. We are less concerned with the survival of traditional business models of journalism than with the continued and improved performance of journalism in the public interest." (Van Der Haak, Parks, & Castells, 2012, p. 2924). "This dynamic landscape of continuous and diversified witnessing and reporting does not represent a crisis of journalism," they said, "but rather, an explosion of it" (p. 2924).

Flexibility in the production and transmission of content has been increasingly reflected in its receivers. There are no reasons to believe, said Nielsen and Sambrook (2016), "that a generation that has grown up with and enjoys digital, on-demand, social, and mobile video viewing across a range of connected devices will come to prefer live, linear, scheduled programming tied to a single device just because they grow older..." (p. 3). Studying changes in "traditional television viewing" they acknowledged that TV news remains an important source for older viewers but called for the medium to reinvent itself. "The fact that no one has found the

right recipe for doing online video news in this rapidly changing environment takes nothing away from the urgency of adapting to it. Television as a platform may well be about to face disruption on a scale comparable to what printed newspapers have experienced over the last decade” (p. 3).

“Television news providers face this transition with many strengths, including well-known brands, creative talent, and deep archives of quality content, but they also risk being constrained by their legacy organisation and culture” (Nielsen & Sambrook, 2016, pp. 3-4). Similarly, Collins and Brown surveyed online news editors at U.S. television stations and newspapers in 2012, and determined that “good multimedia journalism ought to be informed more by the most effective use of the available technologies to meet needs/wants of the audience and less by long-standing traditions carried over from other media” (Collins & Brown, 2012, p. 249).

The addition of content platforms is among the digital realities for television station groups like Hearst and stations like WXII. Garrison and Dupagne (2006) studied media content across platforms, converging under one roof at three co-owned media properties in Tampa: Media General’s *Tampa Tribune*, television station WFLA, and Website Tampa Bay Online. The authors concluded that respondents--news directors, editors, producers, reporters, and technical personnel, viewed convergence primarily as an additional newsgathering tool and one that promotes multimedia storytelling. While respondents saw a need for adaptability across platforms, they also stressed such fundamentals as writing, reporting, and communication skills (Garrison & Dupagne, 2006).

Studying a cable news operation’s attempt to merge separate Internet and cable television production in a single newsroom, Huang and Heider (2007) recommended strong efforts at

integrating the staffs, suggesting incentives and time allowances for reporters to file for the Web. It also suggested that since, at the time, most news sites were offshoots of older media, that news media factor in the necessity of new journalism and business models into the cost of convergence.

Keshroy Spencer, in 2019, studied a large market television station's creation of a digital department to retain audience by generating content, largely online and through social media. "As the demand for content continues to rise," he concluded, "so too will the level of competition television stations will face for viewers' attention" (Spencer, 2019, 51). While there is no clear path to creating content for all viewers, he noted, stations like ABC-owned WPVI in Philadelphia, which he studied (and where he works) "try to stay ahead of the content viewing curve by curating content not just from traditional content producers, but also from viewers within the community. Television stations also diversify their content distribution by simply monitoring the most relevant and viewed content viewers spend the majority of their time consuming, all of which helps keep viewers engaged" (Spencer, 2019, p. 51).

With new platforms, television stations perceive a challenge not only to repurpose or create content, but an opportunity to extend their brands. Jung and Walden (2015) offered a contemporary examination of broadcast companies' use of the World Wide Web, concluding that Websites should be used strategically as conduits for sustaining and expanding brand identity. Their study surveyed college students about their consumption of broadcast television and their use of broadcast company Websites, and found students' "perceived ease of use and perceived enjoyment significantly influence intent to use broadcast Web sites" and that customer-based brand equity "plays a significant role as a mediator between motivations and behavioral intention to use broadcast networks' Web sites (Jung & Walden, 2015, p. 94)." They conclude that

broadcasters should be used strategically for “sustained brand allegiance” (Jung & Walden, 2015, p. 94)).

Early joint efforts brought mixed, temporary results. TV stations sought newspapers’ depth of reporting and credibility, while newspapers sought the opportunity for greater staff visibility through video content and delivery, and a younger audience. Dailey, Demo, and Spillman (2005) cautioned that convergences in media technology as well as partnerships formed with competitive media would challenge distinct, competitive cultures (Dailey, Demo, & Spillman, 2005). A subsequent article found the relationships unlikely to continue or grow (Dailey, Demo, & Spillman, 2009).

Collins and Brown conducted a national survey of newspaper and TV station news managers, similarly concluding, in 2012, that after some early efforts, both had moved away from cooperative agreements and each was generating its own content without cross-media partners (WXII has had sporadic involvement with local newspaper partnerships, focused on local entertainment and recreation. In an interview, former local journalist Jeri Rowe, concluded that there was early enthusiasm, but neither the station nor local newspapers had demonstrated a strong, continuing commitment to joint efforts.). WXII’s online presence and approach to content are discussed in Chapter 5.

In summary, although there have been a few studies addressing technological and related changes in local television, there have been no comprehensive studies of a single commercial station migrating from analog to digital technology, as in the present research.

History of innovation

Television has long referred to both a form of audio and visual content, as well as the box that communicated that content. Today, the content is available on numerous platforms, and the

technology is profoundly different from Alexander Bain's 1843 transmission of alphabetical letters, Thomas Edison's "telephonoscope," Paul Nipkow's Electrisches teleskop (Abramson, 1987), or from the transmission to a 2-inch receiver of the image of a 13-inch papier-mâché Felix the Cat spinning around a turntable in New York City (Leslie, 2013).

"The history of television is instructive," wrote Morton, for the Institute of Electrical and Electronics Engineers "because in many ways the development of TV was a precursor for later technologies such as semiconductors and computers. Like these other innovations, TV benefited from government-sponsored research, military applications, and the efforts of both established firms and entrepreneurial ventures" (Morton, 1999, p. 1301). Morton's history winds succinctly through television's adoption—the United States lagged behind England and France—to international battles over standards, to video recording, to color, to high-definition. "Its commercialization depended on the outcome of major international battles over technical standards, and its success required that it be made cheaper, simpler, and more efficient," Morton suggested, though, that some of those innovations threaten television (Morton, 1999, p.1301).

Paul Starr's *The Creation of the Media* (2004) offered a valuable political perspective on media from the 17th century through the early 21st century. An elaborate history of television innovation can be found in Parson's *Blue Skies*. Parsons' focus was on cable television--which began as community antenna television--as a means to extend the reach of broadcast television in its early commercial days. Its history of innovation and its distribution system are inextricably linked to broadcast television (Parsons, 2008).

Focusing more narrowly, Mark Tayer's 2015 book *Televisionaries* provides an insider's story of the technological development of digital TV technology. Tayer worked as an engineer at General Instruments' San Diego laboratories. Another inside look comes from Phillip Cianci's

HDTV and the Transition to Digital Broadcasting: Understanding New Television Technologies.

Cianci (2007) provides an overview of TV technology, and the Grand Alliance that brought it, from an engineering standpoint. The author had been a digital technology engineer at Phillips Research and at ESPN, which went through a lengthy process toward digital standardization prior to implementation at the network and station level.

Shapiro and Varian (1999) wrote about an earlier technology upheaval in television, involving not only major broadcasting and electronics companies, but also the government's role in the emergence of standards. Throughout the 1940s, CBS, the leading television network, was developing a mechanical color television system, and pushing for its adoption by the FCC, Shapiro and Varian wrote. RCA, the consumer electronics giant and owner of rival network NBC, was also working on a system. Although the CBS system was flawed in that it could not receive existing black and white broadcasts (backward compatibility) without a special attachment, the FCC selected it in 1950 over the less advanced NBC system. NBC's iconic leader David Sarnoff himself noted his model's failure to deliver true color during the FCC's face-off (Shapiro & Varian, 1999).

Nonetheless, the authors wrote, RCA and NBC continued product development, while CBS lacked the manufacturing capability to exploit its political victory. Moreover, RCA produced television sets that would be incompatible with the CBS system. In 1952, the FCC reversed its decision, and favored the NBC-RCA standard, which became the National Television Standards Committee standard, and would dominate for decades. But RCA did not profit from color television sales until 1960. Content availability had emerged as a challenge for NBC in its effort to exploit color television financially. Among its solutions was a partnership with a well-known content provider looking at the new medium for its own innovation. NBC's

“killer app of 1960,” said Shapiro and Varian (p. 13), was a program it obtained from the ABC network. The program had been previously known as *Disneyland* and as *Walt Disney Presents*. On NBC, it was rebranded *Walt Disney’s Wonderful World of Color*. RCA then began selling its color picture tubes to Zenith and other manufacturers. From this, Shapiro and Varian note that in innovation, being first is not necessarily determinative, that dominance on one generation of technology “does not necessarily translate into dominance in the next generation,” and that victories in standards conflicts often requires building an alliance (Shapiro & Varian, 1999, p. 13).

Standards play a foundational role in the development of technology and may go a long way toward guiding technology users in their purchases and execution. Streeter (1996), who suggested that the CBS color model might have been superior in some ways to NBC’s, discussed industry standards competition as “political struggles,” rewarding “some at the expense of others in distributing power among competitors (200-201).” Hearst engineer Faubell notes in Chapter 4, that as issues may remain unsettled, users make their own determinations and selections and, arguably, put their market influence behind particular approaches or favored vendors.

Diffusion of innovation

Everett Rogers, who synthesized more than 500 studies for his first book on diffusion in 1962, defined innovation as “an idea, practice or object that is perceived as new by an individual” (Rogers, 2003, p. 12). In his diffusion of innovation theory, Rogers explained innovation does not gain acceptance all at once; innovation is embraced in stages. He wrote of five adopter categories, covering innovators, early adopters, early majority, late majority, and laggards.

This case study is essentially about an organization's innovation process; it "identifies the main sequence of decisions, actions, and events in this process. Data about the innovation process are obtained from the recallable perceptions of key actors" and related sources (Rogers, 2003, p. 417). Numerous factors, observed and anticipated by Rogers, emerge in this study. This study addresses Rogers' initiation process in Chapters 4 and 5. An agenda was set, not only by the promise of digital technology's superior performance and efficiency in terms of end product (content), but also the need to apply those efficiencies and performance in a larger company with many more internal and external network nodes, among stations, management, staff, and ultimately audience.

Remarking on diffusion, Castells wrote that "microelectronics-based information and communication technologies have been shown to facilitate the digital networks that support the diffusion of the new social structure" (Castells, 2010, p. 2738). While television ratings services like Nielsen Media Research have long assigned geographic boundaries in designating its broadcast markets—to general acceptance, accompanied by local channels on multichannel receivers within those markets—the growth in online content diminishes the authority of those markets, both extending the content's reach but arguably diminishing its commercial value for local advertisers. The emerging "network society is a global society because networks have no boundaries," Castells concludes (2010, p. 2737). "Spatial transformation is a fundamental dimension of this new social structure. The global process of urbanisation that we are experiencing in the early 21st century is characterised by the formation of a new spatial architecture in our planet, made up of global networks connecting major metropolitan regions and their areas of influence (2737)."

Castells noted that networks may be cooperative--as with the networks among Hearst corporate executives and station managers and staff--or they may be competitive--as with vendors seeking a top price and customers seeking the best deal. Or they may be informal, like the networks Hearst chief engineer Martin Faubell describes among station groups in which information is exchanged. While all these networks possess elements of cooperation; Castells notes that “[c]ompetition depends on the ability to outperform other networks by superior efficiency in performance or in cooperation capacity.” Networks are formed around sets of goals and evolve according to their ability to “self-configure in an endless search for more efficient networking arrangements” (Castells, 2009, p. 21).

Hearst managers and staff also recalled implementing innovation, as outlined by Rogers: matching innovation to function/problem (Chapters 4 and 5), and restructuring—as is evident in the adjustments to newsroom workflow and station news promotion (Chapter 5). WXII’s clarifying and routinizing new digital workflows (Chapter 5) became a benchmark for the Hearst station group (Rogers, 2003).

Christenson, Raynor, and McDonald (2015) cite the clearer television picture as an example of sustaining innovation, rather than a disruptive one. The term would appear to apply also to the newsroom, station, and studio technology that produces the content displayed on a television set with a clearer picture.

Bhattacharya, Chawla, and Ravichandran (2015) see a gap in the literature on diffusion of innovation. “Management ‘gurus’ stress the need for organisations to be innovative in order to survive,” they wrote. Innovation, they contend, is a set of processes at the micro-level, “stimulated, facilitated and enhanced by a set of macro-structural conditions.” ((Bhattacharya, Chawla, & Ravichandran, 2015, p. 33).

“However, rarely do the people who talk about the need for innovation say exactly what they mean by it; and, more importantly, they do not explain in detail what an organisation must do in order to be innovative. They do not tell their audience what processes are involved in innovation; nor do they outline the factors that need to be taken into consideration”

(Bhattacharya, Chawla, & Ravichandran, 2015, p. 33). Bhattacharya, Chawla, and Ravichandran discuss demographic factors in innovation. However, the present study identifies different variables relating to organizational values—established and changing—and relationships—with vendors, with managers, with staff, and with audience.

History, government, time, and space

Notions of concentrated media power and oligopoly and the impact of government and law on communication hardly began in the 21st or even the 20th century. Blondheim (1994), Carey (1992), and Starr (2004) observed that as early as the telegraph, the federal government for the first time—but not the last—played an active role in the development of a new communication technology. Congress had given seed money (or venture capital) to fund the initial Washington-Baltimore telegraph line, and continued to appropriate money when private investors would not. Congress later subsidized land grants, rights-of-way, and other incentives for developing a trans-continental telegraph line running along railways (Starr, 2004), although Congress later expressed concern about the monopoly powers of telegraph operator Western Union and news agency Associated Press (Blondheim, 1994; Starr, 2004).

Communication across space and time were forever reconfigured by the telegraph, communication scholar James Carey concluded, along with social and economic experiences. Physical movement was no longer necessary for the delivery of messages. Transportation and communication were no longer inseparable (Carey, 1992). The telegraph, said historian Menahem

Blondheim was key to changing from an age of transportation to an age of electronic communication and an emphasis on information (Blondheim, 1994).

Streeter (1996) and Dempsey and Gruver (2009) discussed the role of U.S. Commerce Secretary (later president) Herbert Hoover in giving electronic media a relatively free hand early. Commercial broadcasting took off following the launch of KDKA in Pittsburgh in 1920. Sec. Hoover had actually expressed opposition to broadcast advertising and commercialism, which would steer radio toward a profit-centered medium for advertising and entertainment. Hoover advocated instead that broadcasting should serve the public interest. But, Dempsey and Gruver note, Hoover's belief that an associative state in which businesses cooperate with each other would create "desired outcomes for society" actually led to a "passive drift toward acceptance of a commercial system" (Dempsey & Gruver, 2009, p. 226).

"The life and thought of Hoover," Streeter said, "nicely illustrates the character of the social reorganization that occurred at the beginning of this century." Hoover, Streeter noted, introduced the phrase "public interest" to broadcast regulation. However, Streeter said, Hoover's vision of the public interest was subordinate to free enterprise. Hoover believed, Streeter wrote, that the public interest was served by a system promoting "continued development and growth on a capitalist basis" (Streeter, 1996, p. 43).

Brinkley produced a compelling tale of the lengthy process surrounding high-definition television, and the roles of business and government (1997). "The 2009 switch from analog to digital television broadcasting," wrote Grant, Brown and Nachlinger, "is one of the most dramatic recent examples of the reach and impact of digital technologies on consumers in the United States" (2010, p. 188). Less noted, they said, "but no less significant from a technological perspective, is the conversion of much of the equipment used to produce, store,

and edit television programs. For viewers, these changes are relatively transparent, but for researchers, they offer an excellent opportunity to study the process of technological adoption in the communication industries” (Grant, Brown & Nachlinger, 2010, p. 189).

Cultural scholar Raymond Williams anticipated the regulatory, business and economic, and political influences contributing to the environment in which Hearst and other TV station groups advanced digital technology. Rejecting technology as a single, determining force, he wrote that determination is best viewed “as a process in which real determining factors—the distribution of power or of capital, social and physical inheritance relations of scale and of size between groups—set limits and exert pressures, but neither wholly control nor wholly predict the outcome of complex activity within or at these limits, and under or against these pressures” (Williams, 1974, p. 133).”

Williams noted that television had been developed with “specific military, administrative and commercial intentions” which interacted, “in real, if limited ways, scientific intentions.” As a technology, he wrote, it was dominated by commercial intentions, but maintained “some real political and military interests” (Williams, 1974, pp. 133-134).

Williams was similarly prescient on the promise and delivery of satellite communication. Observing the “blue sky” rhetoric advancing the technology, he wrote that “[a] worldwide television service with genuinely open skies would be an enormous gain to the peoples of the world ...[a]gainst the rhetoric of open skies which, in fact, would be monopolised by a few large corporations and authoritarian governments. ... Most of the inhabitants of the ‘global village’ would be saying nothing ...while a few powerful corporations and governments...would speak in ways never before known to most of the peoples of the world” (Williams, 1974, p. 149).

Also discussing globalization, along with the widespread commercialization of mass media, Castells concluded that the “formation of these global multimedia business networks was made possible by public policies and institutional changes characterized by liberalization, and regulated deregulation, nationally and internationally in the wake of the pro-market policies that have become pervasive throughout the world since the 1980s” (Castells, 2009, p. 56).

The press, the church, knowledge and empire

Using theories rooted in the study of paper, pulp and the newspaper industry, Canadian scholar Harold Innis wrote in *Empire and Communication* that “The United States, with systems of mechanized communication and organized force, has sponsored a new type of imperialism imposed on common law in which sovereignty is preserved de jure and used to expand imperialism de facto” (Innis, 1950, p. 195). Journalism and communication scholar James Carey credited Innis with launched the modern studies that now exist under the banner of media imperialism. Carey credited Innis with approaching communication scholarship broadly, in a “genuinely interdisciplinary way. He was simultaneously geographer, historian, economics, and political scientist and he located communications study at the point where these fields intersected (Carey, 1992, pp. 114-115)”. Castells similarly credits Innis’ “pioneering work”, showing “the close interaction between the technological transformation of society and the evolution of its spatial forms. We know that technology is not the determinant factor of this evolution (Castells, 2009, p. 2738).”

Power is communicated. Messages were used by “priests and scribes” to justify established authority, Innis wrote. “Sword and pen worked together...to establish authority, he wrote (Innis, 1952, p. 30). Monopolies of knowledge, Innis said in *Empire and Communications*, “developed and declined partly in relation to the medium of communication on which they were

built and tended to alternate as they emphasized religion, decentralization, and time, and force, centralization, and space” (Innis, 1952, p. 192).

In an iconic work of fictional literature, novelist and social critic Victor Hugo observed that entrenched powers initially feared the influence of Gutenberg’s printing press for its dilution on their monopoly of information. Writing in the 19th century through the eyes of a 15th century priest in *The Hunchback of Notre Dame*, Hugo writes of “the terror and dazzled amazement of the men of the sanctuary, in the presence of the luminous press of Gutenberg (Hugo, 1831, book 5, chapter 2).” It signified, said Hugo’s Frollo, “that one great power was about to supplant another great power.” It means, Frollo believed, “The printing press will kill the church” (Hugo, 1831, Book 5, chapter 2).

Through Gutenberg’s movable type, Canadian media scholar Marshall McLuhan wrote in *The Gutenberg Galaxy: The Making of Typographic Man* that “Europe entered the technological phase of progress, when change itself becomes the archetypal norm of social life (McLuhan, 1962, p. 155). The advent of print technology, McLuhan believed, facilitated and promoted many of the salient developments that influenced the modern Western world: individualism, Protestantism, capitalism, and nationalism (McLuhan, 1962). Like Williams, Elizabeth Eisenstein’s massive 1979 *The Printing Press as an Agent of Change*, criticized McLuhan’s conclusions, finding them overstated, even misleading, although she acknowledges the transforming powers of print in Europe. Eisenstein considered the importance of institutional context with any technological innovation (Eisenstein, 1978).

Journalism and sociology scholar Michael Schudson was also skeptical of McLuhan’s well-known technological determinism, and at least about the immediacy of the impact of Gutenberg’s press. “There is reason to be suspicious of the notion of technological revolutions,”

said Schudson (2010, p. 102). If the printing press brought democracy, he noted, “it took its good natured [sic] time! There was no such thing as a democracy anywhere in the world for three centuries after Gutenberg” (Schudson, 2010, p. 102). Printing, he wrote, did not produce a scientific revolution by itself.

Slack and Wise wrote that technology does not, by itself, determine effects. “People create and use technologies,” they said. “Effects are not imposed on us by the technologies themselves” (Slack & Wise, 2015, p. 53). As this case study demonstrates, government, corporations, networks, leadership, and audience are variables, which suggests that the story of digital technology adoption at Hearst and WXII might make a better case for cultural determinism--which, Slack and Wise say, occurs when technology is determined by the result of the “values, feelings, beliefs, and practice, of the culture” (Slack & Wise, 2015, p. 7). But beyond the obvious desire among technology users for speed, efficiency and precision, not all users share the same sentiments. Even nonlinear, digital editing—with its far greater efficiencies than the linear-analog process it has replaced—adds the time delay and computer-processing demands of rendering (when video or audio information is processed from a coded source to form sound or images). Slack and Wise advise that a choice between cultural and technological determinism is unnecessary (Slack & Wise, 2015).

In *The Creation of the Media: Political Origins of Modern Communications*, political scientist Paul Starr offers this perspective: “As a new technology emerges, so do new choices about the purposes and organization that will guide its development—whether, for example, they will primarily be military or civilian, governmental or private, or non-profit or commercial. Architectural choices are often politics by other means, under the cover of technical necessity” (Starr, 2004, p. 6).

Starr wrote that the European experience did not necessarily speak for the United States. Compared with European nations, where governments retained greater control, Starr wrote, communication in America tended to exhibit, among other qualities, greater commercialization and decentralization, faster extension, and widespread penetration of communication networks. While Starr is less cynical than some other communication scholars in discussing the central part government has played in developing and regulating mass media in this country, he also acknowledges political as well as commercial interests, citing congressional decisions to allow books and newspapers to be distributed, untaxed, through the mail at low rates, in efforts to promote the spread of information across an expanding, uniquely continental republic (Starr, 2004).

The literature has explored the interplay of media, technology, government, culture, time and space, typically from a distance. Relevant literature includes surveys, histories, criticism, and commentaries, usually aimed at government and corporate policy or gleaning directions of government and corporate policy from broad looks at product development and purchases, from sales figures and surveys. Absent from the literature is a case study of a single commercial U.S. broadcast television station in relation to a newly expanded station group in a deregulated environment, and the processes and effects relating to its migration from analog to digital technology.

The review of the literature leads to the following questions for the study:

RQ1: How did the Hearst television station group approach an atypical level of innovation, requiring significant financial demands, but also demands on leadership and communication, in bringing innovation to a local television station?

RQ2: How did profound changes in the business and regulatory environment affect the Hearst group, and how did that affect the adoption of new technology within the group and at a particular local television station?

RQ3: How did changes in technology affect operations at a local television station?

CHAPTER 3

Methodology

History's elite bias

“Who built the seven gates of Thebes?” asked Bertolt Brecht (1936). “The books are filled with names of kings. Was it kings who hauled the craggy blocks of stone (Brecht, 1936)?”

In “A Worker Reads History,” poet Brecht cited numerous examples of buildings and monuments and conquests, and noted that while the names of Caesar, Alexander, and Frederick the Great reverberate through time, the masons and the soldiers—those who lived and those who died-- and even the cooks are forgotten.

Decades later, Chicago steelworker Mike LeFevre told oral historian and radio personality Studs Terkel, “Somebody built the pyramids. Somebody's going to build something. Pyramids, Empire State Building--these things just don't happen (Terkel, 1).”

Brecht might have agreed. “So many particulars,” he noted. “So many questions.” Some dates and places regarding innovation, government deadlines, and broadcasting switchovers of TV’s digital conversion have been recorded as history. But history has its limits. Company presidents and chief executive officers are typically the people quoted and remembered. TV station and even station group engineers--while quoted, even profiled in the trade and local press--are seldom quoted by historians, social scientists, or in the *Wall Street Journal*.

Social scientists Mukerji and Schudson cite “an elitism among traditional historians connected, in part to their reliance on written record to uncover the past but, more important, tied to a vision of history as a chronicle of “major sociopolitical and cultural changes” (Mukerji and Schudson, 1991, p. 7). British historian E.P. Thompson called it the “enormous condescension of posterity” (Thompson, 1963, p. 12.)

Scholars have debated the definition and parameters of the historical method since at least 400 B.C.E., when Thucydides broke from the Homer's and Heroditus' epic tradition, toward an approach he believed would be more precise and timeless (although in fairness, the works of Heroditus, and especially Homer, survive as well). Syracuse University history professor R.J. Shafer offered a workable approach and a useful definition that easily incorporates the case study: "Historical scholarship rests on a laborious, systematic process of investigation and interpretation aimed at securing the most accurate account possible of any event or series of events. This difficult process constitutes the historical method" (Shafer, 1969, p. 4).

This inquiry discusses WXII's adoption of digital technology using the many tools of case study, largely through interviews, but also including evidence which overlaps with historical method, such as document analysis. The following describes the methodology.

A call for cases

A case study of a television station's transition to digital technology offers an opportunity to examine dynamic change in a dominant medium both at the ground level and over the air. The uniqueness in the story of any individual station—its market, its position within the market, its ownership and management schemes, its relationship to broadcast networks, its individual challenges and the choices made in addressing those challenges--becomes, in effect, the case study.

Even in an industry profoundly affected by consolidation, staff reductions, competition from new digital platforms, and especially by audience size, television likely remains too glamorous and prestigious an enterprise for its experiences with modernization to be categorized within what Thompson and other historians would call called "history from below" as an alternative to so-called "great man" theories. The television station remains among the most

important point-to-point distribution systems for media content and for advertising, and continues to draw millions of viewers and billions of dollars.

Television generally, and local television specifically, maintain a cultural relevance and influence built over more than three-quarters of a century. Just as broadcasting shifted seismically from storytelling, comedy, and music through words and sound over the airwaves to primitively captured images that moved in small boxes, television's move from analog to digital has been similarly earth-shaking.

This case study will incorporate tools of historical investigation-- primary and secondary documents, and cultural and physical artifacts to provide background and setting. The study intends to explore the technological, organizational, and cultural challenge of transition, largely using observations and insights offered through in-depth interviews. While not intended to be representative of all TV stations, the study of WXII and the Hearst group nonetheless provides a microcosm of the challenges faced by similar entities to digital technology and adjusting to the new environment the technology created.

While largely absent from academic literature, researchers can glean information regarding the various transitions from analog to digital technology among television stations from vendor marketing and from trade publications, and from comment and continuity from key personnel at the station and group under study. They address not only the replacement of old technology, but also the design, selection, purchasing, installation, implementation, function, and impact of new technology and new processes. They address regulation and growth, long- and short-term planning, central and local leadership, and internal, external and intra-company communication networks that crossed the nation.

The case study

Industry and general terms that formerly carried clear meanings and raised clear inferences—television station, programming, audience--appear vague and imprecise in 2019. The very digital technology intended to improve television's competitive position risked diverting some of the benefits of the industry's transition from television to seemingly infinite and often competing formats. And, much like Gutenberg's movable type, digital technology immeasurably expands the audience for that content, across countries, continents, and—more recently—new media platforms.

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This project identifies and examines, through case study, the ways in which the switch from analog to digital technology redefined a local television station. The purpose of the study is to provide a window into a local station's efforts to maintain and advance its position as a source of entertainment and information content and as a vehicle for advertising. It will explore not only the intended improvements for its traditional television broadcasts, but also its adaptation to unforeseen technological and environmental changes, its ability to repurpose existing

programming and content across new platforms, and its generation of additional content to fit those new platforms.

“Case study research,” Yin said, “is an empirical inquiry that investigates a contemporary phenomenon (the case) in depth and within its real-world context, especially when the boundaries between phenomenon and context may not be clearly evident” (Yin, 2014, p. 16). Yin recommended the case study method for inquiries in which the researcher has “little or no control over behavioral events,” and when focusing on contemporary events (Yin, 2014, p. 14). Both apply to a case study of a TV’s station’s relatively recent and largely undocumented adoption of digital technology to generate content for old and new platforms.

Emerging digital platforms offering competitive content forced station and group management to confront a largely unanticipated digital revolution. Laptop computers, tablets, and smart phones threatened to diminish the connection between product and brand and its audience built over decades. Ultimately, though, those threatening technologies provided opportunities to extend both product and brand. The study will chronicle these challenges and the way they were addressed, in the words of those who addressed them. The study is intended to go beyond historical record.

The case study research method has proven effective in inquiries into television and technology (Huang & Heider, 2007; Dupagne & Garrison, 2006). Although this will be a single case study of a commercial broadcast station, it will also refer to benchmarks beyond WXII to TV executives and others’ observations regarding an upheaval in the television industry--acknowledging the cautionary tale of the newspaper industry regarding its challenges in shedding legacy costs and fully embracing digital technology (Abernathy & Foster, 2010).

Research methods are employed to explore, to describe and to explain, individually or in some combination. This case study will attempt all three. Yin said the case study research method arises out of the desire to understand complex phenomena, by focusing on an individual case, retaining a “holistic and real-world perspective (Yin, 2014, p. 9).”

Given that the main product of most local television—particularly in the case of study subject WXII—is news, a news analogy seems appropriate. Using journalism’s “5Ws (also traced to classic rhetoric (Franzosi, 2010, p. 49) a case study attempts to answer the “who,” the “what,” the “when, the “where” and especially the “why” (Yin, 2014, p. 9).

Yin distinguishes three types of case studies: the intrinsic, the instrumental, and the collective. An instrumental case study is used to offer insight into phenomena; an intrinsic study attempts a deeper understanding of the particular case, and a collective case study looks at a number of cases illustrating a particular phenomenon. This study is intended primarily as an intrinsic exploration of an individual TV station and its relation to a larger station group. But although it cannot, as said earlier, represent a universal experience, it nonetheless hopes to be instrumental toward a better understanding of the phenomenon faced by local television in the 21st century (Yin, 2014).

Sources: interviews and questions

Yin rejects the notion of many social scientists, that research methods can be categorized hierarchically, and that case studies may be used preliminarily, but not to explore causality. Case study research, Yin said, goes beyond exploratory, toward the explanatory (Yin, 2013, p. 18).

Yin cited six sources of evidence: documentation, archival records, interviews, direct observation, participant observation, and physical artifacts (Yin, 2014, p. 106). The design of this project incorporates all of them; indeed, incorporation of various forms of inquiry is among the

benefits of the case study. Although a case study is not ethnography or primarily observational research, it frequently document observations, perspectives, and anecdotes from uniquely positioned participants.

Rogers noted that “The innovation process in organizations identifies the main sequence of decisions, actions, and events in this process.” Data about the process can be obtained from “the recallable perceptions of key actors in the innovation process” (Rogers, 1995. p. 390).

Documents and archival records—particularly contemporaneous reports from business journalists--are included in this study as available to corroborate information from interviews. Archived video is available to chart the progress of the digital transition; the station produced a special video of its digital efforts as an example for other stations, presented to an industry-wide TV news association in 2007. Historical research offers the perspective of documented external timelines and mandates. Interviews, however, with key station and group personnel and corroborated with documentation whenever possible, will provide the bulk of the data for analysis.

Triangulation and reliability

The interview is one of the most important sources of case study evidence and is the primary source of information here (Yin, 2014, p. 110). The questions in this study targeted the chronology for the digital conversion, choices made, the organizational structure and reasoning behind those choices, the results of choices made, and their implications for the immediate future and beyond. Yin advises “guided conversations over “structured queries.” Interviews followed a consistent line of inquiry, but the “actual stream of questions in a case study interview is likely to be fluid rather than rigid.” Questions were open-ended, non-threatening, and probative (Yin, 2014, 110).

Yin discusses five categories of questions (Yin, 2014, p. 90). Two levels--questions asked of specific interviewees and questions asked for the individual case--are especially useful for this study. Answers to questions asked of individual interviewees discussed their specific roles in the station's conversion to digital transmission and production at WXII.

Answers to introductory questions identified the interviewee's responsibilities and role in digital conversion. From there, questions asked of specific interviewees, requested for the individual case, were especially useful for this study. The questions in this study targeted the sequence for the digital conversion, choices made, and reasoning behind those choices, the results of choices made, and their implications for the immediate future and beyond (Yin, 2014, p. 90).

From the interviews and corroborating documents and news articles, the study constructed a narrative charting the challenges and choices at Hearst and WXII. The interviews were conducted by phone and recorded digitally. When necessary, subjects were contacted following the interviews for further input, context, clarity or elaboration. These served as member checks. Data were triangulated for reliability using archived documents, including and newspaper accounts, and especially through other interviewee recollections and observations. All interview subjects provided introductory information identifying their backgrounds and their responsibilities and role in digital conversion at WXII.

Construct validity, as offered by Yin, matches the research goals with the appropriate approach. The case study's recommended focus on the "how" and the "why" provides a reliable method to examine not only the timelines and technology, but also the choices and strategies used in converting WXII to digital transmission and content, through the recollections and observations of those tasked with the job (Yin, 2014, p. 120).

For internal validity, questions probed the causal relationships among the challenges and opportunities brought by emerging technologies and competing content platforms. As said elsewhere, however, the study is at least as interested in the process of conversion as it is in its results.

Selection and value of WXII and Hearst for case study

Television station and station group staff and management had to address their own conditions, budgets, cultures, and challenges on their ways to digital conversion. WXII is hardly the only TV station with a digital story to tell, but the station and the group offer a compelling subject for a case study. The station resides in a top 50 market, as ranked by Nielsen Media Research (Nielsen, 2019). Its owner, Hearst Television, was not and is neither the largest nor the smallest station group. WXII was, however, early enough in adopting technology to offer an instructive experience for study, and conversations with station and group sources offer insights into the planning and execution of major technological change.

Abernathy & Foster (2010) noted that the newspaper industry had clung to old business models and failed to address new operational, organizational, and business challenges, including technology that had lowered barriers to media entry and the losses in revenue from lowered circulation and new competition for classified and other advertising. Solutions would require more than minor adjustments, they said, and recommended shedding legacy costs quickly, re-creating its community online, and exploring new sources and new approaches to marketing and advertising revenue.

As noted, WXII has had the unusual distinction of being owned by the corporate successors of both historic Yellow Journalism rivals Pulitzer and Hearst. In fact, Michael

Pulitzer, a direct descendant of Joseph Pulitzer, worked at WXII both prior to and during the early period of Hearst ownership.

Like the broadcast networks, Hearst is part of a massive and diversified media company with holdings in everything from TV content production to publishing. Unlike the networks, stations and the station group operate with relative independence—although much of the management for digital migration was centralized--and unusual stability for the industry. Among journalists covering the television industry, Hearst management was considered more accessible than most, particularly at the station level and among its news vice presidents, all previously station executives.

As will be discussed, the station was a relatively early adopter of digital technology and its experience has informed other stations in the large Hearst station group. WXII was asked to demonstrate its conversion success in a digital newsroom video tour, produced for the Hearst group meeting at the National Association of Broadcasters/Radio and Television News Directors Association convention in Las Vegas 2007. Hearst group management recognized the station as an exemplar, for its members to follow for their own digital newsroom efforts.

Management at Hearst is unusually stable for television stations, and most of the interview subjects in this case study offer insights from long relationships with the company and the station. As noted in an interview with longtime industry observer Harry Jessell (see below), Hearst is rooted in the news industry, and its stations are regarded among the more serious news providers in local television.

Research suggests local management at the non-network-owned stations are likely to be more independent when dealing with the local environment, and more likely to have risen

through the station group (Phillips & Sorensen, 2003). As discussed below, the Hearst management contributing to this report can claim unusual stability.

“Our analyses of data on thirty-five years of mobility by commercial television station managers strongly support our central thesis,” Phillips and Sorenson wrote. “Independent television stations are almost twice as likely as network affiliates to fill vacancies through internal promotions, which we argue is a consequence of the fact that they are more sensitive to environmental change and as a result have less bargaining power in the labor market. Our analyses also pointed to one reason that robust firms have more bargaining power: They are more likely to attract better (e.g., more experienced) employees. We conclude that robust firms are better able to hire talented employees and then allow the discipline of the market to link each employee's effort and attainment” (Phillips & Sorensen, 2003, p. 836).

While TV news is the subject of much criticism, within that world Hearst stations enjoy an enviable reputation, particularly regarding local television’s main product, news. The group has earned numerous honors, including not only Emmy awards and RTDNA local and national Murrow awards, but several Peabody awards for political coverage from the University of Georgia’s Grady College of Journalism and several Walter Cronkite Awards from the University of Southern California’s Annenberg School for Communication. It has also received the DuPont-Columbia Journalism Award and the National Association of Broadcasters' Service to America Award. Hearst’s first corporate news overseer, Fred Young, won the RTDNA’s First Amendment Service Award in 2002, and the association’s highest honor, the Paul White Award for lifetime contributions to TV journalism in 2009. Hearst’s current senior vice president for news, Barbara Maushard, was awarded RTDNA’s First Amendment Leadership Award at a banquet in Washington in March, 2020.

Harry Jessell, who has covered the business of television for decades as the longtime editor at *Broadcasting & Cable* magazine and is the founder and publisher at the website *TVNewscheck*, rates Hearst high among television station groups. In an interview, Jessell noted Hearst stations' and news managers' long list of honors and praised it for its "impressive" commitment to local, state and federal election coverage. Hearst, he said, was among the last and probably the best of the newspaper companies that brought its commitment to local news to broadcasting although, he added, the company's reputation for television news likely surpasses its newspapers' reputation.

Its television group, he said, "took the responsibility seriously, to serve the local community, to serve the public interest. And they came out of good journalistic traditions."

In an interview, Tom Rosenstiel, a longtime media critic for the *Los Angeles Times*, later head of the Pew Research Center's Project for Excellence in Journalism, agreed that Hearst was "definitely among the groups that had a stronger reputation for local journalism." Rosenstiel's 16 years of analyzing local news for the Project for Excellence led him to suspect that groups like Hearst may have been influenced by their presence in markets like Boston, "where the demographics of the market influenced the quality of local stations." Hearst's flagship station has been Boston's WCVB since 1986. Candy Altman, who was news director there and later elevated to groupwide news vice president, is now retired from Hearst, and works internationally as a consultant.

The value of WXII's story is not limited to the ending. Significant value arises in the key case study questions: the "how" and "why" WXII got from "there" to "here." The "there" is indeed history; the use and impact of established analog technology offered a benchmark for

practice and performance. The “here” is dynamic and changing, even presently. But the details of the changes, the challenges and choices prove compelling.

Patelya discusses the value of atypical cases. “In clarifying lines of history and causation it is more useful to select subjects that offer an interesting, unusual or particularly revealing set of circumstances. A case selection that is based on representativeness will seldom be able to produce these kinds of insights” (Pateliya, 2013, p. 117). This case study meets Pateliya’s criteria. The experience explored is distinctive. WXII and Hearst were not the first TV station and group to adopt digital technology for transmission or for workflow, and they were not the last. Hearst is a large group; it is not the largest. WXII operates in a market that is neither the largest nor the smallest. But the station and the group both experienced profound restructuring from a combination of technological, business, management, and government forces.

Deregulation and Hearst

Hearst Television is part of the iconic Hearst Corp., a massive multimedia company with a media history dating back to 1880 and broadcasting interests going back nearly a century. Hearst made major gains in television stations following deregulation by the 1996 Telecommunications Act, which, like earlier changes in law, raised the cap on TV station ownership and increased the concentration of TV stations into fewer, larger groups. Some groups’ digital advancement may have been slowed by the enormous debt and financial commitments following expensive shopping sprees by numerous station groups. But the debt-averse Hearst Television, Hank Price noted, was poised to embrace, albeit carefully—the new opportunities as well as the costs of digital platforms for its many new, post-deregulation TV stations.

Hearst already owned TV stations in large markets Pittsburgh and Baltimore prior to deregulation. Hearst has not been the most aggressive television company regarding station acquisition, but the company has made significant purchases over more than three decades. In 1986 Hearst purchased WCVB in the top 10 market, Boston, and the station has become its flagship. Shortly after the 1996 Telecom act Hearst stations doubled its station number to 12 to form the Hearst-Argyle group. And in a deal completed in 1999, it added nine stations from Pulitzer publishing, including WXII in Winston-Salem (Fairclough, 1998).

Interviewee Selection

This study applied the logic of purposive sampling in interview selection. Robinson explained that purposive strategies may be useful when certain individuals possess particular, even necessary, perspectives on the phenomena being studied (Robinson, 2014).

The interview protocols were approved by North Carolina State University's Institutional Review Board (IRB). The participant recruitment strategy started by developing a list of current and past Hearst and WXII executives and staff. The author was acquainted with 11 of the interviewees from his work as a journalist and university instructor. They were contacted by telephone or email, using the IRB-approved interview solicitation, and all agreed to participate. They included Hank Price, Michelle Butt, Candy Altman, Brian Bracco, Fred Young, Steve Hammel, Barry Klaus, Lisa Fulk, Kevin Kline, Harry Jessell, and Tom Rosenstiel. The first phase of interviews was supplemented by snowball sampling, in which known interviewees recommended others whose expertise would be valuable. Those recommendations included Hearst engineers Martin Faubell and John Norvell, former promotions director Mark Strand, former print reporter Jeri Rowe, and Capitol Broadcasting digital leader John Conway. Former WXII sports reporter Dave Goren and author Philip Cianci were also recommended by industry

contacts. Again, no potential respondents in the second phase declined to participate. All 18 interviewees agreed to phone interviews, and to be identified.

Martin Faubell, Hearst's head of engineering, and John Norvell, WXII's chief engineer, provided invaluable information. Hank Price, who was in charge of WXII from 2000 until 2014, when he left to head a newly Hearst-acquired station in Birmingham, Ala., was another key source.

Hearst TV (formerly Hearst-Argyle) took the unusual step of concentrating some management responsibility by bringing it increasingly in-house. In 2000, Hearst was among the first large station groups to eschew the industry-wide practice of using outside news consultants (Trigoboff, 2000). Outside news consultant typically bring experience as news executives (Hank Price had previously been one of those consultants, with the prominent firm Frank N. Magid Associates). But consultants sometimes clash with the station's news managers and even anchors. Natalie Jacobson, perhaps the most prominent anchor in Hearst's largest market, Boston, famously criticized the role of consultants. "Who appointed these consultants God?" she asked (Lehr, 1999, para 20).

In place of outside consultants, Hearst further concentrated its news management when it elevated two of its larger market news directors, Brian Bracco from KMBC in Kansas City and Candy Altman from flagship station WVCB, to work with longtime group news Vice President Fred Young as in-house consultants to Hearst stations. Young had also been a station general manager. The decision to go in-house with news consulting is an indication and perhaps a contributing factor in the relative management stability at Hearst stations—in an industry not known for management stability. Their status as company executives and not outside consultants avoided conflicts regarding client relationships. Their longevity as Hearst executives factored

positively in their value as interview subjects. TV stations in general are notorious for turnover, particularly at the general manager and news director positions.

All three were interviewed for this study, and all three were able to provide perspective beyond a single station, and into group networking and strategies. None perceived any disloyalty in discussing the transition at issue, and none refused to answer questions. They were known to the author (in addition to Price) from his time in journalism, as were many television executives in many groups, and were known to be credible and candid. Each was directly involved in the digital transition at WXII at some point, aiding in the collection of relevant data for a case study. Along with Faubell, the group's chief engineer, the group news executives demonstrated just how inextricably linked the station's migration to digital technology was to group strategy.

The corporate news managers were asked to discuss planning, coordinating, communicating, purchasing, scheduling, and implementing changes related to digital technology and digital content at the group level, and with WXII specifically. Station executives, including Hank Price, Michelle Butt, Barry Klaus, and Lisa Fulk addressed developments from the station side. The study is also informed by relevant literature and interviews with experts in technology, finance, journalism, and local television.

The study also included interviews with a former newspaper editor, Jeri Rowe, who collaborated with WXII on mutual content; its longtime sports director Dave Goren, and Kevin Kline, a news producer in his first job after college. They offered their perspectives at the staff or contributor level.

Data are presented as a narrative, offering a timeline, with information attributed to each source. Two longtime executives with neighboring station WRAL and Capitol Broadcasting

were also interviewed. Capitol Broadcasting was an innovator in high-definition television, and its own internal conversion to digital operations provided an interesting benchmark.

Interview Transcription and Analysis

As a member check, all subjects interviewed for this study were offered the opportunity to review their input. When necessary, further input was sought for further context, clarity, and elaboration. Data are also triangulated for reliability using archived documents, including Hearst audience research and newspaper accounts when available, and especially through other interviewee recollections and observations. Most, if not all, the interview subjects are skilled communicators. Saturation was reached when participants, who had worked together for years on digital adoption, offered a common narrative. The study was designed to cover different perspectives of the digital migration: technological, business and management, and practical. Participants agreed not only on the facts, but they frequently referred to one another as sources for additional detail. No counter-narratives or inconsistencies needed reconciling. Documents, such as trade publication articles, filled memory gaps, particularly regarding dates.

Interviews were recorded and transcribed, resulting in more than 200 pages of double-spaced pages. Constant comparison analysis was employed to reduce the data. In the first stage, the initial review of the interview transcripts/recordings assigned information to the following categories:

Business strategies and execution, including observations, comments, and recollections regarding expenses, revenue, government deregulation, and industry consolidation;

Station operations, including planning, staffing, purchasing, training, and execution;

Technology changes and effects, including differences in workflow time and distance differences from digital conversion, both internal and external; and

Distribution: the history, planning, staffing, and execution for new platforms and ways of distributing content, including digital TV channels, Web pages, social media, and mobile apps.

Chapters 4, 5, and 6 will describe the narratives that emerged from the integration and elaboration phases of the transcription analysis. These concerned the activity at the group level, its relation to the station, and then the effects of the new technology on station functions and operations. Overlap was to be expected, as many interview answers and subjects addressed more than one category. Finally, in the last phase of constant comparison analysis, examples from the interviews were selected to highlight some of the dominant themes.

This case study is not intended to be generalizable, or externally valid. As noted by Pateliya, average or typical cases do not always provide the best source of information. However, the present case study is intended to illuminate the process of diffusion digital technologies into television broadcasting, showcasing the key factors involved.

CHAPTER 4

The Hub and the Networks

The adoption of digital technology at TV stations like Greensboro-Winston Salem's WXII brought predicted improvements in video and sound quality through new, streamlined digital production and transmission processes at the station, and through larger, lighter and less cumbersome, but—at least initially—more expensive receivers in the home.

WXII's odyssey navigates through unprecedented changes in the forms and functions and ownership and management changes in the topography of local television. Emerging digital technology—everything from switches to routers to audio equipment to studio cameras to field cameras to computers and software to cell phones—promised greater performance and efficiency than existing analog equipment. It would come at a cost. At the same time, the continued deregulation of television, particularly the lifting of limits for a single owner regarding the number of stations and market coverage, gave the newly enlarged groups greater economies of scale. Scale lowered the cost-per-station, but there were many more stations to consider requiring a far greater investment in equipping, installing, training, and implementing. Subsequently, emerging digital platforms offering competitive content forced station and group management to confront an unanticipated digital revolution in which laptop computers, tablets, and smart phones threatened to diminish the connection between audience and a product and brand built over decades (see chapter 5).

As a result, a large station group like Hearst's (then Hearst-Argyle, following a merger) centralized much of its engineering solutions and purchasing, while maintaining communications not only with the vendors it would consider patronizing, but also with the station engineers and staff who would use the new equipment.

As Hearst's chief engineer, Martin Faubell, noted, less expensive analog technology might be subject to individual station and even manager preferences, coming primarily from local budgets. But digital technology would be part of the overall overhaul in local television in the late 20th and early 21st centuries, and strategy and execution shifted greatly to the group level, particularly regarding research, purchasing, and installing.

Implementation in organizations, Rogers said, "typically involves a number of individuals, perhaps including both champions and opponents of the new idea, each of whom plays a role in the innovation-decision." Implementation of innovation in an organization, he said, "amounts to mutual adaptations in which both the innovation and the organization change in important ways" (Rogers, 2003, p. 403).

Thus, the purpose of this chapter is to highlight the role of centralized management, interpersonal communication, vendor networks, and other networks in diffusing the new technologies across Hearst stations, including WXII in Winston-Salem.

Composite signals, new ratios

"We live in an analog world," said Mark Tayer. A longtime technology executive who spent years working for equipment maker General Instrument's digital television projects, Tayer observed that "[t]he sights we see, the sounds we hear, even the odors we smell are continuous and direct representations of our real-world experience (Tayer, 2015, p. 3)."

Analog broadcasts transmit audio and video in one composite signal. Digital audio and video, and other information, such as program guides and closed-captioning, are processed separately and transmitted as discrete packets, each with identifying data and "assembly instructions" for the receiver, explained Philip Cianci, formerly with Philips Research and ESPN's Digital Center (Cianci, 2007, p. 2).

Computers, Tayer said, “ushered in the trend of translating the analog realm into an intermediary digital language, a binary string of zeros and ones symbolizing the actual phenomena perceived by our brains and senses.” Messages received through digital media, then, eventually convert back to analog for human perception (Tayer, 2015, p. 3). The terms are used interchangeably frequently, and they are certainly related, but high-definition television (HDTV) and digital television (DTV) are not synonymous. Digital television typically refers to the digital transmission of television, which replaced analog TV. High-definition television generally refers to the higher resolution images and sound, which also replaced analog TV. HDTV is used to describe both the higher-end product and the consumer’s sets on which the product is displayed. DTV offers advantages for HDTV, and is the transmission means for most, but not all, multichannel television services. A high-definition set receiving an analog signal still offers only standard-definition television.

Adding to possible confusion over terminology are the broad categories of digital equipment which reshaped television not only in the appearance and sound of its higher-end product and transmission, but also in the content production and station workflow this study addresses.

Even the early high-definition broadcasts were, in part, analog. Hearst station group’s chief engineer Martin Faubell said that “in those early days we faked it.” Faubell explained that with early high-definition broadcasts--nearly a decade before the eventual federal deadline--while the network signals came in and out of the station in the wider 16:9 HD aspect ratio, local content was produced in the standard-definition 4:3 ratio. That ratio had been in use from the early days of television. Motion pictures shown on analog television use a “pan-and-scan”

approach, which invariably sacrifices part of the screen image, or a “letterbox” approach, which reduces the overall size of the viewing area to accommodate the greater width.

“So,” Faubell said, “we would convert that and, yes, stretch it out to the 16:9 [aspect ratio] and it looked horrible. We were on the air, but I was pretty embarrassed, in some cases, by how crappy we looked.” The appearance of those images, “up-converted to high-def,” Faubell said, encouraged and hastened the transition to digital technology.

Aspect ratio is the proportional relationship between the width and height of a video display. The 4:3 (1.33) ratio saw wide use for more than a century, beginning in Thomas Edison’s lab in 1892. While various ratios developed for ambitious motion picture projects (including Cinerama, CinemaScope, Todd-AO, VistaVision, and IMax), 4:3 served television until the advent of high-definition (popular technology writer David Pogue notes that the 16:9 ratio becomes 9:16 for people watching video holding their smart phone normally, in an upright position. “That’s such a radical change in dimensions,” he wrote, “that no existing movie or TV show will fit unless it’s dramatically shrunk, to the point that *most* of the screen is black.”) (Pogue, 2018, para 14).

The slow transition from analog to digital, wrote Steve Mullen in 2001, “exacerbates our ‘should I work in 16:9 or 4:3?’ quandary” (Mullen, 2001, p. 54). That slow transition, he said, extended the life of the 4:3 ratio.

Mullen’s observations make it clear, however, that if a station was buying a new camera, it made sense to go with one that can switch between 16:9 and 4:3. “Because the transition is being carried out over a longer period of time than was initially expected, 4:3 production gear has had its life extended.” How long, Mullen asked, could a station use its equipment during the

transition? How can a station “future-proof” its work so it can survive technological transition? (Mullen, 2001, p. 54).

But even if the overall product remained largely analog until the new century, digital technology increasingly contributed to that product. Digital technology helped television stations and networks resolve image and sound issues that had long plagued the industry years before digital transmission and reception were the norm. As of the turn of the century, most of the of the television transmitted and received over-the-air remained years away from the largely digital product that would come with the high-definition mandated by the FCC in 1996, and eventually in place by 2009 (WRAL-TV in the Raleigh, N.C. market became the first television station in the United States to broadcast a digital television signal. Numerous stations, including WXII-TV, were broadcasting digitally years before the mandated deadline).

There is little doubt that the digital signal produces superior video and audio for HDTV than an analog one. “...the further an analogous wave is from its broadcast tower (or repeater) the more distorted the signal becomes,” eventually manifesting in a lost picture and screen filled with “snow,” Elon University professor (now president) Constance Ledoux Book wrote in 2004 (p. 10). The quality of a digital signal remains intact over longer distances, as the binary stream is repeated until it is simply gone (Book, 2004).

One of the keys to digital audio and video is compression, said longtime WXII Chief Engineer John Norvell. Norvell explained compression in practical terms: “Let's say I'm looking at a picture. I'm looking at a checkerboard picture on the screen. I look at it and go, ‘here's a white spot. The next 15 spots are going to be white too. I don't have to send you all 15 spots. I just sent you the one and when you get to the other end, you just duplicate it 15 times. When it turns black, I'll tell you, it just went black and then you duplicate that until I tell you [to change]

again. So, with digital compression, instead of sending a 30-gigabit file, you're sending a three-megabyte file. You can compress it.”

Beyond HDTV images, the compressed digital video is bundled with associated audio and data streams into a “packetized elementary stream” (PES), and streams in combination. The packetized stream is capable of providing a single high-definition program, or multiple standard-definition programs. Moreover, “the simplicity of binary data” provided by digital technology adds versatility, efficiency, the ability to operate with computers, and the ability to upgrade that extends television to multiple platforms, both complementary and competitive (Book, 2004, pp. 9-10).

The smooth, continuous wave of analog audio and video had initially been considered more “aesthetically pleasing” than its digital representative, Cianci said. But the discrete units of information “are so small that the auditory system perceives the sound as continuous (Cianci, 2007, p. 2).”

For decades, television and its predecessor radio were the dominant media. Through various networks and local facilities, television content providers could transmit their messages across great distances—advancing the benefits of the telegraph and telephone. Yet, the producers of media content still carried messages in some physical form from one transition point to another—by air, by ground transportation, and by hand—sometimes from country to country, state to state or city to city; sometimes from room to room, or floor to floor within the same building—and sometimes to comic effect (see Chapter 5). But even as it sharpened and expanded the images for its audience, digital technology would change the workflow for its producers.

Television is an industry largely defined by change. The news that is broadcast changes, programs change, delivery changes, equipment changes, and, as insiders know, personnel

changes—frequently. The dramatic changes brought to television at the station level largely coincided with arguably more dramatic changes in the regulation and structure of station ownership. Combined, those changes contributed to a profound reshaping of television’s most traditional system of delivery. For the purpose of digital transition, even in the part of the industry with the most local presence—and a company, observers agree, more committed to localism than most—the economies of scale in planning and purchasing led to more centralized management.

Diffusion

As noted in Chapter 2, diffusion is the process by which an innovation is communicated through certain channels over time among the members of a social system (Rogers, 2003, p.5). An innovation is an idea, practice, or project that is perceived as new by an individual or other unit of adoption. Communication channels refer to a process of creating, sharing, and understanding information among sources and receivers. Sources originate a message and communicate through channels to a receiver. While mass media may be the most rapid and efficient way of informing receivers, diffusion is a very social process that also involves interpersonal communication relationships. Diffusion is a special type of communication, Rogers said, in which the messages are about a new idea (Rogers, 2003, p. 6).

The spread of digital television technology innovation has been studied for its relationship to consumers and as government and industry policy (Book, 2004; Oswald, & Bailey, 2016). The timing, pace, and extent of digital technology conversion—beyond transmission—among local television stations has not been monitored in real time or later.

As mentioned, researchers may find some information regarding the various transitions from analog to digital technology among television stations from vendor marketing and from

trade publications, and from comment and continuity from key personnel at the station and group under study. Without independent industrywide monitoring, the recollections of key Hearst and WXII personnel demonstrate that on Rogers' diffusion of innovation scale, Hearst appears to range from innovator (as a station group and with selected stations) to early adopter (selected stations, including WXII) to somewhere between early and late majority.

Some technology pieces developed from standards that reflected input from television and other industries looking toward digital video and audio—including motion pictures. With some equipment, Hearst's engineers parlayed the group's knowledge of the local television market, its purchasing power within that marketplace, its desire to improve performance, and longstanding relationships with equipment vendors to work with those vendors on product development. Regarding other technology, Hearst engineers felt anxious, and sometimes content to wait until it was more confident in its investments.

Rogers attributes the variance of an innovation's adoption to the perceptions of advantage, complexity, compatibility, observability, and trialability (Rogers, 2003, pp. 219-266). Communication technology diffusion studies frequently focus on the consuming public. For example, Chan-Olmsted and Chang (2006) discussed the level of consumer awareness, perceptions, and misperceptions regarding high-definition television as the federal broadcast deadline approached (albeit eventually postponed, as they anticipated). Gentry (2003) explored numerous diffusion studies in an effort to guide forecasts for consumer adoption of new technologies.

Television content producers are a narrower field of consumers, and necessarily motivated by competitive and commercial pressures. Innovation adoption for a television station group like Hearst challenged the anticipation of future needs and the ability and the resources to

invest incrementally, while trying and observing a technology's compatibility and advantage. The advantages, even necessities, from digital technology made the adoption of digital innovation inevitable. But the road to compatibility with the group's mission offered endless uncharted twists and detours that could yield benefits, setbacks, or uncertainty.

Station WXII and group owner Hearst pursued digital technology to maintain its competitive position regarding the images and sounds it produced, transmitted, and sold. Television professionals might be less apprehensive generally than those engaged in an industry less reliant on technology. Interpersonal channels are likely to be more effective, and more rewarding to participants in such organizational contexts. In interpersonal channels, the communication may have a characteristic of homophily. The transfer of ideas, Rogers says, "occurs most frequently between two individuals who are similar, or homophilous —"similar in certain attributes, such as belief, education, socioeconomic status, and the like." (Rogers, 2003, p. 305). This generally would be true about media professionals working in a broadcast company, who often have similar educations and professional training, and more so among those in a specific area, such as engineering.

But Rogers' and others' studies of diffusion demonstrate that not all users understand and embrace technology willingly, although even if they eventually enjoy its benefits. Heterophilous communication between dissimilar people, he said, can lead to discomfort and cognitive dissonance. Nonetheless, he said, while homophily accelerates the diffusion process, it can also limit the spread of innovation among a close-knit group. "Ultimately," he said, "the diffusion process can only occur through communication links that are at least somewhat heterophilous" (Rogers 2003, p. 306). Hearst and its stations, including WXII, utilized elements of both homophilous communication networks—among vendors and engineers—and heterophilous

communication networks —among station and corporate managers and staff—in diffusing digital technology.

Networking

A central concept in diffusion of new technologies is the network. For the general public, the word “network” was likely most closely associated for decades with television networks. In the late 20th and early 21st centuries, “network” applied more broadly, spreading to job searches, business transactions, and social life. The newly defined networks similarly relied frequently on technology, and negotiated distance, culture, and terrain as did ABC, CBS, and NBC.

The communication networks involved in Hearst’s adoption of digital technology also reflect those described by Rogers in diffusing innovation. A communication network, he says, consists of interconnected individuals who are linked by patterned flows of information. While networks contain a certain degree of structure or stability, he asserts, providing some predictability, he allows for considerable flexibility within their patterned flows. In a social system with 100 members, for instance, Rogers computes 4,950 possible network links (Rogers, 2003, p. 337).

Rather than seeing the transfer of technology as “a one-way movement of a technology from a research and development source to a receptor system,” Rogers asserted that it is more usefully conceived as “two-way communication, with receptor organizations initiating research problems and needs for technology and then providing feedback on their technology implementation.” The kind of two-way communication network that emerged in Rogers’ observations among technology providers and “receptors” (Rogers, 2002, pp. 323-324) closely resemble the networks described by Hearst engineers and executives among various entities,

including the group's central engineering, its television stations engineers and managers, its vendors and, on occasion, even between Hearst and its competitors.

Championing innovation

From its top group managers to its engineers to its station staff, Hearst employees needed to sign on to the relative advantage gained through new digital technology, which Rogers defines as "the degree to which an innovation is considered better than an existing practice" (Rogers, 2003, p. 233). Observations from Hearst personnel and from a privately distributed video shared with this project, demonstrate that the increased access and efficiencies digital equipment brought to content production were enthusiastically received, and perceived as clearly superior to the videotape and analog processes they superseded (see Chapter 5).

Rogers highlights the role of "champions" in diffusion of innovation. A champion, he said, "throws his or her weight behind an innovation, thus overcoming indifference or resistance that the new idea may provoke in an organization." The champion, Rogers said, need not be particularly powerful or highly placed within an organization. But they are typically in "key linking positions, possessing analytical or intuitive skills, and skills of persuasion—which may, he notes, be more important to innovation diffusion than power (Rogers, 2003, pp. 414-417).

Howell, Shea & Higgins identified three factors exhibited by innovation champions: enthusiasm and confidence, persistence under adversity, and involving the right people (Howell, Shea & Higgins, 2005). Evidence from their study of innovation and innovators (although preliminary) linked their "champion behavior measure" positively to project performance.

Champions may exist at numerous levels in the adoption of digital technology, particularly in a high-tech industry like television. Within the Hearst group, its in-house news consultants—Fred Young, Candy Altman, and Brian Bracco, led in training and coordination

among Hearst's several stations. At the station level, numerous Hearst executives noted that Hank Price, the general manager during who led the station during the time studied, typically embraced new technology. So did WXII executive producer (subsequently assistant news director and news director) Lisa Fulk, and the station's chief engineer John Norvell.

But a study of the digital innovation at WXII or any Hearst station necessarily focuses on Hearst's technology network as much or more than the individual station. The transition of station equipment from analog to digital "had tremendous ramifications for news," News Vice President Candy Altman said, but "it was really much more of an engineering event."

That put Hearst's Vice President of Engineering Martin Faubell at the center of the digital transition. Hearst managers at both the station and group level praised Faubell—who began his television career at the innovative station WRAL in Raleigh—as the driving force for matching station needs with technology and putting the technology into place. They cited his knowledge of station operations, of available technology, and his insights into what was coming. They also cited his ability to network with station managers and with vendors.

Altman moved from news director at Hearst's flagship station, WCVB Boston, to become an in-house news consultant for Hearst stations around the country—including WXII in its early transition to digital. She credits Faubell for keeping Hearst ahead of other station groups, calling him "a genius when it comes to technology and digital. Many of the vendors over the years would go to Marty first to try things out."

Altman likened Faubell to "a rock star" in his field. Walking the National Association of Broadcasters exhibit hall floor with Faubell, she said, "is like walking with Mick Jagger. His advice is coveted by the companies that are trying to figure out what the next great thing that television engineering departments are going to need."

Brian Bracco, who became a news vice president after being news director at Hearst's KMBC Kansas City, was similarly impressed. "Marty was very aggressive," Bracco said. "I can't even tell you how smart Marty is. He saw where we should be...I said to myself, 'How did he know?'" Fred Young, the first of Hearst's news vice presidents, called Faubell "our tech guru." For Hearst colleagues, and for Howell, Shea & Higgins's definition (2005), Faubell was a diffusion champion.

With significant authority and even more influence, Faubell communicated up and down with top Hearst and station management and staff, and outward—into an informal, but established network of vendors and consultants, and sometimes competitors. That network communicated formally through the trade press and industry conferences; but beyond those insights gathered, paths were pursued and decisions made from interpersonal communication based on past relationships and mutual expertise and economic interests.

In addition to group and station executives, Faubell reported continuous contact with Hearst engineers, and with vendors with whom the group has relationships. They share a common understanding of television technology. Rogers cites the communication through channels and over time in the diffusion. Trade shows and associations create such channels. Diffusion research, Rogers said, "usually emphasizes individuals as the units of decision and analysis, although organizations are also studied, and emphasizes the person-to-person social networks through which innovations spread" (Rogers, 2002, p. 329).

Faubell's insights into the role of economics and collaboration on the diffusion of innovation make a case for Hearst as an innovator, or at least early adopter—pursuing digital strategies despite the absence of benchmarks or reference points for the new applications. In the parlance of Rogers and other diffusion theorists, Faubell would qualify as an opinion leader, well

connected to the social system, and with continuing discussion and exposure to innovation—although Faubell makes clear that Hearst’s motivations were clearly more financial than social, and his observations were often proprietary.

In a brief profile, reserved for industry leaders, Faubell discussed his approach with the industry trade publication *Broadcasting & Cable* (Dickson, 2003). "The trick is to look several years ahead and try to develop ways to take advantage of technology in a larger way," he said. Then, as now, he noted the varying levels of existing infrastructure and investment, and the varying levels of knowledge and ability at each station (Dickson, 2003).

As with other industries, local television station and group management network through such channels as trade shows, vendors, and peer contacts. Faubell said that many of the products purchased for Hearst stations to streamline workflow or improve output developed through frequent contact between the vendors and group and station executives, including its news and content directors and its engineers. "I've always had a philosophy," Faubell said. "If you've got something to sell and you want to tell me, come on and I may not buy it, but come and try to sell me." In short, Rogers’ concept of the importance of networks in diffusion held true in this example. A presence in the network cannot guarantee a sale, but it will facilitate communication.

Size and leverage

Hearst Communications is a massive, international conglomerate employing thousands of people in hundreds of properties covering numerous information and entertainment platforms, including print, television, and the Internet.

Rogers wrote that studies consistently find larger organizations more innovative than smaller ones, noting that size is easily quantified for measurement in a study, and that size can be a “surrogate measure of several dimensions that lead to innovation” including resources and

technical expertise (Rogers, 2003, p. 411). Hearst's structure, particularly relating to its television properties, reflects decentralization within a large corporation (although within its station group, management has been both centralized and decentralized following deregulation and the group's expansion).

Faubell brought the preferences from Hearst's internal network of engineers, content producers, sales and promotion professionals and managers—along with his company's considerable size and resources—to the external network of vendors and manufacturers with whom he'd dealt on numerous orders. The insights from Hearst's long-term and new management proved significant factors in the company's approach to overhauling systems at its many stations. The economies of scale that favor group co-ordination and purchasing do not begin with digital television equipment, the deregulation of the 1980s, or the more dramatic deregulation of the 1990s. Nor was Hearst the most aggressive station group when it came to expansion. But its growth was substantial and both the costs and cost savings of advancing technology increased substantially as well. As Faubell noted below, when Hearst owned six stations, those stations used six computer systems, and would change systems on the preference of a new news director. He also noted that even after a significant purchase, an expensive piece of equipment remained in its box, as station staff were unable on their own to put it to use. The perceived needs of the larger group clearly elevated a centralized role in purchasing and implementing new technology.

“When I started in this job back in 96,” Faubell said, “we had six TV stations and we had just bought a seventh [in Tampa]. We were no different than most of the industry...you know, publishers like Hearst and [newspaper and television groups] Belo and Gannett all had six or so stations. And then the rules changed, as we got bigger, it became more obvious to me that we

couldn't support the old way of thinking. You had six engineers who were obviously smart and go to NAB [National Association of Broadcasters conventions, where vendors and sessions highlight new products and solutions] and do their own homework. But you can't solve the same problem with six different solutions in six different companies. We couldn't support that kind of thinking when we were going to continually get bigger and bigger and bigger. So, we sort of came together on the assumption that money is money is influence, and we're going to use it on the vendors. We're not going to let them eat us alive.”

Altman agreed that having a larger group allowed “more leverage for Marty and his purchasing power, and his ability to get the best stuff early.”

Hearst decided it would change the relationship with vendors so that they were “not just vendors, but partnership vendors that we could develop with and move forward,” Faubell said. “So, for instance, we partnered early on with [Tektronix-owned technology vendor] Grass Valley and [President and Chief Executive Officer] Tim Thorsteinson because we realized at that point we were still struggling with the first wave of digital,” a reference to the difficulties of synchronizing digital audio and video tracks. We own KCRA (Sacramento), and there was a history of KCRA's working with Grass Valley. So, we partnered with Tim Thorsteinson and the folks at Grass Valley and started conversations about digital switchers. We said to Tim, ‘we'll help you. We'll buy the first two Grass Valley switchers that were going to be digital. And that became the Kalypso [introduced in 1999 at a retail cost of \$215,000]. So, we bought them for Boston and Sacramento [Hearst stations WCVB and KCRA, respectively].”

“And that set our course in terms of our relationship with vendors. We decided that we wanted to pick our partners, pick our technology, and work with certain large vendors and manufacturers. And by that leverage, we got closer to the products. We got closer to the

development, we got closer to the management of those companies. And so, we were pretty close to a lot of these companies that were hard at developing new products for the digital environment,” Faubell said.

“You get on an airplane and you go out to visit. You spend a couple of days at the factory, and you talked to their engineers, and you talked to their management. We did that a lot in those days.” Faubell said that over the years, he’s frequently visited vendor headquarters around the country “and sit down and go through a technology briefing and roadmap discussion about where they’re going and why. And they would want our opinion; whether we should turn left or right or keep going straight?”

From what Faubell referred to as its “deep relationships with our vendors,” he said Hearst gains insight see into the future of product development. With a company like Sony, for instance, “we’ve been in development on so many different things.” As a result, he said, “it’s very rare that we go to NAB [conferences] and say, ‘Wow! We never saw this coming!’”

Such relationships can require confidentiality, Faubell said. “We like to think we have NDAs [non-disclosure agreements]. We kind of laugh about it. ‘Do we have an NDA?’ Well, we’re not going to talk about it anyway.”

Faubell said he has brought senior management with him on visits with vendors. Hearst management and the vendors “sit and talk business, and talk about our relationship. And if we’ve got some issues, we’ll talk about the issues. We’ve had a good influence, I think, on these companies’ product development and their roadmaps. We don’t ask for something we’re not going to need.” Faubell said he understands that the vendors also do business with such other station groups as Raycom, Belo, or Gannett, “and we all know each other pretty well because we

compete in all these markets.” They don’t share competitive secrets, Faubell said, but they will discuss common problems.

Engineers at the various Hearst stations also proved a resource, news vice president Altman noted, as they communicated frequently about equipment that worked and equipment that didn’t.

Accountability is necessary, Faubell said. Incumbent vendors maintained a “right of first refusal,” he said, but the group also did trials to see which vendor had the best products and the best prospects going forward. Hearst would stick with vendors during rough times, Faubell said. But product lines need to evolve, and if they didn’t, “it’s time to move.”

In the past, Faubell said, “you’d go buy a tape machine, and spend, say, \$35,000 for it, and that’s all it ever did,” Faubell recalled. These days, “technology changes all the time. You don’t have to be over the edge, but you’ve got to be out in front. You’ve got to know what’s coming that’s going to upset your business because of the history of your investments in technology. So, you’ve got to have your head on a swivel and be on the lookout for the next threat in terms of the competition or technology shift that’s going to obsolete some other investment so you don’t end up with inferior product and doing an inferior job. That’s critical.”

In summary, Hearst’s relationships with vendors was an important network that helped speed the rate of adoption of new technologies for a waiting network of stations with which he’d been in constant communication.

The plan

Hearst would ultimately spend millions overhauling technology at its many stations. Rogers noted that “[o]rganizational leaders and technology managers often underestimate the

difficulty of the technology transfer process. They perceive the obvious (to them) benefits of a technology and feel that it is so advantageous it will “sell itself” (Rogers, 2002, p. 325).

The Hearst station group’s upper management, Faubell said, neither underestimated the difficulty nor overestimated the benefits of transitioning to digital. Upper management said, “we’re not just going hand you a blank check,” Faubell recalled. “They said, ‘tell us, we need to know what this technology transition is going to be. Yes, we’re aware of it. We understand it to a degree. We see the benefits... you need a plan. You need to let us know what the budgets are. You need to plug this into some sort of 5-year, 10-year plan.’” Faubell and the Hearst engineers came up with long-range plans, and updated them each year, as the sequence of purchases and installations were sometimes rearranged, and prices changed. Faubell said, “we were pretty rigorous about it.”

Hearst took a groupwide approach to upgrading its technology, Altman said, and tread carefully around comfort levels and even resistance. “I think it was less about any one particular place and just more about the fact that change is difficult for people. Even systems that don’t necessarily work that well are still the systems people know. I think getting people to trust the technology probably took the longest amount of time because initially, of course, it wasn’t necessarily as trustworthy as, you know, as the tried-and-true tape that had been in existence for 20 or 30 years. So that’s why I think it was really just more a matter of getting people to trust it and to have experience with it and realize that, you know, there were going to be some problems. Like with any new technology there were going to be some kinks. They were going to have to figure out what was working, what wasn’t.” Hearst’s own network of stations, departments, and engineers would put diffusion theory’s trialability concept in practice.

Faubell said he met with station executives each January in Orlando to review plans. “We were paying attention to transitions in companies, technologies, and designs,” he said. Specific numbers remain proprietary, Faubell said, but he confirmed that the transitions in Boston and Sacramento (KCRA) ran into millions of dollars, he said, and Hearst spent “multiple” millions more throughout the group, including the selection of equipment and vendors, design and integration, and additional labor. This was unrelated, he said, to high-definition transmission or the federal mandate.

Switching

Digital is “such a broad word,” Norvell mused. Eventually, it meant “a type of digital signal converted to a picture on the front end.” It meant, he said, “TV as a final product.”

Digital’s full capabilities were not known early on, Faubell said. They would become clearer as more stations moved toward transmitting in high-definition. “On top of that,” he said, “we were making investments in digital switchers at that point. And so, we started down that road to get to SDI—serial digital—and then we could move from there to actually get to widescreen.”

Digital switchers, which select, switch or mix from among audio and video sources, are a key part of a digital system. In the early part of the 21st century, a single digital switcher required a low six-figure investment, and went up from there. In its marketing material, manufacturer Cisco notes that switches and routers look similar and perform some similar functions, “but each has its own distinct function to perform on a network (Cisco).” Cisco defines a switch as “a controller, enabling networked devices to talk to each other efficiently. Where switches create a network, Cisco said, routers connect multiple networks. A managed switch can be configured for greater local or remote control of network traffic and access (Cisco).

The ability to improve switching, Norvell said, “was part of the promise of digital. “So, if you go from the old analog switch or to an actual digital video signal, and it allows you to get more, better, higher quality...more pronounced, more resolution...to get you to high-definition, to where you’re not necessarily in the analog world.”

Once there’s a digital switcher, Norvell said, “it allows you to put higher quality, better video through. Then, somebody said, ‘let’s build a camera with that same output.’” As Norvell noted, Hearst’s and WXII’s digital switch were underway.

Transitioning and standardization

Upgrading and replacing is a constant reality in a technology-based business, like local television. Prior to the last few years of the 20th century, decisions to replace equipment were grounded in normal replacement cycles, Faubell noted. “It was a matter of where they were in their transition, historically speaking, who was coming due for a replacement of their old analog systems?”

Straddling the technologies proved difficult. “You might get 8 or 9 or 10 years on certain pieces of studio equipment when it was all analog,” Faubell said. “You could replace one piece at a time, and it didn’t matter.” But, with the incursion of digital, he said, “you’ve got to consider obsolescence, repairs, and [whether] it’s time to make an investment in the station. This was the new dilemma; we’ve got to make a complete shift from analog to digital. And it’s not one piece at a time. It’s almost every piece, right now.”

Faubell compared it to an earlier time in television, when broadcasters switched from black and white to color. New pieces, he said, could incorporate the National Television System Committee standard for color (which was in place from 1954 until the digital standard). “Old pieces, not so much,” he said. “So, it was very similar that moving forward, you’ve got to adopt

new technology, but you can't do it in one piece at a time because the new piece doesn't have analog inputs or analog outputs. It's digital-in and digital-out. Well, that doesn't fit very well into the rest of the analog plant."

Hearst came up with a standardized design," Faubell said, "and we came up with a standardized way to go into our stations and actually pay to get the installation done. It was so large a scale there was no way our small staffs and smaller stations could take this project and get it done at any certain time." Hearst made "a big corporate plan," Faubell said. "We came up with a technical infrastructure plan, with the installation plans, with the budgets and we kind of rolled through the group, starting again with the stations that needed it most because they had the oldest equipment."

Being first with a technology isn't always enough, Shapiro and Varian noted, drawing specifically from the competition between CBS and NBC to set the color television standard. Price/performance ratio is important, as is adoption by a number of players. It may be necessary to form alliances, and to possess technological support—as NBC had through parent company RCA's manufacturing capability.

Standardization continued to prove challenging. "When technology moves, it's inherent in competition that Vendor A doesn't really want to play well with Vendor B," Faubell said. After a couple of decades, he said, the vendors have learned to pay at least lip service to plug-and-play compatibility, particularly as video moves over to Internet protocols—although, Faubell said, competitive "slugfests" continue until standards emerge, or the power shifts to the buying community. At that point, a user can plug into the output of one vendor's device and play through another.

To some degree, the constancy of equipment rotation served the transition. “We went with the stations that needed it most in the first wave,” Faubell said. “So, it started almost as a replacement cycle. But the premise was that we can't keep going down the analog road. We've got to bite this thing called serial digital; make a transition.” In some cases, he said, the cost as well as the utility favored moving to digital. As of mid-2018, Faubell said, “I'm starting to see analog equipment cost more money because it's harder to get, and nobody' making investments in it anymore. From a technology standpoint, it's all turning the corner to go digital.”

As diffusion studies have noted, late majority adopters and even laggards will need to adopt new technologies when the traditional technologies disappear. Even after probing and selecting vendors and products, Hearst needed to balance the costs and other challenges of timing in diffusing the various station and network technologies.

Timing

Faubell said that the first “real integration” of digital technologies came in the form of a “frame store.” The frame store allowed correction of problems that accompanied a station’s taking signals from “a remote source like the network [that] wasn’t in coincidence, or timing—as we call it—with the internal signals of the station. Generally,” Faubel recalled, “we took a vertical roll every time we went in and out of networks.”

As early as the 1970s, California-based Adda Corporation and other companies offered digital frame stores, which helped avoid vertical roll (*Backstage*, 1979). Analog TV viewers will recall that vertical roll, a frequent problem with their old TV sets, occurring when a picture appears to scroll repeatedly—usually vertically—from the top of the screen to the bottom, or the bottom to the top. To avoid or minimize it from a feed, “most stations decided to genlock to the network,” Faubell recalled.

Genlock refers to a technique dating back to the early days television broadcast and switching systems. Engineer Henri Rapp explained that genlock dates back to the early days of TV's broadcast and switching systems, a technique used to synchronize cameras and other video sources' frames to minimize distracting "nasty artifacts (Rapp, 2018, para 2)," and keep audio and video synched as well. While genlock remains available and is sometimes used, Rapp said, use of a central clock and most modern switchers can synchronize without genlock (Rapp, 2018).

Genlocking to a remote signal was not always the safest or most satisfactory way of synchronizing signals, Tom Tucker, of Tektronix Inc. wrote in 2000 for *Broadcast Engineering*. "As digital technology evolved, the development of the video frame synchronizer enabled the synchronization of video signals from different sources. However, the original frame synchronizers dealt only with the video portion of the program material. As they were used, and cascaded from one place to another, delays began to creep into the video path that delayed or retarded the video with respect to the audio (Tucker, 2000, p. 72)."

But genlock could work, Faubell said, "unless the network had a problem. And then you were left to freewheel [improvise]. So, the development of a digital frame store that took video and digitized it and could store it in a complete frame of video was not only a novelty, it was damned impressive. And so, in those days, that was the first level of 'wow.' We actually see the video that can be digitized. And we bought a lot of frame synchronizers as everybody did in the industry and then, you know, there were digital memories and, and digital chips and all of a sudden analog video could see its way to get into digital and then get back to analog."

During his decade as chief engineer at WTAE in Pittsburgh, Faubell recalled that slowly but steadily, "the industry started moving down in this direction, taking advantage of improvements in technology...leaps and bounds in terms of processing power and speed."

“We had cameras in the studio that would output RGB [red, green, and blue lights which combine to produce a variety of colors] and we would use those three separate signals to do chroma-keying as best as we could.”

Chroma keying is a technique used to layer a video on a different background, typically using a green (sometimes blue) background (*Popular Photography*, 2012; Billups, 2008).

“Chroma key is your friend,” wrote cinematographer Scott Billups, “because it releases you from the shackles of reality” (Billups, 2008, p. 28). Chroma keying developed as a special-effects technique in the motion picture industry, but has proven useful even in presumably reality-focused applications, such as placing a virtual map behind a weather presenter in local newscasts.

But effectively, Faubell said, “everything in that station was analog video.” With the introduction of the ability to convert analog to digital “the next step was, well, why are we doing that? Why don’t we just go more digital?”

Much of the digital technology, even when developed for other platforms, could apply to local television. But the acceleration in the pace of change forced management to think strategically and make choices not only regarding which product to purchase, but when.

Standards and tape

Following the frame store, Faubell recalled, the next big thing in useful digital technology for local TV, was recording. By the mid-1980s, even as audio and video media began considering new ways to bring about high-definition, the Society of Motion Picture and Television Engineers (SMPTE) worked on standards for digital recording.

Digital tape became more useful and more available in the mid-to-late 1980s. But rapidly emerging and competing standards and equipment forced stations and station groups to consider

their financial investments carefully and strategically. Amid different formats and solutions from competing high technology companies, consistency and standardization inevitably emerged as issues.

In 1986, Sony and Bosch launched D-1 the first major professional digital recording format, D-1, also known as Component Digital. Several U.S. and Japanese companies had already agreed to standards. Digital and uncompressed, D-1 could maintain quality despite multiple generation, editing and signal processing. Although not designed for high-definition, D-1 was long a benchmark standard for digital video. But it was considered too expensive for wide implementation. D-2, also called composite digital, launched in 1988. It used a metal-particle tape, could be applied to computer recording, and cost less than D-1. D-2 was created by Ampex, although Sony eventually became a co-developer (Fist, 1996).

Each of the formats and related products had strengths and weaknesses, and each required a substantial financial commitment, particularly upon introduction. The first real incarnation of digital video inside of a television station, Faubell said, came with the less expensive D-2 format. D-2 essentially took an analog signal, digitized it, put it on a piece of videotape, and stored it for play back.

“But the input and the output in those days was still analog,” Faubell said. “And in the background, there were some companies pushing a newer, what I’ll call a ‘pure view.’ No, you really don’t want to start with analog. You want to be digital all the way through,” better accommodated, he said, but more expensive with the D-1 standard.

Faubell said that at first, he and WTAE resisted. “I remember dodging the siren song of D2,” he recalled. “I had friends who were pretty deep in the industry who said to me, ‘Marty, it’s sexy; digital and cool...

“And there was a competing standard, although it was far more expensive in the early days called D1, and Sony and Ampex and others started to go down that road. So, I dodged the siren call to spend money on D2 and waited for D1” to become more practical.

It took time to address Faubell’s hope for embedded audio with D-1 and eventually a “complete digital footprint from camera all the way through the plant.” Faubell said Hearst did a few stations with D-1 and a separate audio router. “One of the problems with the non-embedded version of D1,” he said, “was that you could bring a signal in, split it, try to rejoin it back together again, and you would have this lip-flap.”

Lip-flap, also called “lip synch,” comes “when you’d be watching the picture and you say there’s something wrong here and I’m not sure what it is. You’re reading their lips and the audio is, in those days typically behind. And if it gets a couple of frames off, it’s noticeable... And it was horrible, and no devices really existed to fix it. So, it was incumbent upon the local station engineers to really make sure their plant was set up in the right way and managed in the right way.”

Faubell believes that his long friendship with the president of video router manufacturer Utah Scientific, Tom Harmon, helped keep Hearst close to the cutting edge. “Tommy and I used to have these long conversations about where [technology] goes next. They were obviously plugged in because they made routing switchers; we learned a lot together.

In the mid-1990s, Faubell said, “when Utah Scientific developed embedded routers, that began our real, earnest investment in, and migration to, digital.” The development and standardization of serial digital interface would also prove important.

SDI and the ‘serial conga line’

Serial digital interconnect (SDI) for video, was defined by SMPTE standard 259M (and enhanced by subsequent standards) quickly became the method of choice for new and expanding television installations. A major advantage was that SDI could carry a significant amount of ancillary data, and provide space for various signal formats with details for embedding digital audio and multiplex digital audio signals into a digital video signal, carried in the SDI's ancillary data area.

The SMPTE standard made a big difference, Faubell said, because vendors still competed with different products, but not different implementations." By the mid-2000s, he said, "we hammered down and started putting plans together to migrate our plants that were aging with analog to full up serial digital."

Hearst wanted to install D-1 equipment, Faubell said, "but we're going to have to wait until we can get the embedded version at a better cost point and a full, broad array of products. In those days you couldn't buy some of the test equipment that we needed for embedded. So, we had to work with Tektronix and leader and other companies to sort of develop products that fit that embedded model."

Testing equipment, such as the oscilloscopes those manufactured by Oregon-based Tektronix, measure and visualize the way electrical signals evolve over time. Telecommunication engineers consider them invaluable in testing and debugging electronic network circuitry, and digital oscilloscopes have improved speed and analytical ability (*Nature Photonics*, 2010).

"Once the SMPTE standard was adopted and ratified, and companies started to adhere," Faubell said, "it got us to the point where you take a video cable and hook it up. You knew it was going to work. And to be sure, once the standard started to show up in real products, you had the

confidence to say, that Tektronix is going to rock with a Utah router. And I'll be able to see what my digital signal looks like," Faubell said. "Because if you have a problem, you want to tear into it and diagnose your issue; you really need test equipment for that. And in the early days, some of that was not there. But that's where it really started to break for us."

Scott Bosen, of Utah Scientific, explained in *TV Technology* that separate audio required numerous layers of routing and distribution, "patch panels, cabling and support gear." Embedded audio, he said, "saves money and reduces complexity." (Bosen, 2011, p. 24).

"What we called 'serial digital embedded,'" Faubell said, "carried as many as eight channels of audio. In the old analog video days, we only did stereo left and right." A benefit of moving from analog to serial digital, said Faubell, was the exit from "the old NTSC standard, which was a bastardization of the old black and white analog system. When they added color, they effectively mixed it into the signal to carry the color information... There were different signals added into the old black and white and it worked--can't say it didn't work. But it came with all kinds of side effects. It limited our ability to have a very clean signal."

A "huge, huge advantage" of serial digital, Faubell said, was clean video. "...all of those crappy artifacts we had since the advent of color television, we could leave behind now." Digital Beta-cam replaced the three-quarter-inch analog format, he recalled, and it avoided the artifacts and other issues that arose from analog. And reporters and producers returning from the field brought back to the station a pristine recording. But any point in "the chain of custody" that brought the video back to analog, and "spit it back out as digital...trashed it," Faubell said. "The minute a producer tried to play that video, if it touched any analog equipment after that, it went south pretty quickly. It had to be a serial conga line from the beginning to all-the-way through

the chain, all the way to the transmitter, and it was completely digital. Then,” he said, “you’ve got something.”

These moves, Faubell noted, were not in anticipation of high-definition transmission. Regardless of the federal mandate, “analog television was going the way of the dinosaur and this new implementation of serial digital video was coming. But high-definition and the DTV transition was still hanging out in free space.”

In short, HDTV helped shape the implementation, but, choices and implementation aside, digital technology may have been inevitable.

In an interview, author Philip Cianci said, “People in the business understood the standards developed for digital television and in particular high-definition television. We’d have two components. There’ll be a production standard, and there would be a transmission standard. They were related, but they’re not the same.”

“If there never was an HDTV or DTV transmission regulation and standard,” asked Cianci, “would production and facilities have gone digital? Yes, absolutely. Not even a question. It was already happening.”

The hub – impacts on newsrooms

Early newsroom computer systems, like BASYS, were text-based, ran on dumb terminals, and helped producers and reporters generate scripts, run teleprompters, browse wire service copy and other text-based functions. The Internet added text-based wire service browsing.

Eventually, newsroom computer systems were tracking content through interactive “rundown” directories, as well as editing, graphics, and other content-production and management tools. The list of functions is lengthy, and includes scheduling, email and

messaging, Web browsing and research, cataloging and creating metadata, voiceover recording, script and show timing, captioning and subtitling, archiving, high- and low-resolution tools, and Web publishing, among others. (Scott, 2005).

Faubell also pursued workflow efficiency through “sharecasting,” a store-and-forward system that allowed Hearst stations to distribute shared programming, such as syndicated shows and national advertising spots from a technical hub at its WESH station in Orlando, rather than recording and storing the programming at each station, repeating the same workflow. The content was stored as compressed “IP” files and distributed via Hearst’s own satellite capacity. As with other processes, “sharecasting” began at WCVB in the group’s largest market, Boston, and at its adjacent station WMUR in Manchester, N.H., and spread from there (Dickson, 2003).

Economies of scale were apparently less a priority for a smaller station group under analog. At one point, Faubell recalled, each of the Hearst group’s then-six stations had a different newsroom computer system. When station news management changed—a frequent occurrence in local television (although less frequently, historically at Hearst stations)—newly hired news directors wanted to throw out the existing computer system and install one they preferred. “It was a great frustration to the newspeople,” Faubell said.

Hearst decided, Faubell said, “to pick one.” The group had done a lot of work with Associated Press, which marketed the Electronic News Production System (ENPS) for newsrooms. “So, again,” Faubell said “through our joint efforts, we got into a partnership on the development of ENPS and something called MOS [Media Object Server]. We jumped on that wagon early.”

Hearst traded its various newsroom systems for AP’s ENPS across the group, Faubell said. By 2003, it had adopted another common technology platform, using Sony digital

production switchers across all stations for full serial digital interface news production, and the group was working with Pinnacle Systems in developing graphics automation for sharing content.

AP's Electronic News Production System (ENPS) was introduced in the U.S. in September 1997 at the Radio Television News Directors Association's (RTNDA, later RTDNA—Radio Television Digital News Association) annual conference in New Orleans. The drop-and-drag system had already been in operation at the British Broadcasting Corp. (BBC), and in test installations at CBS and National Public Radio. ENPS was described as a platform-independent newsroom system able to combine text, audio and video in a single desktop unit. In addition to its drop-and-drag interface, it offered a "briefing button" to retrieve through key word searches information from a catalog of wire stories, pictures, sound clips and maps. Thumbnail video images could also be retrieved from a 100-gigabyte server (Dickson, 1996).

ENPS developed the Media Object Server (MOS) protocol, with Hearst and other station groups, and 22 equipment providers—including rivals as competitive as Sony and Panasonic—as an open system, designed to enable reporters and producers to fully generate news segments and rundowns from their desktops. MOS let newsroom staffers “access and exchange information via networks and control devices including video servers, editors, graphics and character generators from individual newsroom workstations.” MOS was designed to integrate virtually any newsroom program or equipment into its system, according to AP. Its developer, AP Broadcast Technology Development Manager Mike Palmer immodestly called it “the Holy Grail of newsroom computer systems” (Anderson, 1999). Tribune Broadcasting Co.'s KSWB San Diego, was the first U.S. station to announce its use of MOS, in October 1999 (Berger, 1999).

Different groups, different pace

Steve Hammel retired in 2018 as general manager at WRAL in Raleigh (and became interim director at WUNC, a public broadcasting station based at the University of North Carolina later that year). Hammel had worked previously in news and general management for eight-station Allbritton Communications—acquired by Sinclair in 2013--and for the Meredith Corporation, which was the 13th largest station group in 2019 (Miller, 2019) (former Allbritton CEO Robert Allbritton’s Capitol News Company is the publisher of *Politico*).

Hammel agreed, generally, that bigger groups have advantages in adopting technology based on number of stations, market size, and overall revenue – consistent with diffusion theory’s premises about the concepts that speed or slow adoption. He concluded that among Allbritton, Meredith and Hearst, Hearst took the lead in adopting digital technology. However, he said, an innovator like WRAL would always be at the cutting edge, also (see Chapter 5). WRAL gained national attention (and the cover of *Broadcasting & Cable* magazine, featuring owner Jim Goodmon and his tower) when it became the first high-definition broadcaster in the U.S. WRAL-HD, owned by Capitol Broadcasting, beat the Model HDTV Station under construction by NBC-owned WRC-TV, in the far larger Washington, D.C. market, to air (Dickson, 1996).

Hammel called his former boss Goodmon “a visionary,” and cited his former station’s reputation for championing innovation as an advantage, despite the size of the group. WRAL and Capitol Broadcasting were streamlined by lean management and by geography to move quickly, he said, [from] their analog signal, and people would buy new TVs—HDTVs. And when they did that, if there was only one station broadcasting in HD, people would want to utilize that

investment in their TVs and watch WRAL. It was the only station in HD, not only in Raleigh, but in the country. So, that vision paid off.”

Even with its relatively small size Capitol Broadcasting’s reputation for innovation, Hammel said, made it an attractive partner for technology vendors. “Usually,” the former WRAL general manager acknowledged, “it does cost more [per station] if you’re competing against a group that has a hundred stations versus your one. But if you’re the Associated Press, you want to entice WRAL, because you can put in your promotional material for broadcasting, cable and elsewhere that ‘WRAL has signed onto this.’” Any discount given to “entice” WRAL was not the reason for its innovation, Hammel said, but “a nice side benefit.”

In-studio technologies

When “in the natural order of things,” stations needed to invest in new studio cameras, Faubell and Hearst turned to Sony, which had developed a new HDVS (high-definition video system) line prior to the 1998 Winter Olympics. Sony’s HDVS products were introduced in 1984 as high-definition analog equipment, and by the late 1990s TV stations could use the same cameras in either the 4:3 and 16:9 aspect ratios. The Sony line of HDVS studio cameras, available late that year, listed between \$90,000 and \$142,500 (Dickson, 1997).

Faubell and others credit sports producers with pioneering high-definition programming, noting that major sports events are often used by broadcasters to kick-start the latest forms of TV technology. Liang noted that the Beijing Olympics in 2008 were “stored, edited, produced, and broadcast purely via digital files,” and without videotape. (Liang, 2013, p. 473).

Sports programmers like ESPN at the time were less concerned with multigenerational loss of image and audio quality than the mechanical issues associated with tape. ESPN relied on tape for recording and editing, and sought, but had not found, a sufficient disk-based storage

solution. ESPN's vice president of system engineering and electronic maintenance said the network was evolving toward a server environment, would gradually replace analog studio cameras with digital cameras and routers. "We've got a pretty significant analog plant," he said, citing issues common to most, if not all television content producers, "so we look at how we can maintain and get the most life out of our equipment" (Dickson, & Jessell, 1997).

Hearst's equipment strategy, Faubell said, was in part to consider closely the replacement cycle at each station, while looking ahead. Sony offered ways stations could transition to high-definition while still broadcasting in analog. "Analog was over," Faubell said. "We started to see options to go to HD, and we began that migration when we looked at the station's history and said it's time for new studio cameras, or it's time for new graphics devices, or it's time for other investment in the station. We began to see that we hadn't started with a plan, but we developed one. We'd already started making these other investments in stations." The group could go from "0 to 100 miles per hour," as the prices started to come down as the digital functions became "a little less than cutting edge" and competition increased. The dollars, nonetheless, were measured by the millions for the group's large purchases.

Faubell and other executives recognized that "we were just running out of time on the legacy equipment. We have to make the station [broadcasts] look better, despite the fact that it really wasn't yet fully high def." Faubell disliked the look and said, "the upconverting analogue and all the noise...it was terrible. I hate those days. I don't even think about it now." However, he added, "it fooled a lot of people," and even knowledgeable TV people thought they were watching in high-definition.

Installation

Despite its own considerable resources, after deciding to adopt, Hearst needed help implementing the innovative digital technology. Faubell noted that WXII and other recently purchased stations had hardly been at the cutting edge when it came to technology. Since Pulitzer had been in the planning and process of selling its stations, “they’re not about to spend a lot of money on capital improvements. So, when we bought Pulitzer, we had to up our game in those eight markets, and make those transitions.”

Faubell recalled that after the Pulitzer group purchase, he got a sense that Hearst would have to do more than purchase new equipment. One station, he said, had “an old analog router. It was beginning to fall apart, and parts were becoming harder to get.” It was obvious, he concluded, that it was time for a new, digital router. A year later, he visited the station, and “found the new router still in the box it was shipped in. They hadn’t even taken it out of the box.”

Station management had told Faubell, he recalled, the old router was failing, and it needed a new one. “Well, here it is, a year later, and it’s still in the box. We had some very difficult meetings about why this wasn’t installed. Well, they didn’t have the resources, I didn’t have the resources, and nobody wanted to admit it. Nobody ever wanted to talk about it. I finally said, ‘it does us no good to buy technology that sits in the freaking box!’”

As demonstrated by its decision to bring its consultants in-house, the Hearst group prefers finding solutions within its own network of resources. But the solution to the massive overhauling of station technology was found in Pflugerville, Texas. “It became obvious to me that it was another piece of business that we were going to have to pick up and do: find a company that does design, does integration, and does installation. We had some experience with

Beck and Associates [now BeckTV]. They'd done the design and the integration for the new facility in Kansas City [Hearst purchased KMBC in 1981, and KCWE in 2001—which it had operated under agreement since 1997--in 2001].

Beck was hired for 18 designs and updates with Hearst. Other than the major deals Hearst does with large vendors, “they’ve done all of our purchasing. They do all of the integrations and installations, and they’ve been a huge help to us. Huge. Not inexpensive, but we couldn’t do what we do without that help.” Faubell said the company’s approach to the jobs—10 days on, five days off—was both accommodating for TV stations, where “you can’t do the work during the ratings periods” and to its employees. “On their big projects, they want to make sure that their people get home and see their families, and I appreciate that. They treat their people right. And in some years, we were doing three, maybe four high-def [definition] conversions a year.”

BeckTV was founded by a father and son in 1981, and employs numerous engineers, designers, and fabricators in several cities. It lists dozens of TV stations—including several Hearst stations—along with radio, production, universities, municipalities, and sports and entertainment venues among its clients. On its Website, Faubell provides BeckTV’s first client testimonial, praising the company’s work and integrity (BeckTV, 2020).

Faubell acknowledged that employing an outside vendor for such large and important work seems incongruous with Hearst's largely in-network approach—perhaps best demonstrated by its then-recent decision to bring news consulting in-house. Hiring outside news consultants frequently lead to friction with station news staff. Faubell believes Hearst and Beck avoided similar problems despite BeckTV’s outside contractor status. Even with the delegation to BeckTV, Faubell said, Hearst’s staff maintained control.

“All of our chiefs [chief engineers] know they’re there for a reason and they’re in charge,” he said. Once BeckTV completed design and installation, it was up to the chief engineers to make sure it works in their facility. Hiring Beck, he said, more or less “relieved [station engineers] of the burden of all of that work. It’s intensive, it’s exhausting. And the staff could never handle it if we asked them to. So, it was a kind of a cooperative thing. Beck understood, rightfully so, that they were guests in our station’s house and treated our people with great respect. They made friends and allies everywhere they went and allies wherever they went.” In doing so, he said, Beck and his staff became part of Hearst’s network.

The outlook for stations

Local news is the principle product at Hearst stations, and developments in newsroom systems—the equipment stations used to report, produce, edit, store, and promote station content—drove station workflow. Faubell recalls when systems ran with greenscreens on mainframes, microcomputers, and dumb terminals. “There was no real intelligence in the terminal,” he said. But it was a gateway to client-server architecture, and processing power went into the desktop computers. “That’s what Windows brought to the party,” Faubell recalled.

By 2002, vendors claimed the tools they offered no longer required months of extensive training. “Newsrooms will get more complex to design and build and simpler to operate,” said BBC Technologies CEO Philip Langsdale, offering an accurate prediction “Stories will be handled more quickly and more dynamically. And content will be held in one core format and distributed using simple re-formatters to a wide variety of receiving equipment: TVs, PDAs, Internet and mobile device” (Kershbaumer, 2002, p. 34).

Manufacturers were marketing around the idea of the digital newsroom, one that could “connect the dots” in all the functions necessary to convert video from the field into news

packages. Digital video and the client-server model allowed editing and production from a desktop. Journalists could access low-resolution “proxy” copies of clips on the server, in order to tie their scripts to the video, or even access the high-resolution clips to put together the package on a desktop (Kershbaumer, 2002, p. 32-47).

Over the next few years the tapeless, digital newsroom would come together. And it would come together for Hearst in Winston-Salem, at WXII.

In summary, although the research literature has honed in on trends and general directions in networks, in the adoption of digital technology in television, and their impact on consumers and on journalism, this chapter has explored the impact of industry deregulation and consolidation, the internal and external networking, the roles of centralized and decentralized leadership, and the deliberation and selection processes for a large TV station group. The next chapter looks more closely at station WXII, and its participation in the migration from analog to digital technology.

CHAPTER 5

Implementation and the Impact of Digital Diffusion at the Station Level

The environment in which WXII adopted digital technology went well beyond the walls of its Coliseum Drive location or even the borders of its three-city market. As discussed, the deregulation of station group ownership limits, the consolidation of stations into fewer and larger groups (and the accompanying diminution of individual station owners and smaller groups), and the increased role of Hearst corporate management in station consulting all influenced the strategies for purchasing and implementing technology.

Corporate voices as well as station management and staff voices, therefore, are present in this chapter, which focuses on the execution and impact of technology at the station level. Changes in technology influenced, and were influenced by, the capabilities of digital switches and routers, newsroom computers and programs, nonlinear editing and interactive rundown directories, Websites and social media, station branding, station promotion, mobile reporting, and economics. They were also influenced by key people in the chain of command and execution—by their history and longevity with the company, their capabilities and credibility, their enthusiasm, their training, and their role in the communication network that begins with technology manufacturers, moves through corporate and station management, to the technology users (and ultimately, to their audience).

The diffusion at WXII seems to reflect both centralized and decentralized systems, as described by Rogers (2003). Clearly, research, purchasing, and installation strategies were centralized in Hearst's engineering department, and corporate management helped strategize the order of implementation among its stations, as well as some training. However, local managers and staff received some deference from the group, as Hank Price and Michelle Butt attested, with

regard to training and some order of diffusion. As discussed below, influential local personnel were incorporated into rollouts and execution. In addition, local staff had some discretion to experiment as they applied the technology and negotiate new challenges presented, incorporating lateral or horizontal communication. As Rogers noted, “In reality, an actual diffusion system is usually some hybrid combination of certain elements of a centralized and of a decentralized system (Rogers, 2003, p. 395-397).

WXII

On September 29, 1953, two of the initial owners of television station WSJS flew from New York to North Carolina to see a pre-launch broadcast at a hotel room in the twin cities that gave their names to well-known cigarettes. Unlike the new, relatively small market station, the visiting owners were nationally known. Mary Pickford was a film icon, known in her acting days as “America’s sweetheart.” Her husband, actor Charles “Buddy” Rogers, had been known as “America’s boyfriend, and in 1927, had starred in the first film to win the Academy Award for Best Picture, *Wings*. The couple were partners in the station—which is today called WXII, with the local newspaper, the *Winston-Salem Journal*.

“I was a pioneer in motion pictures and now I feel as though I am a pioneer in television,” said Pickford. After watching a television set in their Winston-Salem hotel room, Pickford said “the picture was the most beautiful thing I have ever seen” (Mills, B. 1953). (Despite her considerable notoriety, beyond the first reference the 1953 article refers to the actress throughout as “Mrs. Rogers,” as was customary at many newspapers.) WSJS’s first official broadcast the next day, September 30, was a World Series game between the New York Yankees and the Brooklyn Dodgers.

The station has always been an NBC affiliate, although it shared ABC network programming, as a secondary affiliate, with the slightly older WFMY prior to ABC affiliate WGHP's sign-on in 1963. The station has changed hands numerous times. Newspaper owners Piedmont Publishing bought out Pickford and Rogers in 1959, and Piedmont was purchased by Media General in 1968. Four years later, the station was purchased by Multimedia, which changed the call letters to WXII, reflecting the Roman numeral for its position on the analog dial. Pulitzer took over the station in 1983.

The most recent change came in 1998, when Pulitzer stations, including WXII, were purchased by the Hearst-Argyle group. The business of local television was in an upheaval, brought by government deregulation, hundreds of station sales, massive consolidation, impending high-definition television, and profound technological disruption in the way things had always been done in local television. Martin Faubell, Hearst's chief of engineering, noted that offering stations for sale typically left the choices, changes, and capital investments for new owners. At the time of the sale, WXII and other Pulitzer stations were not at the cutting edge when it came to technology, and needed preparation for what was coming. "When we bought Pulitzer," Faubell said, "we had to up our game in those eight markets and make those transitions. We really started that in earnest when Hank [Price] came on, and John [Norvell] moved in."

Price returns to North Carolina

Hank Price's issues with CBS' station management were not secret among television professionals anywhere in the country toward the end of his time at Chicago's WBBM, in 2000. Price's siding with a WBBM newsperson, at the risk of alienating corporate management, had been widely reported in national trade and in Chicago's local press. The anchor of the station's

ambitious planned newscast, Carol Marin, refused to work with newly hired CBS station group executive Joel Cheatwood. Marin, a Chicago fixture also known for network reporting, had walked away from NBC's Chicago station, WMAQ, when it hired Jerry Springer for commentary in 1997. Cheatwood had been vice president for news at WMAQ and shared in the responsibility for the Springer decision (Johnson, 2000).

Marin's program launched in February 2000, intending a serious, in-depth counter to common perceptions of local news as frivolous or entertainment-oriented. It received national attention and support from news colleagues. Keynoting the 2000 Radio Television News Directors Association (now Radio Television Digital News Association), CNN anchor Christiane Amanpour gave the program a shout-out from the podium: "I don't dare ask how this radical experiment is doing in the ratings. All my fingers and toes are crossed." *Broadcasting & Cable* magazine said, "The 10 O'Clock News: Reported by Carol Marin was at once a low-rated Chicago newscast and the most closely watched newscast in the country" (Trigoboff, 2000).

As his relationship with the station group grew increasingly contentious, Price seriously considered an approach from Hearst, which was adding stations to its portfolio. He said he chose Hearst's newly acquired Winston-Salem station over its station KCRA in the larger Sacramento market (Nielsen, 2019), due to his history in North Carolina. Price had previously run Gannett's WFMY in the Greensboro-Winston-Salem-High Point market, before moving first to Minneapolis. His success in the Twin Cities led to his hiring by CBS to run WBBM in Chicago. While running WBBM in Chicago, the station's local news ratings were never stellar, but the station became more profitable. Marin's newscast would be canceled by Price's successor at WBBM in late 2000.

News executive Fred Young said that although WXII wasn't the first station to begin its transition, Hearst executives decided "that WXII was going to be the model, the prototype for ascension into a digital effort. Hank [Price] was bright, and everybody liked Hank, and everybody had a lot of confidence in Hank. Hank was a forward-thinking guy rather than a tread-water kind of guy. So, he was selected as the general manager."

Price recalled his initial meeting with WXII staff. His reputation, having come from a network-owned station in a giant market where he received national attention, may have preceded him. Price told his new staff, "Let me explain why I'm here. We're going to try to invent the future of television. I don't know what that is. I don't know where it's going to go. I have no idea what the technology is, but I know there's one thing I know and that is unless we start with a number one television station, we will not be strong enough to invent anything."

"So, for the next five years you're going to see me doing whatever it takes, conventionally, to win. And when we're doing that, we'll be able to stretch up.' Well, people just saw rolled their eyes. I asked if there were any questions, and one salesperson raised his hand. He asked, 'Why are you really here?' They didn't believe me. But that's what I was determined to do. And, over the next five years we managed to achieve that. And we were in the digital business."

If his four years in Chicago introduced Price to some of the dramatic changes brought by digital technology, the near-decade-and-a-half he would spend working for Hearst Television, at WXII-TV in Winston-Salem, N.C., would, by his estimation, bring more profound changes in local television. By 2006, WXII had changed the sign outside its headquarters, at Price's direction, as well as its brand, to WXII Digital Media. Noting the sign change during a visit,

Hearst Television's senior news executive, Fred Young, noted Price's intentions. "I guess we're in the digital media business now," Young recalled saying.

From Home Shopping to WXII

Admirers of John Norvell—including Faubell and former general manager Price--suggest his inside-and-out knowledge of WXII makes him a historian of sorts, with a history of the station, literally, underfoot. The floorboards of a television station, said Faubell, may cover revealing artifacts amid the miles of wires, laid at different times, in different colors, gauges and types. Faubell compared it to "an archeological find. It's like, 'Well here was the great flood, and here was the transition to digital. It's funny.'"

It's all about timing, Norvell explained. Analog, he said, "took a lot more wires. You had audio wires, you had video wires." Knowing their length and capabilities was crucial.

"Timing was critical," Norvell said. "The video had to line up perfectly in order to switch without glitching on the air. You timed it with cable. If you send two signals down, a 10-foot cable, 100-foot cable--they don't get there at the same time. So, you had to time the thing. There might've been an extra 100-foot cable under the floor, because you were trying to make the signals get there at the same time." Even a fraction of a second is noticeable, Norvell said, and it needs to be lined up perfectly.

"Ideally," said *Broadcasting & Cable* magazine in 1993, "a television plant will be 'zero-timed,'—all source signals arrive simultaneously at their intended router output." Digital devices' auto-timing circuits will "mask small timing errors, providing you with much greater flexibility in allocating your resources," although plant design needs to address digital's typically longer processing time. Analyzing the relative costs of analog and digital equipment—including switchers, routers, and videotape recorders, the article determines that although digital devices

costs more, their greater versatility, reliability and expected price drops make long-term prospects for the digital plant “very strong (*Broadcasting & Cable*, 1993, p. D12).”

Quality also mattered. “From a technical standpoint,” Norvell said, “if you take an analog signal across 300 [feet of] cable, by the time it got to the other end, it had degraded so badly that you may not be able to decode it. The color would roll off of it. The higher frequency would go away. So, over length and through equipment, you get deterioration in the pictures, the quality, the colors... in the analog days, that stuff mattered. You had to keep your cable short. the equipment that was switching had to line it up just perfectly. In the digital world, you can push that over a thousand foot of cable, and the picture is exactly the same on the other end.”

Dedicated video cable settled some of the confusion amid the tangles. By coloring the cable jacket differently, “it helps us segregate out the old stuff from the new stuff,” Faubell said. “Anything that’s blue we know is new. Anything that’s not, rip it out. We know it’s dead. Cut it out.”

Faubell recalls his first meeting with John Norvell. In 1995, Faubell was taking a look at WTMV Tampa (now WMOR), which became Hearst’s first purchase since WCVB in Boston in 1986 (Rathbun, 1995). The Tampa station came with challenges, Faubell said. During his visit, “this guy walks in. He obviously knows his way around and everybody knows him. He walks into the shop, sits down and starts working on the tape machine.” Norvell was working full time at Home Shopping Network (HSN) at the time, but “on his way home, he would stop in and fix whatever they dumped on his bench. It was piecemeal and they’d pay him for an hour or two; whatever it took. And the more I talked to him, the more I liked him.

“I said, ‘John, would you like a full-time job here? We’re going to go crazy. We’re going to renovate this whole thing and spend a bit of money, and I need someone.’” Norvell, Faubell

recalled, “was way over-scale for what I needed in Tampa. So, I moved him to Winston-Salem. And he’s done a fabulous job.”

Norvell had worked with digital technology at Home Shopping Network. But, as with Faubell’s early experience, it was limited and not yet the “conga line” of digital start to finish. Digital equipment could improve the image on a TV or monitor that was the final product, Norvell said. Analog cameras had become digital, Norvell said, “spitting out” a digital signal.

But the kind of overhaul in file-sharing, transferring, and storage improvements in workflow that Norvell would help engineer at WXII was unknown at the time. Faubell recalled when systems ran with greenscreens on mainframes, microcomputers and dumb terminals. “There was no real intelligence in the terminal,” he said. But it was a gateway to client-server architecture, and processing power went into the desktop computers. “That’s what [Microsoft operating system] Windows brought to the party,” Faubell recalled.

For Norvell, the digital process was more than a quarter-century in the making, beginning with a network where selling did not support the product, but *was* the product. For local broadcast stations like WXII, local news is the principle product; developments in newsroom systems—the choices and perceived needs for the equipment stations used to report, produce, edit, store, and promote station content—would drive and change station workflow.

Challenges of change

Cutting old cables was not always as easy as cutting the wires that were not colored blue. Even in a business built on change—in technology, in programming, in staff and leadership, and in its daily news product—change can be traumatic. In its groupwide approach to upgrading its technology, Altman and Bracco said, Hearst tread carefully around comfort levels and even some resistance, with patience and with training.

“The fact is that change is difficult for people,” Altman said. “Even systems that don’t necessarily work that well are still the systems people know. I think getting people to trust the technology probably took the longest amount of time because initially, of course, it wasn’t necessarily as trustworthy as, you know, as the tried-and-true tape that had been in existence for 20 or 30 years. So that’s why I think it was really just more a matter of getting people to trust it and to have experience with it and realize that, you know, they were going to be some problems. Like with any new technology that we’re going to be some kinks. They were going to have to figure out what was working, what wasn’t.”

It was one thing, noted Altman, if a small station like WMUR in New Hampshire (which converted early to some of the digital technology, Brian Bracco said) didn’t have a problem with change. But WXII, with its larger size and staffing level, was another. “We have to take those things into account, in terms of which technology would work well in which location, and at what speed we could expect it to be adopted. How could that then be applied to Des Moines or Cincinnati or Baltimore? So, in the same way that the news directors communicate with each other within the group, the engineering team communicated with each other a lot at that time, about what was working and what wasn’t. That was a big help.”

As discussed, key decisions for stations were frequently made at the group level for broad strategic and financial reasons. But Price, who ran WXII from 2000 to 2014, and another Hearst station, WVTM Birmingham, Ala., prior to his retirement in 2018, asserted that digital transition strategies were also determined at the station level.

“At the local station, we were also making a system,” he said. “For instance, throughout the history of this business, when we go to a new standard, we’ve done piecemeal. And by that, I mean when we went from film to video tape it, we kind of mix and matched and so forth. And

then when we went from videotape...So, the companies make the big decisions. But the stations also had to make decisions, within the framework of the company.”

Station identification and ratings improvements

Among Price’s early decisions at WXII was an old-school one: posters. Throughout the walls of the station, Price had placed posters with guidelines, he said, learned from his decades in local television:

“•Win The Big Story

• Win Weather

• Have Fun

• Take Risks”

WXII’s newscasts were “too plain-Jane,” he concluded. “It was too much like a PBS newscast. But the bigger problem was the fact that it was on a poorly-rated TV station.” One solution, which took a far bigger commitment than posters, was to expand the relevant marketplace and cover more territory to gain more viewers.

The designated market area included three prominent cities--Greensboro, Winston-Salem, and High Point--and the market’s three network affiliates, for the most part, divided the territory. WGHP traditionally focused on High Point, WFMY on Greensboro, and WXII on Winston-Salem. Price was determined to change that.

Rennie Corley, who retired as president and general manager of WXII shortly after Hearst took over the station told *Mediaweek* in 2000 that the move to expand the station’s reach and brand beyond Winston-Salem was a decade in the making. But competitors told the publication the change in strategy accelerated considerably after Hearst purchased the station (Hudson, 2000).

The station philosophy, said former WXII news director and current general manager Michelle Butt, recalled, had been guided by geography and resources. “We’re going to take the smaller piece of the pie, but we’re going to own a hundred percent of it...unless the airport is on fire, we’re not going to go east of the airport...honest to God, they did not go across the line.”

Michelle Butt recalled a day as WXII news director when a newscast led with a weather-related story from Guilford County (east of Greensboro), and a producer looked at her quizzically. Price, who had helped bring Butt to Winston-Salem as news director, called a meeting with the newsroom staff “to tell them that the entire market is now your coverage area. Go find the very best stories all over.” Early efforts included some mutual content with the *Greensboro News & Record*, and later the *High Point Enterprise*.

Mark Strand, WXII’s marketing director at the time, said “I think Hank was a little taken aback by when he found out this strategy...playing that western Piedmont angle and basically playing to those counties that were our strengths, and pretty much ignoring the other counties in the market. From a Nielsen standpoint, that doesn’t hold water.” Strand, who promoted the station’s newscasts, recalled that “it had to be a pretty big story for us to go to Greensboro, being the Winston-Salem station.” Some people in the market, he said, still referred to the station by its earlier call letters—WSJS—when it was owned by the *Winston-Salem Journal* newspaper.

In addition to covering stories across the designated market area, Strand recalled that Price expanded station participation in such events outside Winston-Salem, such as golf tournaments, and joined various committees and groups. “He wanted to plant a flag over there in Greensboro,” Strand said, “and start waking people up to the idea of WXII being over there in Greensboro.”

The focus on the eastern part of the market had been based more on geography than technology or workflow. Former promotions director Strand recalled concern regarding whether the station could make good on its commitment to covering the entire market. But both the expanded geographic coverage and digital technology, Butt said, helped make the newsroom “very nimble.” In the past, reporters needed to be creative, and have good relationships with public information officers if they were covering stories in other parts of the market “because you were always going to be last [to arrive], just like we may always be first, depending on where it hit in this market. So, if there was a shooting and you couldn’t get there, you could at least get [the PIO] on the phone and have it as breaking news.” The opportunities for quicker movement across the market through advanced technology, “was actually one of the things that really made this newsroom and this station very ripe for early adoption [of digital technology].”

Before digital, the newsroom could still cover the market. But “there was only tape and you had to go get [the story].” And there were, she said, “things that you just weren’t going to get.” Digital technology, she said, would eventually put video in the hands of the consumer, or even newsmakers. “The fire department could send us video of a fire we couldn’t get to,” she said. Or, she said, the news department could take photos sent in by viewers and put together a slideshow on the Website. “It allowed us to cover the market more robustly. To showcase better and really take ownership of the entire market.”

Even after the station expanded its reach, said former WXII producer Kevin Kline, the three-city market seemed different from a market of a similar size centered around a single metropolitan area instead of three. Kline noted that the Austin, Texas designated market area, where he later worked—only a few places higher on the Nielsen rankings by population--was much more centered around a single, larger city (Nielsen, 2019) and seemed larger.

Price believed a key to WXII's ratings improvements in 2002 was Hearst's acquisition of Oprah Winfrey's syndicated talk show as a lead-in to its early evening newscasts. Despite the ubiquity of remote-control units, it is well known in television that lead-ins are important, and popular syndicated programming, such as *The Oprah Winfrey Show* was priced accordingly (Bednarski, 2005). WXII celebrated positive post-Oprah ratings trends briefly, with "Thank You" spots that aired briefly, although its claims to ratings supremacy were challenged by competitors. Oprah changed the game, Price insisted, and local newspapers had reported WXII's surging late night news ratings even before Oprah switched affiliation from rival WFMY (Campbell, 2002).

Sportscaster Dave Goren said the acquisition of Oprah Winfrey's show as a news lead-in was a factor in shifting the station's 5 p.m. focus away from sports scores and highlights, to more feature-oriented stories. "I remember when we got Oprah, it was more storytelling, aimed at people who would be Oprah viewers," he said.

Price said the station added a daily feature, about 20 minutes into the 5:00 p.m. news that was targeted to Oprah viewers, and the feature was promoted on the Winfrey show. "The idea was to pull WFMY and WGHP loyalists into sampling our newscasts, which we felt were by that time doing a superior job of news coverage. The rest of the newscast remained hard news." The prior 5 p.m. focus on sports, Price said, "made no sense to me" given the lead-in audience from daytime talk shows. "So, I removed sports altogether from the 5 o'clock."

Goren acknowledged, though, that competing digital platforms offered advantages in sports coverage, with their greater immediacy and absence of time constraints. It wasn't the first time the veteran sports reporter had seen such a shift, when cable began to offer news ahead of local stations. "I remember working in Providence in the mid-eighties," he recalled, "and it was right about that time you had access through either the CNN feed, the NBC feed or... we

subscribed to the Westinghouse [feed. Westinghouse Electric Corp. owned numerous radio and television stations, including the pioneering KDKA. The group was branded as “Group W.”]. You could have highlights from every game.” Weekend sports anchors tried to include a highlight from every game in every sports segment, Goren said. “But then once everybody started watching ESPN, there was really no reason to show all these games.” Still an advocate for local sports, he cautioned, “make sure you have the resources to shoot local stuff.”

On weeknights in Winston-Salem, he recalled, he had about 90 seconds, enough for “one feature story, and that’s it. And now that you have the ticker at the bottom, you can do all the scores there. But don’t forget, you still have an audience whose whole life was watching sportscasts for scores and highlights. And you were no longer giving that to them,” Goren noted.

Price’s decision to move beyond WXII’s traditional stronghold in the Winston-Salem market did not necessarily anticipate the expanded use of digital equipment, but certainly benefited from it. The efficiencies of digital technology “allowed us more equity in production across the market,” Michelle Butt said. Butt liked the changes Price brought. “Hank fixed things very quickly,” she said. “But the idea was that a good story was a good story. And then this idea of nimbleness, I think that really set them up to be incredibly successful.” While recognizing that “consumers go where the best content is,” the station, she said, did not give up its foundation in the Western part of the market. So, the newsroom had already idea undergone dramatic change, which may have helped prepare it for the changes to come.”

The station had taken steps to cover greater distance geographically. covering the short yet time-consuming distance within the station itself—to send news content from one local news production point to another without carrying it in a physical form like a beta tape would be another challenge.

Negotiating short distance

The word “television” combines Greek and Latin roots to mean, literally, viewing from a distance (Eaton, 2012)—an accurate description of the relationship between content provider and audience. But even after technology helped successfully unite content and audience over great spaces in little time, time and distance remained a challenge within a single geographic market, and even within a single broadcast facility. Decades passed before TV content could travel across airwaves between its point of origin and points of production or polish. While television content providers could transmit their messages across great distances, the producers of media content needed to transmit the message in some physical form from one transition point to another—whether in a different room or on a different room—sometimes to comic effect.

Into the 21st century, the pressures of carrying a tape from edit to air could bring chaos even to a state-of-the-art TV news operation. The Poynter Institute’s Al Tompkins noted how “[e]very day the newsroom looked like that famous scene from *Broadcast News* where some poor soul would have to sprint downstairs to make the deadline” (Frechette, 2012, para 16).

Tompkins’ reference was to a fast-paced, serio-comic scene in the 1987 film in which, on direction from a hard-driving executive producer, an assistant grabs the videocassette immediately after it is edited and embarks on a frenetic odyssey to the control room. She confronts seemingly endless obstacles including a mother and child, transport carts, trashcans, a staircase, a water cooler, and an open file drawer—negotiating them by leaping, colliding, dodging, climbing, and sliding. She manages to get the tape to air on time, limping and out of breath.

While played for comedy, the scene is one TV news veterans remember and one to which they relate. “I’ve done that,” recently retired news director and former Hearst vice president for

news Candy Altman said in an interview. Through cable or satellite, television images might travel hundreds, perhaps thousands of miles through the air. But producing those images typically required carrying a tape from one room to another or walked up a staircase. Moreover, author Philip Cianci said in an interview, although the analog tape machines used under NTSC standards had become “the way things are edited, and the way things were copied,” the more they were copied “the more the residual noise builds up and builds up and the copies aren’t so great.”

Michelle Butt, the former news director and current general manager at WXII, remembered *Broadcast News*, and that highlighted scene well. “I’ve seen the movie a thousand times,” she said in an interview. “I’ve often been referred to as ‘somebody’s Holly Hunter [the actress playing the hard-driving executive producer who ordered the last-minute change in the story].”

Nearly two decades after *Broadcast News*, news staffers at WXII helped produce a different video, one that displayed later, state-of-the-art newsroom technology in a more positive way. WXII was one of three Hearst stations highlighting their moves away from analog and toward the benefits of a digital environment in a video intended for Hearst station news executives (but shared with the author). It was presented at a Hearst affiliates meeting during the National Association of Broadcasters conference in 2007. WXII used its own example to tout the advantages of digital video and editing over analog. “It’s what you’ve been waiting for,” said an enthusiastic Lisa Fulk—an executive producer at the time. Over the moving image of a trash container filling with beta tapes, Fulk said, “We’re taking away the safety net and saying goodbye to Beta [videotape].”

WXII became the Hearst prototype for the tapeless newsroom. It took time to evolve, Price and Bracco said. But by 2007, reporters and producers logged stories into an interactive directory. Supervising newscast producers—typically titled executive producers--organized the various segments on the computer directory from inception to completion on the computer in a “rundown.” ENPS’ Rundown Rover listed and tracked stories in their various stages of writing and audio/video production. (In the United Kingdom, where ENPS debuted, the function is known as the “running order.”) Throughout the process, reporters and producers could add notes and communicate through the computer using ENPS’s Media Object Server (MOS) protocol. Messages were coded by color: a red slug (a short name for the story) line means the story has not been edited. A black slug line means the story is ready for air. A quick look allowed the reporter, a TV or Web producer, marketer, or anyone else with desktop access to ENPS to monitor the progress of stories for a particular newscast, allowing them to get an earlier start on working the story into a newscast, bringing it to the Web, or promoting it.

At the center of the production process, reporters and producers used Newscutter, a non-linear, news-centric editing system from longtime newsroom provider Avid Technology. Newscutter integrated into the ENSP system and offered the option of editing in higher or lower resolution, depending on the amount of time available. Lower resolution took about two minutes for the system to ingest for a typical story to ingest; higher resolution for the same story might have taken 10 minutes. But once the video was in the system, it became available to anyone with Avid Assist on their desktop. Reporters, producers, production assistants, supervisors, directors, graphic artists and others could view the story on their desktop computers before or during the editing process. Reporters, then, could access their stories as they write their scripts and select sound bites without waiting for a viewing station. A newscast’s executive producer could

preview the footage while putting together bumpers and teasers, which briefly preview upcoming stories at the beginning of a newscast or going into commercial breaks. TV stations had been using linear editing and videotape for decades. But the advantages of software-based editing, as part of newsroom computer systems, emerged quickly, Poynter noted. Non-linear editing software gave the editor—now, more likely a producer or reporter—"the ability to jump from any place in a sequence to any other place, forward or backward," wrote Casey Frechette, an educator with journalism think-tank, the Poynter Institute. "Along the way, it's possible to cut and insert footage, changing the order of the shots and scenes in a story ...with linear editing, edits are made sequentially. It's impractical to go backward and redo an edit once it's made, and it's challenging to preview how things are progressing until all edits are complete (Frechette, 2012, para 9)."

Think of ENPS, said former WXII general manager Hank Price, "as the brains of the newsroom." ENPS had been the center of the newsroom system for years, Price recalled, although it took a few upgrades before it was fully digital and fully interconnected. The station had a digital editing station, he recalled, not long after he arrived in 2000, replaced by the more versatile Newscutter in 2002.

Former news vice-president Candy Altman said "digital editing really had the most impact when it came to investigative stories and long-form pieces." In the past, she said, once a piece was edited, "making changes was a complete pain in the neck." The piece might have to be re-dubbed, and video might lose a generation of quality. The real transition started, she believed, with nonlinear editing. And, she noted, although the digital process is not entirely without anxiety, "you don't really have a lot of running anymore, jumping over people to get a tape into the machine, because the playback is digital."

Non-linear, said Tompkins, “allowed us to re-edit or change stories with a click of a mouse. Once the story was edited, it could be uploaded to a server for nearly instant playback. Many users could access the video at once. Since the editing was all digital, generation after generation dub after dub was the same quality as the first. Multi-channel audio editing is a breeze and it was just as easy to add transitions and effects (Frechette, 2012, para 16).”

Dave Goren remembers the training for nonlinear editing. Goren was a near-20-year WXII veteran, reporting and anchoring sports. Any time the station got a new piece of equipment, he said, “I was all for it. I’d rather be ahead of the times than behind it.” If the equipment made him more efficient, he said, it would allow him more time for reporting, writing, “logging interviews, or just having the time to think creatively as you wrote.”

Goren recalls classes in editing in two to three-hour sessions spread out over about a week. The sessions included people from different shifts, and they were paid for their time, he recalled. At first, he recalled, “It seemed like I was taking Chinese. I didn’t understand a word of it. I didn’t know any of the characters and I thought ‘I’m never going to be able to adapt’.” But the training, first in nonlinear editing on Avid equipment, proved useful. It eliminated steps. “I worked more efficiently,” he said. Digital made it easier to find specific shots or moments. “Anyone who’s come up through weekend sport knows you have to edit fast.” A weekend sportscaster might have to compile highlights of 13-15 games, with little, if any, of the footage available before very late afternoon, or late evening for night games.

The relatively brief training made a difference, he recalled. His added skills, he said, were fine “for the stuff we did. We weren’t there to edit effects for motion pictures. We were there to do news stories.” Effects such as “dissolves” and “wipes” came in time, and helped with longer, more compelling features. Wipes and dissolves are among video techniques transitioning one

shot to another. In a dissolve, one shot gradually disappears as a second shot becomes more visible. With a wipe, one shot appears to be pushing another off screen, and may come from either side, top or bottom.

Kevin Kline had just graduated from Elon University in 2009 when he joined WXII as a weekend assignment editor. He became a news producer and worked on the station's social media. Kline had never worked with analog technology, and recalled his enthusiasm over station innovations using digital techniques. Kline called using iPads for anchors to read scripts "a great move." But change can bring new challenges: there were accompanying problems with calling up the right script at the right time. The normally convenient swipe had to be carefully done, or the iPad would advance several pages.

The solution was somewhat retro. Kline said he would print out the script, and scan the copy to be read as a PDF (portable document format) on the iPad. "It was just an example of thinking outside the box to find a good solution," Kline recalled. "Before, if we did remote shoots, the anchor would need the scripts printed out and brought to them. Eventually, we would use iPads to write, and even display in real time," said Kline, now a project manager based in Europe for a U.S. technology company. "But early on the technology was helpful, but buggy."

Kline was enthusiastic about the technology, but Martin Faubell said he laughs when less-experienced staffers complain about the difficulties of editing today, or generating graphics. "It's so much easier today," he said, "than physically editing videotape. They have no idea."

Faubell recalled earlier times, watching station staff "cutting pictures out of magazines" for graphics. Later, stations might spend \$100 thousand on single piece of equipment for computer graphics using still images, or the same amount for a Chyron, which produces text-based graphics that typically run at the bottom of a screen. "I mean, look what we've done, the

graphics, we want to monetize it with photoshop. Then stations might spend \$100 thousand for a “paint box”. And I laugh today,” he said. “Look what we’ve done with programs like Photoshop.”

Streamlining the overall process has always been the goal in television station technology. Headlines in trade magazine *Broadcasting’s* (later *Broadcasting & Cable*) coverage of technology and trade shows going back to the 1980s highlights greater features and productivity, and lower cost. “In the volatile production and post-production side of the video equipment marketplace, the trend toward integration of companies with complementing product lines has been evident for the past few years, but never more so than at the 1986 NAB convention” (*Broadcasting*, 1986, p. 56).

Nonlinear editing offered fluid, flexible movement from one point in an edit to another, making for a nimbler process and fewer compromises. Moreover, video editing software is nondestructive; it does not deteriorate the video in the way continued duplicating of tape would. In addition, changes made in nonlinear editing are reversible, including restoration of cut footage (Frechette, 2012).

Nonlinear editing proved the key to digital workflow, John Norvell observed. “Once everything goes nonlinear,” he said, “and all the formats match up and all the vendors get on the same page with how they process and handle things, it makes it a little easier.”

Digital networking vs. U.S. Mail

Former news vice president Brian Bracco, who advised WXII and other stations, explained the thought process behind the switch from tape. “We were going to have to put a lot of money into traditional broadcast,” he said. “We were going to have to re-outfit them. We were

at that tipping point, whether we go invest in tape, or we go digital and we said, 'let's roll.' ...we had a receptive station, and it worked; it actually worked."

Bracco lauded the versatility of the open system. "We could buy a computer, but it didn't have to be an Avid computer," he noted. "We could just buy a computer and put it in the [expansion] cards."

Digital technology offered solutions to challenges of time and space well beyond the station and the market. Networking with other Hearst stations was an increasing priority, Bracco said. Earlier, analog technology made transferring news packages among the Hearst markets difficult-to-impossible. "We had 23 stations with excellent journalists in them; they were doing great work in their markets," he said. "In the old days [their work] would sit in that market and rarely go outside that market." If a story was deemed worthy, a videotape might be shipped from one market to others. Network feeds contributed stories from Hearst and other groups' affiliated stations, but Hearst had more than one network affiliations among its stations. A Hearst story's distribution would be limited to stations receiving the same network feed. Otherwise, Hearst stations might send it to their Washington bureau, Bracco said, "and we'd have to satellite it out. We'd have to jump through 20 hoops to get that to 23 states."

Those hoops included mail carriage, from market to market. "I remember sending people to the bus station to pick up a package," Fred Young, Hearst's first vice president for news said. "That tape still might not get on the air two hours from the point the guy arrived at the bus station to pick it up. And now, somebody emails it to us six seconds after it happened. Go figure."

With digital feeds through computer systems, Bracco said, "if we did a story in Omaha and it was really good, everybody in the group could see it and plug in that story." With satellite

expenses running into six- and seven-figures yearly, Hearst-Argyle decided in 2001 to partner with Loral Space & Communications to create a dedicated satellite service to share stories among Hearst's Washington news bureau and its stations.

Candy Altman recalled an analog "Friday feed" where video and audio were uploaded by satellite to the group's Washington bureau —"the one or two stories stations wanted to share with the group"— and those stories would have to be cut into a reel, and then uploaded again. And now everybody just posts them in a file. With data transmission, stations can share faster and share more stories, including breaking news like weather."

The benefits of the open system, and particularly simultaneous access to video, carried repercussions beyond newsrooms. In the past, former WXII promotions director Mark Strand said, he might have gone into the newsroom to inquire about stories. "You literally went up to a reporter and said, 'okay, tell me about your story. What are your angles? Who did you talk to? What did they say? What's your best sound? What's your best video?'"

The access provided by the ENPS system, said, made promoting upcoming newscasts much easier, by allowing the station's promotions department to see the upcoming stories. Simultaneous access to the video "makes our life easier because we don't have to hunt people down" which, he acknowledged, could be distracting for a reporter or producer, or "fight for a tape in an edit bay. We can get an idea of where they are on their story, whether it's written, whether it's in the process of being written, or whether it hasn't been written at all" thanks to the ENPS system, he said. Contact between news and marketing continued and continues today, he said, and the challenge for marketers to get to the news in a timely way for promotion remains. But the digital editing in the ENPS system brought improvements in marketing the newscasts.

Even with the accelerated access, Bracco said there was never any temptation to fill newscasts with stories from other markets and cut back on local staff and production. “We could share everything and homogenize the local newscast,” he said. “But I don’t think anybody in our company would have stood for that.” News, Bracco said, “was in our DNA.” News, including news features, needed to be local, produced by people who know their markets, Bracco said. In addition to the group’s long list of plaudits, Hearst executives cite its stations’ success with viewers. The group, Bracco said, sought a benchmark, that 70 or 80 percent of its stations rate number one or number two in their newscasts. “We always beat that benchmark. That speaks volumes,” he said, crediting “our managers at these individual stations, who are able to take the research and figure out what they needed to do to make be successful in their markets.”

Former WXII general manager Hank Price, who had predicted job elimination from digital technology as far back as 1998, said that at Hearst, he was able to keep staff through shuffling and retraining for digital positions. Budget approval from upper management for new positions at the station’s Internet and other digital businesses, he said, would have been more difficult to attain.

Online content

In 1999, Hearst decided its early Websites ranged from “very, very good to not so good (Lafayette, 1999).” Having grown substantially from the Argyle and Pulitzer station purchases, the company invested \$20 million for a 30 percent stake in Internet Broadcast Systems (IBS). As part of the deal, IBS would build Websites for all Hearst stations. IBS already provided news, information and entertainment portals for several stations and station groups in the U.S. and Canada. “The deal makes Hearst-Argyle [as it was known at the time] an Internet leader in the broadcast industry, where many station owners have been looking for ways into the portal

business,” said industry publication *Electronic Media*. Hearst said it had been looking for ways to better engage viewers and advertisers, repurpose programming, and prepare for interactive television and e-commerce (Lafayette, 1999, p. 1A).

IBS grew out of the website created in 1996 at WCCO Minneapolis by news director Reid Johnson. Over time, IBS served numerous prominent station groups besides Hearst, including McGraw-Hill and Post-Newsweek, CNN, WRAL and others, sometimes as part of an equity deal. As with other groups, in its deal with Hearst and WXII, IBS provided design and launch services, Web journalists, national news, and salespeople. Technology support for all stations came from Minneapolis. WXII supplied local news and video, and promotion on the station. “That’s the only way,” said CEO Tolman Geffs. “If you’re going to win, you’ve got to have somebody who cares. And we’re in business with them to make this win (Greene, 2000, p. 66).”

Hearst worried at first about culture clash between the separate IBS and Hearst news and sales staffs, but they eventually interacted as partners (Owen, 2000). Former WXII producer Kevin Kline said he had a good working relationship with the “outsourced” staff from IBS while working on the Website. If, for instance, he had reported a story, he’d be able to write it from his notes while someone from IBS was saving the station time by putting together brief stories from one or two police press releases (see Huang & Heider, 2007).

Writing about TV network Websites, Liu and Chan-Olmsted divided the resources involved into property-based—provided by the television companies, and knowledge-based—provided by Internet firms such as IBS. The television companies, they said, parlayed their property resources into Internet alliances, gaining access to the Internet firms’ knowledge, which was “essential in creating an Internet presence for the broadcasters” (Liu & Chan-Olmsted, 2003).

Since the Website ran out of station computers, buying equipment was unnecessary, Price said. The costs to the station came with file server rentals (cloud technology), and staffing.

Geffs said at the time that IBS and Hearst-Argyle considered using a station's Website as a "local portal" to be an old approach (Greene, 2000, p. 82). Chan-Olmsted and Park concluded, similarly, in 2000, that fewer than half the 300 local station Websites they studied were continuing their initial approaches as local content hubs. Such hubs offered such community information as classified-type ads and directories. Local stations, they said, had moved toward emphasizing news and programming in online content, and used the Website as a text-oriented tool for headline news and programming information. Fewer than half the 300 local station Websites they studied continued as local content hubs, which offered such community information as classified-type ads and directories (Chan-Olmsted & Park, 2000).

Again, economies of scale seemed to have been at play with IBS' relationships to station groups. Sources cited in *Broadcasting & Cable* magazine suggested the IBS deals disfavored small broadcast groups unable to bring "big distribution clout" into its Web networks. Sources in the magazine article also questioned how lucrative Website advertising might be, since higher-trafficked newspaper sites struggled financially (Greene, 2000, p. 70).

Like IBS, *Broadcasting & Cable* reported, its competitor, WorldNow, listed mostly station groups among clients, although it also served single stations and smaller groups. WorldNow provided the technology to host and maintain a station's Web site, training, support and some aggregated national content. Stations provided local content, promotion and sales (Greene, 2000).

"None of us knew what we were doing," said Hank Price, who ran WXII and later WVTM for Hearst. Price said he had disagreed with the portal approach. "Hearst took the

position with many others—and which I disagreed with—that your Website should not be tied to your TV station. Your website should be a community portal. And therefore, in Milwaukee [where Hearst owns WISN], the website up there was called the Milwaukee channel.com, WXII’s was originally called the Piedmont Channel. And the idea was to be a community portal. I tell from the beginning that the value that this thing was only going to have value if its brand was tied to our television brand, and that people would seek it out if they saw it as part of what they valued with the television news.”

In August 2002, WXII kept the Website, but changed its brand, dropping “The Piedmont Channel” from its website and promotions. From a marketing perspective, Price said he worried that too many brands on TV and its Website sent viewers too many messages. One brand, he said, would simplify things (Kritzer, 2002). “We had so many brand and marketing slogans back then,” the station’s promotions director at the time, Mark Strand, said, in an interview.

Price said the station received early, positive email feedback regarding the branding change. The station, Price said, had been seeing improved ratings, and retained the brand “WXII 12” (Kritzer, 2002).

The community portal did accommodate some station creativity. Price and current news director Lisa Fulk, who worked closely on the digital migration at WXII, recalled a pitch from morning news director Judy Stone. “She had a great idea,” Fulk said, to start a wedding page and put all things wedding-related on it. She even helped with the layout, and grew it from the ground up.’ With the go-ahead from Price and other managers, Stone contacted photographers and other wedding professionals to contribute content. She asked reporters and anchors—typically celebrities in their markets--to share video and photos from their own weddings on the page. Both Price and Fulk said the station was careful to separate content from sales. Although it

initially posted promotional content for free, the station's wedding page eventually became a moneymaker, earning \$50,000 a year, according to Price—not a huge sum by television standards, but significant online, especially in the earlier days.

Price recalls being satisfied with the news content provided by IBS, but frustrated with the cost. Designating profits proved a challenge, he said because advertisers were not seeing return on their Internet investment. A Website might draw viewers from all over, but that did not serve local advertisers. Web specials designed to measure local ad effectiveness did not convert to customers, Price said. While dollars went on the books as Internet ads, local stations frequently made up for discontent by providing additional or discounted broadcast advertising time, according to Price and other station executives. Over time, the Web would become profitable for local stations. But early on, the stations were using it as a loss leader—or, Price believes, as brand extension—for the broadcast channel, even if the books showed the sites to be more viable.

“It was quite expensive,” he said. Although IBS was a group deal, “we had a cost line on our budget. So, we were paying it. And you have to ask, ‘Is this a bottomless pit?’ Obviously, we needed to sell advertising on the Web. But that was very hard to do; we didn’t have mobile yet. A lot of people didn’t have high-speed Internet; you still had a lot of people with no Internet at all.” Price and other executives said changes brought by smart phones, video streaming, and high-speed Internet helped stations cross into real profitability around 2009 or 2010. “But, he recalled, “we said, ‘What’s the future?’ We thought there was a future there.” Among the game-changers online, Price said, were high-speed Internet, improvements in video streaming, and smart phones—which contributed to his and other stations extending their brands not only on the Internet, but through phone applications (apps).

In 2014, the giant Nexstar Broadcasting Group purchased IBS for \$20 million. Although Hearst renewed its agreement with IBS, now known as Internet Broadcasting, it has also advanced its own networks for information exchange, Price said, and added centralized desks for clearing content in Pittsburgh, Kansas City, and Orlando.

Television stations' online presence continues to evolve. Commercially, Price and other executives noted, it does not bring the dollars or the profit margins long associated with local television. It is, however, a necessity, and an increasingly integrated platform for WXII's content and brand.

Changing newsroom mindsets

Lisa Fulk believes it helped her work with the Internet and other digital efforts that she came from the newsroom, and not from outside the station. "It all intertwines," she said. "I would communicate with producers and let them know what's popular on the web, so that they could also promote things within the newscast to push to content on the website--whether it was additional content or maybe something that didn't make the newscast. I was still working very closely with everyone in a newsroom.

"Having good relationships with coworkers is always a plus. I really worked hard trying to get everyone involved in participating or contributing to the web. That was our station's goal. With Hank's support and Barry's support, we encouraged everyone in every department, whether it was master control, promotion... not just news, to find a niche in a way they could contribute to getting content on the web. Our directors would post video of stories that we had aired in the newscast."

Content has changed over the subsequent years, she noted, "we don't put everything on our website. We learned from research, you learn from the tools you have, that show you what

people are clicking on and what they're not clicking on. People don't want to go to your website and see an archive of your television newscasts anymore." Visitors might, however, want the big story of the day, "and they want more and more info throughout the day as the story progresses. So, you pick things that are top-of-mind daily to focus on with the web. We know that only so many stories are going to perform well. And if you're spending time putting everything on there and no one looking at it, then that's a waste of time."

Changes in established patterns of news production and distribution created new challenges, pitting the time-sensitive value of news against the new concept of news space. Producers were wary of breaking a story on the station's Web page, Fulk said, and giving competitors a chance to catch up in time for the next newscast. "There was the idea that the other competitors would scoop you if you held it, or if you got it out there on the web before we got it out there in the newscasts, they [competitors] know about the story. They can go after the story. Then, it's not an exclusive story."

"We know a story," she said. "Do we go ahead and put it out on our website or do we hold it and break it first on the next upcoming newscasts like 5:00 PM or 6:00 PM, so that the competition doesn't get a hold of it? A lot of the time, there's that discussion. Maybe we should hold it till 4:45 and then put it out on the web?"

In the past, she said, the station might hold it to lead the 5 o'clock newscast and "We're not going to put it on the web yet. We're going to put it on the web after the story. It's the complete opposite now. It's just so amazing how everything has evolved and changed." Online updates for a big story, Fulk said the Web could not only supplement on-air reporting but also, likely drive people to the newscast.

Today, she said, “it’s ‘get it on now’ because people have their mobile device ‘get it out on the web,’ ‘get it out on the mobile,’ ‘extend the push alert... People are consuming news all day, 24/7, on their mobile device, on the web... You don’t wait till the television newscasts. But that [traditional mindset] was really hard to overcome; that was a hard transition.”

Barry Klaus, who was news director at the time, remembered the mindset and the transition. “The Internet was second tier to television. And there was some breaking news in the afternoon, and we were going to post the breaking news on the website a couple of hours ahead of the 5:00 news. And I remember saying in the newsroom that if we did that, would we be giving the opportunity for the competition to get on the story and be competitive and perhaps even a beat us at 5:00.

“And I remember thinking about that,” he recalled, but noted that “yeah, they could beat us if we rolled over and played dead. I mean we had to post the story and then keep advancing it. We’re starting to realize that people were online, and those were our viewers. And that was, in a sense, part of that--that period when we were realizing that we needed to think of ourselves more as a digital news operation and not just the TV news operation.”

“Television definitely was in the hearts and minds of the organization,” he recalled. “No question about that. But I process it this way: we posted online at 2:00 or 2:30 or whatever. And then at 5:00 we do something else. Well we’re no longer breaking it. We broke it at 2:30. The 6:00 show used to be the ‘show of record.’ So, if you broke it at five where you, then there’s the opportunity to have a big splash at six, and then what about late night? So, there’s always something out there. There was always something next. We just had to get comfortable with the idea that people were at work, they were online...whether it was the desktops--back in the day--or then mobile. We were getting comfortable with the idea that if we could reach them and

connect with them, it doesn't matter what platform we connect with them on as long as they're getting it from us."

"People are consuming news 24/7," Fulk said. "You don't wait." But the established mindset, she said, was really hard to overcome. That was a hard transition."

Parallel challenges already existed in allocating big stories—as business resources—to specific newscasts. Referring to ratings "books," Klaus said, "You typically have a show that you're targeting" for improved ratings. "You might start a book targeting your 11 o'clock news. You've developed a commanding lead in all your other shows, and you want to pump up the 11.

"Well then, you're saying that that's got a different set of priorities, a greater level of importance than the earlier shows had. And what does that mean? Does that mean you're all about the 11? So, you throw everything you have at that one news catch for the last week of the book? I remember doing that...ultimately we got to where the brand was the most important thing, and the delivery system needed to be secondary to that." The more modern mindset helped in transitioning to more mobile delivery systems which, Klaus recalled, came faster than expected.

Fulk said that even as she oversaw Web content, she continued working closely with the newsroom. But, she said, she did not discuss with producers what was popular on the Web or push them toward popular Web subjects. Stories, she said, might be "additional content, or something that didn't make the newscast."

"I was one of the news producers who had an interest in working on the digital side," said Kevin Kline, who worked at WXII in 2009-2010. During that time, he recalled, the Website's main page offered an online slide show of rotating stories. On weekends or mornings, when he had more responsibility, Kline said he made sure each story had been replaced during the shift.

The Website, he said, was set up to automatically feed the station's Twitter account and eventually its phone application (app). Content, then, could be repurposed and the station's brand extended to additional platforms.

"We did push for additional content," he said, and adding a human element to Web content. Before each newscast, he said, "we got our weather-people to tweet a forecast." And on the station's Facebook page, anchors Nicole Ducouer or Kimberly Van Scoy recorded a three-headline tease. Kline thought the content was particularly effective in the mornings, "when people are waking up, and looking at their phone. We'd catch them first thing."

To fully exploit the flexibility offered by a Website's 24-hour presence and unrestricted cyberspace, news managers had to think beyond the traditional box and, as they explain, reversing years—even decades—of strategic thinking focused on newscasts and ratings books. Over time, online updates became more frequent and station Websites, including WXII's, not only provide independent content, but break stories and supplement broadcast stories.

In the field

Among the most direct ways to minimize newsroom workflow is to avoid the newsroom altogether. Local and network programming—particularly sports—had been broadcasting from outside regular facilities for years. But digital technology accommodated it with speed, efficiency, and portability. As of 1999, due to the uncertainty of spectrum and the cost of COFDM (Coded Orthogonal Frequency Division Multiplex, a method of encoding digital data)-equipped trucks with digital transmitter and antenna—starting at \$100,000--TV stations continued to replace worn units with traditional, analog ENG, said Shook Electronics President Ron Crockett, even as TV news expanded live coverage.

While WXII is identified by its three cities—Winston-Salem, Greensboro, and High Point, much of the market is rural, and provided Hearst with challenges of population density and topography. “It’s not a big station,” Bracco said. It wasn’t our Sacramento station. It’s got more hills; terrain was an issue. Some of our stations had older equipment, maybe even hand-me-down equipment. There was a thought process: Do we buy 10 more new cameras, and 10 more [editing stations]? Or do we say we’re going to buy 10 more new cameras, and maybe laptops, and go all-digital and move away from the videotape and all that? Does that make dollar-sense to do that?

It was one thing, noted news vice president Candy Altman, if WMUR didn’t have a problem with change. But WXII, with its larger size and staffing level, was another. “We have to take those things into account, in terms of which technology would work well in which location, and at what speed we could expect it to be adopted,” she said.

Hearst’s long-established and mutually beneficial relationship had the company considering Sony “top to bottom” for cameras. But prior to the 2000 National Association of Broadcasters annual convention—the industry’s largest trade show in 2000--Hearst put in a sizable order for Panasonic’s DVCPRO digital cameras to replace the Sony BetaCams at several stations and bureaus. Panasonic had made inroads with its digital cameras, (Dickson, 2000), and the DVCPRO had its fans, Bracco noted, particularly among management at Hearst’s recently acquired stations.

WXII was not among the stations receiving the Panasonic cameras from the 2000 order, Price said, as he preferred to go all-digital at once with his field cameras, rather than change “piecemeal.” In fact, he noted, over the years his station took cast-off Betacams from the stations that were getting the newer Panasonic cameras. Price said he preferred the used cameras to new

ones, so that his station eventually would have the latest new technology toward a replacement cycle once the station went all-digital.

Despite the large 2000 purchase from Panasonic, Price, Bracco, and Faubell agreed that Sony remained Hearst's preferred manufacturer. Sony had offered digital cameras that sold for more than \$30 thousand each, Price recalled, while Panasonic's cost less than half that. But Faubell said he wanted more out of Sony in terms of quality and features. Sony had a digital camera, but Hearst considered it too expensive, and lacking in certain areas. "Sony had had a history of trying to convince the market that Sony had a better idea... a better mouse trap," said Faubell. But, he recalled, the company was listening less to its American customers and even its American representatives on some issues regarding cameras. Hearst wanted portability in camera size and storage, and audio capabilities. "It finally got down to the point where I had a long and difficult conversation with the Sony executives in America. I said, you know, I'm about to make a decision here and it's not going to go your way. And, you know, I said, you need to tell [Sony executives in] Japan, because of our relationship, that I want them to hear it from me before they read about it or hear back from you that you guys lost the deal."

The U.S. Sony representatives asked for time "So, the next afternoon, sure enough they call me and said 'if you tell us what you want, give us the opportunity. I said, 'Fine. Here's what we want and here's what we're going to pay for it...And they came they came back and showed me the prototype. It has since gone on to become [Sony's] best-selling ENG (electronic news gathering] camera."

"Marty designed that camera, and told Sony what we were going to pay," Price recalled. The Sony cameras cost a few thousand dollars more but offered the features Faubell sought. Price said the new Sony cameras, which WXII received about 2009-2010, were small without

being flimsy, and—on top of Hearst’s wish list—carried SD 9 secure digital, card-based storage and advanced digital, chip-based zoom capability, which Faubell and other Hearst executives preferred to heavier optical (lens-based) zoom capability.

Bracco called the negotiation “brilliant. Marty saw the future. He saw where it was going. Card storage was platform agnostic—you could stick a memory card into anything.”

And, as Faubell noted, SD cards could be purchased anywhere. Indeed, Price noted that one of his videographers ran out of memory while working in the field, and bought a new SD card at a Walgreen’s.

These were big purchases, Hearst executives noted, totaling millions of dollars. “It started with what are we going to shoot it on and what are we going to record it on? We’re not doing ‘high-def’ video tape.” And while some of the “also ran” vendors were offering memory cards, Sony had a proprietary version—taking away the ease of replacement. Faubell said he suggested they make an adapter that for their cards. “That way, you don’t say uncle,” he recalls telling Sony executives, and he didn’t have to settle for a memory card he didn’t want. “So, they came up with an adapter. I didn’t understand their point of view. They didn’t understand mine, So, let’s figure out how we can do this. And they did. I give them a lot of credit.”

Brian Bracco said adding technology sometimes meant a “shadow budget,” for digital, in addition to the standard technical budget, depending on where the station’s conversion fit into the group’s overall strategy. Stations would submit their normal budgets, including such capital expenses as cameras, ENG trucks, etc. Bracco, who was a Hearst news director for years before becoming news vice president, recalled that the standard budget would “go to New York and to [longtime Hearst Television president, now retired] David Barrett and everybody would bless it and okay that budget.” Bracco said that each year different stations would be targeted for digital

adoption, and he would meet and conference with general managers and station engineers to prioritize digital expenses beyond the capital budget—“over and above what they wanted.”

The move from outside to Hearst’s own in-house network consulting also was not in anticipation of the coming digital transition, Fred Young recalled. But the approach proved useful. Hearst brought the same in-house approach to its digital conversions. “We were all going to digital,” Brian Bracco recalled. “It meant we had to change the course over a one- or two-year period just because of the rapid acceptance of this as a means to get news out in a more-timely fashion.” Bracco recalls planning and putting the plan in motion, beginning around 2004-2005, and lasting until about 2011, when—although TV stations frequently upgrade equipment--digital had become the norm. But changing hearts and minds was as much a part of the challenge as changing equipment.

“Digital was the word, the thing everybody was talking about,” Bracco recalled. Television was losing viewers to cable, then-President David Barrett told Hearst executives, and people are also looking at their computers.

“When the digital revolution came and we needed to transition a lot of people who had been doing television the same way for a number of years,” Bracco said. “We could have hired somebody on the outside to come in and say, ‘Okay, here’s an Apple iPhone, here’s how you can take the picture and edit it. Here’s how you can do FaceTime, here’s how you can get a video on the air in 2.5 seconds... We could have hired someone to do that. But we decided not to.”

“So, it kind of fell upon me, to then go out to individual stations and hire people—or not hire; borrow people who had real expertise in different areas.” Bracco said he pulled together a team that included an executive producer, a photographer, and a reporter, and others—from Hearst stations—selected for their aptitude with technology. “We then created a program

basically, of how we're going to move into next-generation news; how we're going to transition from the heavy camera and go out, shoot, edit, come back and be done. We did everything from nuts and bolts to editing from the field and everything else." By drawing the team from skilled Hearst staffers, "we had street cred walking in," Bracco said. "We had a photographer teaching photographers, a reporter teaching reporters, a producer teaching producers...and they were all from our company."

WMUR, Hearst's relatively small New Hampshire station was the first to really advance mobile technologies, Bracco said. Its adjacent Boston station in the same market—Hearst's largest—was among the last. An advantage of the smaller station, he said, was that many on the staff were in their first or second job and "weren't so entrenched" in older ways of doing things."

"We came up and we showed them," Bracco said. "We did kind of a little dog and pony. And at the end of the day we gave them all cell phones and laptops, and all this stuff in a big packet. And a little bag, sort of like a backpack.

"The room just exploded. They said, 'Really? You're going to give us all this stuff?' And they didn't know the consequences of it. I don't think we knew the consequences of it.

"Like anything else, you use the word 'change' and everybody says 'Why?' or 'No, we don't need to.' We were mindful and conscious that there could be resistance, whether it be from photographers, from reporters, from producers, whatever. But I think what mitigated that to a large degree was when their own colleagues from their own stations within their own company, came in and said 'this is the next greatest thing; we need to embrace that.' It made it much easier."

WXII, he recalled, was in the second tier of mobile reporting technologies, advancing most after 2007. As a group, Bracco said, "I think we were an early adopter. And to this day, all

this stuff is changing. If I went back and looked at the of the course we put together for the station in New Hampshire, I think we would all probably laughed saying, ‘that looks like, you know, tinker toys.’”

Laptops, Bracco said, “could be taken out into the field, they could be taken to Timbuktu.” And the ENPS interface, he said, allowed reporters and producers in the field to link to story rundowns or video in other Hearst markets.

“We taught them how to shoot with cell cameras and high-end small commercial digital cameras,” Bracco recalled “We taught them how to transfer back to the station the video, how to ingest the video and in some cases, how to edit digitally...to go live with Skype via cell. It was all part of the digital ecosystem we were trying to get stations to adopt.

“One size did not fit all...and although they all got the training...and tools (cell phones small commercial digital cameras) and how to use them...it was up to each of the stations as to how they employed the technology and when.” At some stations, union contracts restricted news staff from crossing into different functions, although eventually contracts became more flexible. “Many stations embraced the concepts. ‘all in’ some, in baby steps,” Bracco said. “In some cases it freed reporters to create their own story from beginning to end. And in some cases (where possible) gave photographers a chance to be heard too. By giving each digital cell phones for example...we doubled the size of people able to shoot video. It just made good sense to train and given them the digital tools. They come upon an accident, tornados etc. ...”

It was never about cutting costs, Bracco said, noting the added expense of the tools. “It was all about the digital revolution before us and the new technology to embrace....just a new way of telling stories. It was about change.”

Former producer Kevin Kline was at WXII for the expanded use and training with laptops and phones at WXII. The new approach, he said, streamlined producing and editing stories, and diminished the use of the ENG/satellite trucks. The new equipment also helped reporting from the field beyond audio and video, Kline recalled. “You could look up information,” he said, instead of having to rely on the newsroom. “You could track sources, make calls...you could write the script. The technology was not that difficult,” he said. “We focused on reporting.”

Hearst has resisted using such phrases as “one-man-band” or “digital journalism” to describe the approach. “We are supplementing existing news technology, not replacing it,” said Joe Addalia, director of technology projects for Hearst, in 2010. “We just call them reporters. We don’t make a distinction between digital and broadcasting (Beacham, 2010, para 2).

Bracco’s former colleague Fred Young, who retired about the time Hearst introduced its “Next Gen” reporting recalled having mixed feelings. Any apprehensiveness, he said, would have been based on the use of one-person crews less to keep costs down by eliminating reporters or photographers, particularly in station groups “less committed to news.” Today, he feels more positively. “I think the cell phone and the technology have changed it all,” he said, “so that everywhere you go you can capture stories...you can capture video...you can do a piece, and edit it on a cell phone.”

Young now thinks the new technology has helped reinvigorate stations’ focus on local news. With newspapers fading and television losing viewers to other platforms, local news becomes increasingly important for stations. “It’s okay to be a young person in the business again,” he said.

Some journalists have always been inseparable from their technology, he said. Young cited a comment from a guest speaker in an ethics class he taught—iconic Boston photographer Stanley Forman, who won two Pulitzer Prizes in a row as a newspaper photographer. Forman has worked for Hearst’s WCVB since 1983. Forman, Young said, “is still the guy who sleeps with a police scanner.” He said Forman told his class, “‘You know, when I get up in the middle of the night run to a fire or an accident, I used to try to be first. Now, everybody is there with a cell phone. Every person in the community is my competitor.’”

Smart phones, memory cards and laptops offered more flexibility and nimbleness than more expensive and cumbersome ENG and SNG (satellite news gathering) vans and trucks. ENG vans’ high masts, maximize the line-of-sight for the use of microwave; satellite use is the last resort, due to its cost. The Greensboro-Winston-Salem-High Point market does not cover the most varied terrain in the country. But it has mountains—including the prominent Pilot Mountain, and nearby Sauratown Mountains—and valleys. Electronic Newsgathering (ENG) trucks, which could cost well into six figures, could link via microwave or satellite transmission. Over time, ENG trucks developed into mobile newsrooms, with onboard editing stations, and high-definition transmission allowing less training, and reporters or producers to transmit packages rather than simple video and audio. But smaller and even more mobile technologies have made them less of a necessity.

Digital equipment’s smaller size and online transmission made the mobile newsroom even more portable, allowing editing and graphics using laptop computers. Bracco recalled that the phones kept getting better and the backpacks got smaller and more compact. Reporters have been able to send stories online, Bracco said, for more than 10 years, even with 3G (albeit not always reliably). He and Price agree that 5G could be another game-changer in the future.

The market next door

In WXII's neighboring Raleigh market, John Conway, a former newspaper reporter who has been with Capitol Broadcasting for most of the past 25 years and runs its digital division, said that WRAL was in early and big on the Internet, and treated it like a business and not a loss-leader or an obligation. "We focused on it back in 1996," he said. "We ran a full-fledged website when other people weren't even thinking about it." Other stations, he said, "might put up a Website and update it once every 24 hours. We were updating around the clock and built what eventually became the largest digital media property in the state of North Carolina.

"I wouldn't say we monetized it quickly, but we were able to monetize it because the WRAL had decided to focus on building out digital properties when most people treated them as like a novelty or as something to dabble in." Other stations, he said, did not dedicate staff or create a separate division, which WRAL did in 2005 with Capitol Broadcasting Co.'s New Media" (a photo at WRAL's Website shows Conway and others at the launch of WRAL.com in 1996.)

WRAL had its own history with IBS, and Conway left the station to work for IBS, and later for the University of North Carolina (his alma mater), before returning to Capitol Broadcasting. The New Media division, CBC says, "builds and operates digital news and information platforms" and "delivers rich, locally-oriented content and sales and marketing solutions on desktop browsers, tablets and mobile phones (Worthington, 2020, para 15)." It employs 55 people, Conway said (a fact for which Hank Price commented, "Wow.").

Conway agreed with former WRAL general manager Steve Hammel that the Capitol's willingness to invest and its streamlined management have been important for its digital innovation.

Tenured management

Hearst managers said the company did not use its digital efficiencies to reduce staff. “There was never, never, any thought, or anyone saying, ‘we can do this and eliminate jobs,’” news vice president Brian Bracco said. “That couldn’t be further from the truth. That never changed. The hope was that we could get better product, quicker, for multiple sources. That goes back, I think to our standards and practices, and to who’s running the ship. Are there are stations that want to go to the lowest common denominator? You bet. But I’m not so sure that they’ll be the winners in the long run.”

Price, who noted that it would be easier to keep positions than to gain new ones, said he knew the stations would be needing more staff as its digital business grew, and offered training for new positions. Price said he told staff, “‘So, if you’re a master control operator, if you’re a director, if you do graphics...a lot of the things that we do now, if you just look down the line, you can see that those things going to be replaced. So, what I’d like to do is I’d like to offer any of you the opportunity to in your spare time to work on figure out this web thing.’” Hearst executives agreed that staff stability and morale were related and valued.

All of those contacted in Hearst management agreed that the skillsets and attitudes of their colleagues regarding change and innovation—and management’s relative stability-- contributed to significant advancement at WXII and other stations (Steve Hammel, a news and management veteran who for 10 years ran WXII’s neighbor station, WRAL, noted in an interview that two years was typical for a station news director’s tenure). But the Hearst group’s newly expanded size increased not only its already considerable influence with major vendors, and contributed to its restructuring its efforts in news consulting, but also brought new opportunities for valued employees’ advancement.

Michelle Butt had been assistant news director at WTAE in Pittsburgh, one of Hearst's biggest stations "I would have been there longer," she recalled in an interview, "but Fred Young said to me, 'we're buying this station. It's in Winston Salem, you know, you know the area-- being from there, and having worked in Raleigh at WRAL.'" Young said the group needed someone who understood the diverse culture to be news director, and that the group thought a lot of her. "And that was why I went. I knew the Hearst culture." Butt left WXII in 2003 and spent 12 years as news director at Hearst's WBAL, in the larger Baltimore market, and returned to Winston-Salem as WXII's general manager when Price moved out to run Hearst's station in Birmingham, Ala. "You get a chance to prove that besides just knowing your value, you understand the values of the company" Butt said. "And that's why we don't leave, because we keep getting opportunity inside the company to do other things and grow. And we liked the culture and management, and leadership trusts that we can bring the culture to the people at the station."

Barry Klaus, Butt's replacement as WXII news director, had been assistant news director to Butt. Klaus retired after 11 years there. Klaus' successor, Lisa Fulk, rose even more dramatically through the ranks at WXII, advancing from production assistant to producer to executive producer and assistant news director before becoming news director. As an executive producer, Fulk worked on integrating digital technology and the Internet into newsroom culture. Fulk would host a video produced for the Hearst group, showing off WXII's digital newsroom. Group news vice president Group Candy Altman agreed that Price's realizing early the importance of digital transition was key. She and Butt also called the selection of then executive producer, current news director Lisa Fulk to lead the digital media effort "a very important step. And it tells you that she was well-respected in the newsroom," Altman said, "and because she

was well respected, it tells the news department that this is important.” The newsroom, Butt recalled, gave Fulk the nickname “Digi-Mama.”

Fulk is from Greensboro, a major part of WXII’s market, and has spent her career rising through the ranks there. After college, she started at the station in 1993 as a production assistant “just trying to wait for a door to open in the newsroom.” Eventually she became weekend assignment editor, working both days and night shifts. “And after years of doing that, I moved over to the dark world of producing, and just worked my way up, and became the morning EP [executive producer] and the dayside EP. And then the digital executive producer, when Hearst launched that new position across its stations.”

At the group news executive level, news vice presidents Fred Young and Candy Altman retired at Hearst following decades with the company. Brian Bracco left the company for his “dream job, as a general manager in his hometown, running KSHB--where he had “made his name” as a news director before joining Hearst at KMBC (Malone, 2013).

Price was general manager at WXII nearly 15 years, leaving in 2014 to run Hearst’s newly acquired WVTM-TV in the larger Birmingham, Ala. market. He retired there in 2018 as president and general manager. At the end of his station management career, he noted that although his Birmingham station still used analog equipment when he arrived in 2014, by the time he left the WVTM control room—also a prototype for the Hearst group--operated with a producer, a director, and a computer, as he predicted years ago.

The various Websites and publications covering television, and especially television stations and groups, find considerable content in chronicling turnover—whether in moving to larger markets, to smaller markets with greater responsibility, or, to the euphemism for losing a job, to be put “on the beach.” Because of contracts with time limits, not all turnover means firing

or reduction in force. Hearst and WXII both offer stories of unusual longevity and, in the case of former news director and current general manager Michelle Butt, return.

But there is turnover, as reflected by interview subjects who moved on. Both Mark Strand and Kevin Kline, for instance, left the station for what they said were better opportunities, although both spoke positively about their time at Hearst. Another well-regarded news producer, who declined (albeit graciously) to be interviewed, is now news director at a rival station. Dave Goren was not renewed after 20 years at WXII, and is now executive director of the National Sports Media Association, and based in Winston-Salem. Online searches for former producers find them in other markets--some still in television--or out of the business.

Still, Hearst's unusual stability at key management points not only help tell the story of digital transition at the group and station levels but also continue to highlight the roles played by champions and opinion leaders. Faubell, Price, Young, Bracco, Altman, Butt, Fulk, and Klaus, fit Rogers' description for opinion leaders (or even, as discussed, champions), holding a position of influence in interpersonal in internal communication networks and in diffusion of innovation. The network, as Rogers defines it, consists of interconnected individuals linked by patterns of flows of information. The Hearst network managers' delegated authority likely predetermined the eventual adoption of the new technology. Their earned authority and credibility clearly influenced the levels of success in its implementation and reception.

The chapter focused on the roles played by the people in centralized corporate and decentralized station management and staff. It focused on the adoption and adjustments to digital changes in newsgathering, newscast production, graphics generation, and video editing, and their impact. Evolving to digital systems promoted changes in newsroom communication systems and

communication networks with other Hearst affiliates. It promoted change in stations' marketing and promotion, and it helped propel stations into online content.

In short, it focused on how people influenced the diffusion of innovation, and how the diffusion of innovation influenced them.

CHAPTER 6

Conclusion/discussion

“The silicon chip will transform everything, except everything that matters, and the rest will still be up to us.”

--Bernard Levin in *The Financial Times* (October 1978)

The late 20th and early 21st centuries have proven to be a time of historic change in an industry that chronicles change. A confluence of government, innovation, commercial, and cultural forces combined to reshape the medium of television into numerous separate and related media, and to reshape its operations and workflow.

Charting, in a case study, the migration from analog to digital technology at Hearst Television’s Winston-Salem TV station WXII necessarily addresses the influence of government regulation (deregulation, actually). The case study necessarily addresses the subsequent restructuring of television station groups, where smaller groups disappeared and fewer, larger groups emerged. The case study necessarily addresses shifts in audience preferences to traditional and new media content delivered on media platforms. The case study necessarily addresses the increased role of Hearst group management in providing and diffusing extensive technological innovations in fundamental station operations. And the case study necessarily addresses the increased market power of one of those fewer, larger station groups in its relationship with technology equipment suppliers.

Historians and social scientists have recorded—and will, no doubt, continue to record—the continual deregulation of mass media and the concentration of media ownership into fewer hands. But the view is macro, rather than micro. The activities and responses at the implementation

level to major developments are typically limited to local or trade press. Yet, the activity at this level may determine the success or failure of a product, or business, or policy.

Research Question 1 asks how the Hearst station group approached an atypical level of innovation, requiring significantly more financial demands, and demands for leadership and communication in bringing innovation to a local television station. A related research question asks how profound changes in the business and regulatory environment affected the Hearst group, and how that affected the adoption of new technology within the group and at a particular local television station, covered in Chapter 5.

Television stations and station groups routinely purchase technology products, to replace broken or worn equipment and to upgrade for greater performance and efficiency. Digital technology presented a different challenge. For the most part, it outperformed existing analog equipment. But it was costly—particularly in its early stages, as is typical with new technology—and it frequently required additional equipment changes for full utility and performance. End users had to be careful in their selection of approaches and gamble somewhat on standards, with little to no direct product experience to guide them.

Narratives emerge from Hearst personnel of strategizing, of budgeting, of networking, of persuasion, of collaboration, of advancing quickly, and of deferring. The group strengthened and centralized its internal resources, retaining and hiring long-term managers, even elevating some to cut back on outside consultants for its enlarged group, strengthening internal networks. Group engineering and news managers discuss balancing station needs and equipment costs, group preferences and available products, established and developing networks, replacement vs. repair, early adoption of products and delaying for product maturation, and leveraging group market power for influence and price.

By all accounts, the role of Hearst's central engineering, led by Martin Faubell, grew in importance as the Hearst station group grew. When the group was smaller—and analog equipment was less costly—individual preferences could be better accommodated. Faubell noted that at one time six different news directors selected six different computer systems.

That level of local control made less sense as the group grew in size, the executives explained. Hearst was not as aggressive in purchasing and consolidating stations as network-owned groups like the Fox (News Corp.) or CBS (Viacom) groups were, or Nexstar or Sinclair have become. But Hearst absorbed the Argyle and Pulitzer groups on its way to more than quadrupling its number of stations.

Faubell and Hearst news and station management addressed numerous pieces of equipment—switches, routers, cameras, computers, memory storage--as though parts of a puzzle that need to fit with future pieces, as well as current ones. In addition to the challenge of advancement was the challenge of simple maintenance—for the key ongoing functions of running a television station and producing newscasts (and, by this time, Web products).

The final research question asks how the diffusion of technological innovation affected operations at WXII. Station employees discuss the multi-year implementation of innovative technologies, and the ways in which it streamlined and extended station workflow into new areas—both technical and geographic. Innovations and advancements in high-speed Internet, video streaming, and smart phones helped WXII moved increasingly online, adding and repurposing content, and extending its brand. As noted by former general manager Hank Price and former news vice president Fred Young, even the business' name changed.

Appendix One diagrams the themes discussed in Chapters Four and Five. Appendix Two provides a timeline of some key dates mentioned by research participants. Following that, the

Appendix offers photos of some of the people who provided information from the study, on and off the job.

Study Limitations and Future Research

This is a case study of a single television station in a single—albeit large—company within an even larger corporation. Its narrative is not universal or generalizable. The long associations with the company and professional credibility of interviewees helped with the level, quality, and reliability of information. But, as Jessell and Rosenstiel—and even broadcasters who worked at other groups—noted in Chapter Three, Hearst is on the higher end of station groups in commitment to news product and localism, and not necessarily representative of other groups. Other case studies—assuming candid responses—could reveal different approaches involving unusually slow or rapid deployments of innovation, strained networks, inactive Websites, shallow, sensational or abandoned newscasts, technology-enabled one-person news crews as a new standard, or significant layoffs associated with both consolidation and technology.

Van Der Haak, Parks, and Castells (2012) for instance, noted that the massive changes in media business and operating models are perceived as a threat to journalism. As discussed, they distinguished a crisis in profitability among entrenched media corporations from a crisis in journalism itself (Van Der Haak, Parks, & Castells, 2012, p. 2924).

WXII and Hearst managers noted that they have accommodated citizen journalists, or officials providing early video from emergency scenes, in a limited way. As this study shows, some of the technology used in modern broadcast journalism—laptops, digital cameras, smart phones—is shared with the consumer market. But some perceive the lowering of technological barriers to entry into journalism as threatening to journalism as a profession as media concentration and slashed budgets. Citizen Journalism may both provide additional platforms for

news and supplement--for free-existing platforms like local television and local television Websites. Continued, objective study will benefit communication scholars and professional communicators.

Among the themes emerging from this case study is the effect on local television from government deregulation and the new environment created by the resulting growth and consolidation of restructured, larger station groups. While a non-manager sportscaster and producer were interviewed, most of the data collected necessarily came from longtime Hearst managers who observed or participated in decision-making or implementation of new technology. Swift (2013) studied the impact of that deregulation and industry consolidation on attitudes within local television journalism, surveying 10 journalists—not identified by prior agreement--in three large markets. Their responses reflected lower morale, and they said personnel had been diminished following reductions in local ownership following deregulation diminished resources. Some reported pressure to learn how to shoot their own video, and generally do more with less. While Hearst executives insist that was not the intent behind its stations' technology adoption, further, updated study similar to Swift's would be welcome. Prior to joining the academy, Swift said, he was a journalist at Hearst's Pittsburgh station WTAE, where he had observed changes in management approach, consistent with this study. "A company that previously owned a small number of stations was now running things on a corporate level and the changes [involving corporate and management structure] were happening very quickly," he said. Swift also noted that for all that has been written on the changes in media ownership and economics, "[w]hat is clearly and almost completely missing from the literature is how all of these changes have affected practitioners of local broadcast television news" (Swift, 2013, p. 13).

Like the increasing migration of viewers to the Internet and to cell phones, technology and deregulation/consolidation are ongoing stories. With the emergence of mega-groups like Sinclair and Nexstar—not grounded in decades of news and information products like Hearst, Belo, McClatchy, Tribune, and other groups—the emerging approach to local news by television stations and groups, among all their platforms, continue to present opportunities for study.

For example, Sinclair's unusual relationship with news was widely covered in local and trade press. It has largely escaped academic scrutiny and could generate case studies. In 2003, after shutting down local news in a few markets, Sinclair tried parlaying emerging technology into a centralized news operation near its Maryland headquarters that would feed numerous local stations. That was abandoned three years later, and the company has been criticized for its right-wing political commentary (Jensen, E. 2005). Mark Hyman, a longtime Sinclair executive and conservative pundit who recently survived brain surgery and has taken recently to reporting on environmental issues, would make a fascinating panelist in a forum on journalism or station management.

Sinclair is currently building a national news operation out of its Washington properties WJLA and Newschannel 8, purchased from Allbritton in 2014. While the group's political messages attract attention, local news operations have drawn praise for aggressiveness and localism. Among those offering compliments were current WXII general manager Michelle Butt, who competed with Sinclair's longtime flagship WBFF when she was news director at WBAL for Hearst (Farhi, 2014). Sinclair also has faced issues regarding business practices and was accused of having duopolies—owning more than one station in a single market—before they were legal (Jessell, & Rathbun, 1996).

In addition to building the largest group of television stations, Nexstar is planning a primetime newscast for cable channel WGN, replacing current Canadian and United Kingdom dramas, leveraging, it says, the thousands of journalists in its scores of stations, including the stations purchased from Tribune (Littleton, 2020). Nexstar has also been launching local programming in some of its markets.

Further, Internet Broadcast Systems and its competitor WorldNow might offer insights into evolving content and business models in a still-prominent medium like local television. Such a project might first be better suited for a survey than a case study, probing issues of culture, control, content, and commercialism regarding Internet content and business models.

Even beyond the increasing size of the deregulated groups, stations and their owners find new ways to leverage additional resources. Sinclair, Nexstar, and Hearst are also among the groups that have joined Pearl TV, an organization pursuing media opportunities across numerous platforms. As of 2020, Pearl's membership also included Cox Media Group, Gray Television, Meredith Local Media, E.W. Scripps, and Tegna, and reaches nearly half of all broadcast stations in the United States (M2 Communications, 2020). Communication, cooperation, and competition among the groups in the collective present opportunities for study.

Trends in television might be too broad for case studies, but certainly would provide useful subjects for research. Digital technology and consolidation continue to alter the industry and its impact on staff, vendors, and audience. Retransmission consent—cited by Nexstar CEO Perry Sook as an increasingly important factor in the local television business model—has received attention in law journals but would be worth study by media scholars.

Contributions to Theory and Research

This case study gives names and voices to the champions and change agents and influencers described by Rogers and innovation and communication scholars in diffusing digital technology at Hearst Television and station WXII in Winston-Salem. It explores the challenges and choices, practices and priorities from both a broad set of circumstances affecting most or at least much of local television, and those specific to Hearst and WXII. The data demonstrate technology's role in facilitating new and established networks, as defined by Castells and Rogers: across industries, across individual markets, across terrain, across state lines, and across platforms—even negotiating the short but heretofore wearying distance between an editing station and a control room.

Without conflicting earlier findings, the case study adds an in-depth exploration of networking and innovation planning and implementation in practice, as described by the practitioners. In their report on nonlinear editing at local stations within a single state, Grant, Brown and Nachlinger noted the dearth of literature regarding changes in station technology during the relevant period (early 21st century). They concluded that changes in equipment used to produce, edit and store and store television content, were particularly significant for researchers seeking to study technological innovation in a communication industry (Grant, Brown & Nachlinger, 2010).

As noted in Chapter Two, Nielsen and Sambrook (2020), Collins and Brown (2012), Garrison and Dupagne (2006), Spencer (2019), and others have written about the challenges of migration by television stations not only to new equipment, but also to new platforms. Hearst managers and Dailey, Demo, and Spillman (2005) warned of culture clashes regarding new technology and potential relationships with heretofore competitive media. WXII's brief

experiences with local newspaper partnerships was consistent with the findings of a national survey of newspaper and TV station news managers by Collins and Brown (2012). They concluded that neither media showed strong, continuing commitment to such arrangements, and that both had moved away from cooperative agreements; each was generating online content independently.

WXII managers and staff acknowledged in Chapter Five the challenge of modifying both their hands-on skillsets and their mindsets in order to follow and to lead their readers to online journalism. WXII's online presence and approach content are discussed in Chapter 5.

Hearst management discussed the various paces of adoption ranging from innovation—during which Hearst engineers offered input and practical knowledge toward the development of digital technology—to stations' early adoption, to late majority (Rogers, 2003). As noted, much of the diffusion of digital technology, Hearst managers said, was based on an overall strategy and availability of resources. They reported some discomfort among the station staffers who would use the technology, but no real resistance—although, as Faubell noted in Chapter Four, early discomfort at one station rose to the level of keeping a new piece of equipment in its box and unused.

Results further identified qualities of innovation champions, citing enthusiasm and confidence, persistence, and the ability to bring in the right people (Howell, Shea & Higgins, 2005). The subjects interviewed for this study were innovation champions, change agents, opinion leaders, or enthusiastic users of the new technology.

For the many scholars who continue to study the relationship between government and industry—particularly the deregulation of industry—the case of Hearst and its purchase of WXII exemplifies, with ground level views, the enactment of a deregulated growth and management

adjustments. Hearst's acquisition of WXII and the Pulitzer station group came amid the deregulation of television station ownership, which led to a Darwinian shakeout among stations and station groups. Deregulation and the wave of station and group shopping that followed eventually quadrupled the number of stations and markets within the Hearst group. Clearly, from the recollections of both group and local Hearst managers, research, planning and purchasing—and news consulting—became more centralized as the station group expanded following deregulation. In addition, the group's new size gave it a stronger bargaining position with vendors for both immediate and anticipated digital equipment purchases. Not only were product research, purchasing, and installation strategies centralized in Hearst's engineering department, but corporate engineering, management and in-house consultants helped strategize the order of implementation and training among its stations. Swift (2013), who was a journalist at Hearst's Pittsburgh station WTAE, said he observed changes in management approach, which are consistent with this study.

In addition to centralizing several management functions, Hearst hired experienced managers, including Hank Price at WXII (and later WVTM, Hearst's Birmingham, Ala.) who brought major market experience from Chicago and Minneapolis, as well as a history with that North Carolina market--and Michelle Butt--who had been a major market news director for Hearst in Baltimore, and had run news at WXII. As Rogers concluded, management schemes do not always break clearly into centralized or decentralized management in the diffusion of innovation, and that and that the actual diffusion system typically combines elements of both (Rogers, 2003). In summary, the study adds to the literature on organizational diffusion, a topic far less studied in the diffusion literature than societal-oriented diffusion.

Contributions to Practice

The late Philip Graham, *Washington Post* president and publisher, is credited with saying that journalism is “the first rough draft of history (Gartner, 1982, p. 9).” As demonstrated numerous times throughout this study, television industry trade journals covered aspects of station and station groups migrating to digital technology with notices of manufacturers’ new products, some reports on significant contracts, and occasional, brief interviews with station executives on the general subject. For those working in television industries, this study probes and preserves an approach to unusual levels of innovation by a newly enlarged, prominent station group during a time of deregulation, as well as its approach to new and competitive platforms and general industry upheaval.

Grant, Brown and Nachlinger began their study seeking practical information on television stations, applying practical implications of their findings to direct educators on the future of video editing. They applied collective action theory as with diffusion theory to explore and predict eventual 100 percent adoption of nonlinear video editing in television stations (Grant, Brown & Nachlinger, 2010). The present study indicates that Hearst intended 100 percent adoption of nonlinear editing and other digital technologies for all its stations eventually and, as a case study, explores the “how” and the why as much as the “what.”

Hearst management discussed the various paces of adoption ranging from innovation—during which Hearst engineers offered input and practical knowledge toward the development of digital technology—to stations’ early adoption, to late majority (Rogers, 2003). As noted, much of the diffusion of digital technology, Hearst managers said, was based on an overall strategy and availability of resources.

This case study incorporates and complements significant but limited media reports of a challenging time of upheaval and opportunity in the television industry, even as it attempts to advance findings for scholars. Many of the actors are retired, but still well known among media professionals. Others are in the prime of their careers, and others have much of their careers ahead. It is hoped that their story, and their stories, provide a high-definition snapshot in time for their professional peers, and that for scholars, it adds to the literature of innovation diffusion, communication networks, media economics, and journalism.

As noted, scholars like Blondheim (1994), Carey (1992), and Starr (2004) have discussed the reconfiguration of social and economic power that accompanied the reconfiguration of media, especially after the telegraph helped expand its reach. Scholars, including Streeter (1996), Williams (1974), and Dempsey and Gruver (2009), noted the role of government in accommodating that reconfiguration. Without question, established media companies have become massive and concentrated, and in large part—as the study notes—due to government regulatory withdrawal. Hearst is among those companies, and as noted, Hearst Television grew by taking over smaller television station groups following deregulation, and further centralized its management regarding engineering, news, and purchasing. As the study notes, though, even large media companies face competition for audience attention, and finding an approach to profitably and beneficially incorporate the Internet into its content offerings and brand has been a challenge.

Carey, Castells and other scholars discuss the way in which media has negotiated distances thousands of miles and half a world away in an instant. Digital technology has expanded that, offering television stations and other large and small content providers a platform with little or no regard to time or space limitations. As the study shows, digital media aids local

television, extending its reporting range, diminishing the necessity of cumbersome trucks, extended masts, and microwave and satellite connections. Reporters can shoot, edit, produce and go live from the scene with digital equipment they can carry in a backpack or even their hand.

Yet, as this study notes, the negotiation of far shorter distances in moving media content the few steps from an editing station to a TV news control room remained unsettled, even into the 21st century. All the journalists interviewed here lauded the new tools for making their time more effective and, as noted, the example of WXII's newsroom was showcased for all Hearst stations as an example of digital efficiency. But also as noted, digital technology may be a mixed bag if management forces journalists to do more with less (Swift, 2013) and the reduced barriers to entry lower the quality of information the public receives—although scholars like Van der Haak, Parks, and Castells (2012) consider the technology-aided extension of the ability to report as positive.

As discussed above, Innis (1952) distinguished the nature of individual media according to its communication its bias of time or space. Durable media like stone, clay tablet, or parchment favors time, while lighter media like paper emphasize space. As the study notes, using digital technology, images from local news stories (and other content) can vanish in an instant, yet be archived and preserved online in apparent perpetuity.

As noted, Schudson (2010) and Slack and Wise (and others) noted that technology is not, by itself, determinative, and Slack and Wise eschew the necessity of choosing from among other factors like culture, government, or economics (Slack & Wise, 2015).

Without question, this case study is about technology. A walk through any public place demonstrates that it hardly requires a photographer today to view a small, mobile camera or the ubiquitous cell phone as a McLuhanesque extension of eyes and ears (McLuhan, 1964).

Yet, this research is at least as much a study of people. While the speed, efficiency, and performance of technology are objectives, the pace and direction of innovation is influenced not only by the technology but also by the people creating, selling, researching, planning, purchasing, and using it. Media, to recall McLuhan, is the means and a large part of the message. But as the study demonstrates, the senders and receivers—linked not only by technology, but also by shared interests, interdependence, and employment—are people.

Table 1**Network interests in diffusion of digital television technology**

Hearst stations (management, staff)		Hearst Group (engineering, consulting)		Vendors/Manufacturers
<u>Goals</u>		<u>Goals</u>		<u>Goals</u>
Efficiency/performance/v ersatility	↔	Efficiency/performance/v ersatility	↔	Sales
Expansion/branding		Uniformity/standardizatio n/economies of scale		Being first to market
Staff satisfaction and morale		Positive relationships with stations		Establishing products as standards
Positive relationship with station group		Positive relationships with vendors		Customer satisfaction/maintaining/gro wing relationship with groups/stations
<u>Challenges</u>		<u>Challenges</u>		<u>Challenges</u>
Continuing operations through transition		Persuading group management		Competition
Resources (time, compensation) for training		Persuading station staff/management		First-to-market vs. overall performance in product lines
In-house knowledge		Station preferences		Customizing vs. standardizing
Staff resistance/discomfort		Cost of new digital purchases		Discounting vs. profits
Installation and implementation		Cost of maintaining analog equipment/performance gap		
Budgeting		Immediate station needs vs. long term investment		
		Installation and implementation		
		Providing training		

Table 2

Hearst timeline

1986	<ul style="list-style-type: none"> Hearst Broadcasting acquires WCVB-TV for \$450 million, at the time the highest price paid for a TV station
1996	<ul style="list-style-type: none"> Telecommunications Act of 1996 raises limits on television station ownership.
1997	<ul style="list-style-type: none"> Six Hearst Broadcasting and six Argyle Television merge to form Hearst-Argyle Television. Martin <u>Faubell</u> is named vice president of engineering for Hearst Television, moving from Hearst's WTAE Pittsburgh.
1999	<ul style="list-style-type: none"> Hearst-Argyle acquires the Pulitzer station group, including WXII in Winston-Salem, N.C. Hearst invests \$20 million for a 30 percent share in Internet Broadcast Systems, which will design, launch and help feed Website for Hearst and other groups' stations. Hank Price leaves CBS' WBBM Chicago to run WXII.
2000	<ul style="list-style-type: none"> Hearst makes multimillion dollar deal for Panasonic's <u>DVCPro</u> gear for several stations, including camcorders, laptop and studio editing systems, and video tape recorders. The equipment will replace aging Sony <u>Betacam</u> equipment.
2001	<ul style="list-style-type: none"> Hearst-Argyle partners with Loral to create <u>HATSat</u>, a dedicated satellite service allowing Hearst's Washington bureau and Hearst-Argyle stations to share stories. Hearst-Argyle acquires WMUR-TV (Manchester), New Hampshire's TV news leader, from <u>Imes</u> Communications. WMUR will later become Hearst's first station to employ "backpack" units for reporting.

REFERENCES

- Abernathy, P. M., and Foster, R. (2010). The news landscape in 2014 transformed or diminished? (Formulating a game plan for survival in the digital era). *Geopolitics, History and International Relations*, 2(2), 9-30.
- Abramson, A. (1987). *The history of television, 1880 to 1941*, Jefferson, N.C.: McFarland & Co. pp. 9-21. <http://web.mit.edu/uricchio/Public/television/Abramson.pdf>
- Anderson, K. (1999, September 27). Push-button newsroom. *Broadcasting & Cable*, 129(40), pp. 62-63.
- Backstage* (1979, March 9). Adda new storage system. 20(10), p. 70.
- Batsell, J. (2001, October 9). Ackerley: It was time to buy or be bought. *Seattle Times*.
<https://archive.seattletimes.com/archive/?date=20011009&slug=ackerley09>
- Beacham, F. (2010, July 1). *Next-Gen is Hearst's next step in news*. TVNewscheck.
<https://tvnewscheck.com/article/43371/next-gen-is-hearsts-next-step-in-news/>
- BeckTV (2020). What our clients say. Retrieved from <https://www.becktv.com/about.html>
- Bednarski, P. J. (2005, January 24). All about Oprah Inc. *Broadcasting & Cable*, 135(4), pp. 46-54.
- Benkler, Yochai (2006). *The wealth of networks: How social production transforms markets and freedom*. New Haven: Yale.
- Berger, R. (1999, October 11). System lets reporters do it all. *Electronic Media*, 18(41), p. 16.
- Bernstein, P. (2000, October 30). Chi shoos out Marin's hard-hitting newscast. *Variety*.
<https://variety.com/2000/tv/news/chi-shoos-out-marin-s-hard-hitting-newscast-1117788514/>
- Billups, S. (2008, March). Key thoughts on chroma Key. *Digital Video* 16(3), pp. 28-29.

- Blondheim, M. (1994). *News over the wires: The telegraph and the flow of public information in America, 1844-1897*. Cambridge, Mass.: Harvard University Press.
- Blondheim, M. (2004). Rehearsal for media regulation: Congress versus the telegraph-news monopoly, 1866-1900, *FCC Law Journal*, 56(2), 299-327.
- Book, C. (2004). *Digital television; DTV and the consumer*. Ames, Iowa: Wiley-Blackwell.
- Bosen, S. (2011, May 1). Embedded audio. *TV Technology*, 53(5), p. 24.
- Brecht, B. (1936). A worker reads history. (Fragen eines lesenden Arbeiters" - translated by M. Hamburger). *Bertolt Brecht, Poems 1913-1956*, Methuen, N.Y., London, 1976
<https://msu.edu/~sullivan/TransBrechtWorker.html>
- Brinkley, J. (1997). *Defining vision: How broadcasters lured the government into inciting a revolution in television*. New York: Harcourt Brace.
- Broadcasting & Cable*. (1993, November 1). Autotiming: What it is, why you need it. 123(44), p. D12.
- Burrowes, C.P. (2011). Property, power and press freedom: Emergence of the fourth estate, 1640–1789. *Journalism & Communication Monographs*, 13(1), 1-66.
- Campbell, D. (2002, March 4). TV stations want more newspaper partnerships. *The Business Journal*, 4(27), p. 3.
- Worthington, L. (2020, January 22). WRAL Launches all-new app design.
<https://www.capitolbroadcasting.com/2020/01/22/wral-digital-launches-all-new-app-design/>
- Carey, J. (2000, June 15). Journalism and democracy are names for the same thing. 'Nieman Reports. <https://niemanreports.org/articles/journalism-and-democracy-are-names-for-the-same-thing/>

- Carey, J. (1992). *Communication as culture: Essays on media and society*. New York, London: Routledge.
- Castells, M. (2009). *Communication power*. New York: Oxford.
- Castells, M. (2010, November 16). Globalisation, networking, urbanization: Reflections on the spatial dynamics of the Information Age. *Urban Studies*. 47(13), 2737-2745.
- Chan-Olmsted, S. & Chang, B-H. (2006). Audience knowledge, perceptions and factors affecting the adoption intent of terrestrial digital television. *New Media & Society*, 8(5), 773-800.
- Chan-Olmsted, S. & Park, J. (2000). From on-air to online world: examining the content and structures of broadcast TV stations' web sites. *Journalism & Mass Communication Quarterly*, 77(2), 321-339.
- Chen, H., Yang, Z., Wu, Z., Li, D., Ma, Xiaoqing, M., Xu, H., & Tian, D. (2017). Serial digital interface video signal jitter generator and its calibration method. *Measurement*. 106 (August), 116-120.
- Cianci, P. (2007). *HDTV and the transition to digital broadcasting*. Oxford: Focal Press.
- Cisco. What is a switch vs. a router? Retrieved from:
https://www.cisco.com/c/en_ca/solutions/small-business/resource-center/networking/network-switch-what.html
- Collins, S. & Brown, T. (2012). Convergence or business as usual? Comparing new media use at television stations and newspapers. *Atlantic Journal of Communications*, 20(4), 248-260.
- Dailey, L., Demo, L., & Spillman, M. (2009). Newspaper survey suggests TV partnerships in jeopardy. *Newspaper Research Journal*, 30(4), 22-36.

- Dailey, L., Demo, L., & Spillman, M. (2005). The convergence continuum: A model for studying collaboration between media newsrooms. *Atlantic Journal of Communication*, 13(3), 150–168.
- Dempsey, J., & Gruver, E. (2009). The American System: Herbert Hoover, the associative state, and broadcast commercialism. *Presidential Studies Quarterly*, 39(2), 226-244.
- Dickson, G. (1996, September 9). BBC taps AP in huge newsroom deal. *Broadcasting & Cable*, 126(38), p. 59-60.
- Dickson, G. (1996, July 29). WRAL-HD begins broadcasting HDTV. *Broadcasting & Cable*, 126(32), p.60.
- Dickson, G. (1997, March 10). Sony rolls out HDVS for NAB. *Broadcasting & Cable* 127(10), p. 19.
- Dickson, G. (2003, April 7). Faubell drives news tech. *Broadcasting & Cable*, 133(14), p. 50.
- Dupagne, M., & Garrison, M. (2006). The meaning and influence of convergence: A qualitative case study of newsroom work at the Tampa news center. *Journalism Studies*, 7(2), 237-255.
- Eaton, K. (2012, August 16). Your future TV is not about television. *Fast Company*.
<https://www.fastcompany.com/3000497/your-future-tv-not-about-tele-vision>
- Eisenmann, T. (2000). The U.S. cable television industry, 1948-1995: Managerial capitalism in eclipse. *The Business History Review*, 74(1), 1-40.
- Eisenstein, E. (1979). *The printing press as an agent of change: communications and cultural transformations in early modern Europe* (2 vols. ed.). Cambridge, UK: Cambridge University Press.

- Eisenstein, E. (1978). In the wake of the printing press. *The Quarterly Journal of the Library of Congress*, 35(3), 183-197.
- Ekdale, B., Singer, J. B., Tully, M., & Harmsen, S. (2015). Making change: Diffusion of technological, relational, and cultural innovation in the newsroom. *Journalism and Mass Communication Quarterly*, 92(4), 938-958.
- Fairlough, G. (1998, May 26). Heart-Argyle to buy broadcast unit from Pulitzer for \$1.15 billion in stock. *Wall Street Journal*. <https://www.wsj.com/articles/SB896147532340966000>.
- FCC (2020, January 3). Broadcast station totals as of December 31, 2019. Commission Documents. <https://www.fcc.gov/document/broadcast-station-totals-december-31-2019>
- Fist, S. (1996). *The Informatics Handbook: A guide to multimedia communications and broadcasting*. Springer: U.S.
- Frechette, C. (2012). *What journalists need to know about digital editing*. Poynter. <https://www.poynter.org/reporting-editing/2012/what-journalists-need-to-know-about-digital-video-editing/>
- Franzosi, R. (2010). *Quantitative Narrative Analysis*, Sage: London
- Gartner, M. (1982, October/November, 1982). The first rough draft of history. *American Heritage*, 33(6). p. 9. <https://www.americanheritage.com/first-rough-draft-history#9>
- Gay, V. (2001, November 19). We shall overwhelm. *Mediaweek*, 11(4), p. 24.
- Gentry, L. C. (2003). *Forecasting consumer adoption of technological innovation: Choosing the appropriate diffusion models for new products and services before launch* (Order No. 3115965). Available from ProQuest Central; ProQuest Dissertations & Theses Global. (305327849). <https://proxying.lib.ncsu.edu/index.php/login?url=https://search-proquest-com.prox.lib.ncsu.edu/docview/305327849?accountid=12725>

- Greene, K. (2000, September 25). TV outsources the Internet. *Broadcasting & Cable* 130(40), pp. 66-82.
- Hans, N. (2006, October 1). Newsroom technology. *TV Technology*, 48(10), p. 28-33.
- Howard, H. H. (2006). Television station ownership in the United States: A comprehensive study (1940–2005). *Journalism & Communication Monographs*, 8(1), 1–78.
- Howell, J. & Shea, C. & Higgins, C. (2005). Champions of product innovations: Defining, developing, and validating a measure of champion behavior. *Journal of Business Venturing*, 20(5), 641-661.
- Huang, J. & Heider, D. (2007). Media convergence: A case study of a cable news station. *International Journal on Media Management*, 9(3). 105-115.
- Hudson, E. (2002, May 29). Market profile: Greensboro. *Mediaweek*, 10(22), pp. 12-17.
- Hugo, V. (1831). Book fifth, chapter II: This will kill that. *The Hunchback of Notre Dame*.
<http://www.classicreader.com/book/330/>
- Innis, Harold. (1951) *The bias of communication*. Toronto: University of Toronto Press.
- Innis, Harold. (1950) *Empire and communications*. Oxford: Oxford University Press.
- Johnson, S. (1997). How low can television go? *Columbia Journalism Review*, 36(2), 24-29.
- Jung, H. & Walden, J. (2015). Extending the television brand: An examination of why consumers use broadcast network Web sites. *Journal of Broadcasting & Electronic Media* 59(1), 94-111.
- Kershbaumer, K. (2002, March 31). The new newsroom: Digital technology ties news system closer together. *Broadcasting & Cable*, 132(13), pp. 32-47.
- Krakow, W. (1985). Real time uses of color for electron microscopy via a television-rate digital frame store. *Journal of Electron Microscopy Technique*, 2(5), 405-424.

- Kritzer, J. (2002, August 28). Raleigh band wins blues competition. *News & Record*.
https://www.greensboro.com/raleigh-band-wins-blues-competition/article_95000c0d-3bd2-5623-b9b2-ed04d5208eeb.html.
- Lafayette, J. (1999). Hearst-Argyle puts \$20M in Web. *Electronic Media*, 18(39), p. 1A.
- Leslie, E. (2013, Summer). *Mark Leckey's Anima Mundi*, Afterall: A journal of art, context and Enquiry. https://www.researchgate.net/publication/291551141_Mark_Leckey%27s_Anima_Mundi.
- Lewis, S. (2012). The tension between professional control and open participation: Journalism and its boundaries. *Journalism Studies*, 15(6), 836-866.
- Liang, L. (2013). Television, technology and creativity in the production of a sports mega event. *Media, Culture & Society*, 35(4), 472-488.
- Liu, F. & Chan-Olmsted, S. (2003). Partnerships between the old and the new: Examining the strategic alliances between broadcast television networks and internet firms in the context of convergence. *International Journal on Media Management*, 5(1), 47-56.
- Malone, M. (2013, Jan. 21). Bracco lands dream job as Kansas City 'chief'. *Broadcasting & Cable*, 143(3), p. 18.
- McClellan, S. (1998, December 14). Union blues. *Broadcasting & Cable*, 128(51), pp. 26-28.
- McLuhan, M. (1962). *The Gutenberg galaxy: the making of typographic man* (Toronto: University of Toronto Press, 1962).
- McLuhan M. (1964) *Understanding media: The extensions of man*. New York: McGraw-Hill.
- McLuhan, Marshall & Fiore, Q. (1967). *The medium is the message: An inventory of effects*. New York: Bantam Books.

Mermigas, D. & Lafayette, J. (1998, May 18). Buying stations while getting is good. *Electronic Media* 17(21), p. 12.

Miller, M. (2019, May 29). *Nexstar is the star of TV station groups*. TVNewscheck.

<https://tvnewscheck.com/article/235386/nexstar-is-the-star-of-tv-station-groups/>

Mills, B. (1953, September 30). Mrs. Rogers is enthusiastic about broadcasting. *Winston-Salem Journal*. <https://northcarolinaroom.files.wordpress.com/2019/04/pickfordenhanced53.jpg>

Minow, N. (1961), Television and the public interest. American Rhetoric Online Speech Bank.

<https://www.americanrhetoric.com/speeches/newtonminow.htm>

Morton, D. (1999). Viewing television's history. *Proceedings of the IEEE*, 87(7), 1301-1304.

Mukerji, C., and Schudson, M. (1991). *Rethinking popular culture:*

Contemporary perspectives in cultural studies. Berkeley: University of California Press.

Mullen, M. (1999). The Pre-history of pay cable television: an overview and analysis.

Parkside Historical Journal of Film, Radio and Television, 19(1), 39-56.

Mullen, S. (2001). Walking the line between 4:3 and 16:9. *Video Systems*, 27(1), 54-58.

Murrow, E. R. (1958). A "wires and lights" speech for today." RTDNA.org.

https://www.rtdna.org/content/edward_r_murrow_s_1958_wires_lights_in_a_box_speech

Nielsen Media Research (2019, Sept. 19). Local television market universe estimates.

<https://www.nielsen.com/wp-content/uploads/sites/3/2019/09/2019-20-dma-ranker.pdf>

Nielsen, R. & Sambrook, R. (2016). *What is happening to television news?* Oxford: Reuters

Institute for the Study of Journalism. <https://reutersinstitute.politics.ox.ac.uk/sites/default/files/2017-06/What%20is%20Happening%20to%20Television%20News.pdf>

Oswald, K. & Bailey, W. R. (2015). Restarting static. *Television and New Media*, 17(1), 62-79.

- Owen, J. (2000, July 17.). Web networking. *Adweek*, pp. 68-70. <https://www.adweek.com/brand-marketing/iq-analysis-web-networking-50393/>
- Parsons, P. (2008). *Blue skies*. Philadelphia: Temple University Press.
- Pateliya, Y. (2013). Research method of qualitative research: ‘Case Study.’ *International Journal for Research in Education*, 2(1), 116-120. http://www.raijmr.com/ijre/wp-content/uploads/2017/11/IJRE_2013_vol02_issue_01_25.pdf.
- Pérez-Latre, F. (2014). Legacy media: A case for creative destruction? *Palabra-Clave*, 17(4), 1097-1113.
- Phillips, D.J. & Sorenson, J. (2003). Competitive position and promotion rates: Commercial television station top management, 1953-1988. *Social Forces*, 81(3), 819-841.
- Photo Glossary: Chroma Key Compositing (2012, July). *Popular Photography*, p. 42.
- Pogue, D. (2018, February 20). A brief history of aspect ratios, aka screen proportions. *Scientific American*. <https://www.scientificamerican.com/article/a-brief-history-of-aspect-ratios-aka-screen-proportions/>
- Rathbun, E. (1995). Hearst warms to Tampa-area TV. *Broadcasting & Cable*, 125(45), p. 68.
- Rapp, H. (2018, March 22). Timecode vs. genlock: Why timecode may not be enough to keep your set in sync. *TVTechnology*. <https://www.tvtechnology.com/the-wire-blog/timecode-vs-genlock>
- Robin, M. (2000, May). The ATSC standard. *Broadcast Engineering* 23(5), p. 60.
- Robinson, O. (2014). Sampling in interview-based qualitative research: *A theoretical and practical guide*. *Qualitative Research in Psychology*, 11(1). Pp. 25-41.
- Rogers, E.M. (1995). *Diffusion of innovation* (4th ed.). New York: Free Press.
- Rogers, E. M. (2002). The nature of technology transfer. *Science Communication*, 23(3), 323–341. <https://doi.org/10.1177/107554700202300307>

- Rogers, E. M. (2003). *Diffusion of innovations* (5th ed.). New York: Free Press.
- Schudson, M. (2010). Political observatories, databases & news in the emerging ecology of public information. *Daedalus*, 139(2), 100-109. *Schumpeter, Joseph (1975). Capitalism, socialism, and democracy. New York: Harper.*
- Scott, A. (2005, October 1). The evolution of newsroom systems. *TV Technology*.
<https://www.tvtechnology.com/miscellaneous/the-evolution-of-newsroom-systems>
- Shafer, R. & Bennett, H. (1969). *A guide to historical method*. Homewood, Ill.: Dorsey Press.
- Shapiro, C., & Varian, H. R. (1999). The art of standard wars. *California Management Review*, 41(2), 8-32.
- Shepardson, D. (2019, September 16). FCC approves Nexstar Media deal to buy Tribune Media. *Reuters*. <https://www.reuters.com/article/us-tribune-media-m-a-nexstar-media/u-s-fcc-approves-nexstar-media-deal-to-buy-tribune-media-idUSKBN1W1276>
- Spencer, Keshroy (2019). The role of a digital department at a major market broadcast television station; A case study. [Drexel University].
<https://doi.org/10.17918/6FQT-6683>
- Stake, R. (1995). *The art of case study research*. Thousand Oaks: Sage Publishing
- Starr P. (2004). *The creation of the media: political origins of modern communications*. New York: Basic Books.
- Starr, P. (2002, September 9). The great telecom implosion. *The American Prospect*.
<https://www.princeton.edu/~starr/articles/articles02/Starr-TelecomImplosion-9-02.htm>
- Stasukevich, I. (2011). Next-gen newsgathering. *Dv*, 19(2), 32.
- Streeter, T. (1996). *Selling the air: A critique of the policy of commercial broadcasting in the United States*. Chicago: University of Chicago Press.

- Swift, K. (2013). The changing landscape of television news at a time of deregulation: a case study of practitioners in three major markets. <http://hdl.handle.net/1903/14658>
- Tandoc, E. & Vos, T. (2016). The journalist is marketing the news. *Journalism Practice*, 10(8), 950-966.
- Tayer, M. (2015). *Televisionaries*. U.S.: Media Tech Publishing.
- Terkel, S. (1974). Mike LeFevre: who built the pyramids? *Working: people talk about what they do all day and how they feel about what they do*. New York: Pantheon Books.
- Thompson, E. P. (1966). *The making of the English working class*. New York: Vintage Books.
- Trigoboff, D. (1998, December 14). John Henry versus the supercomputer. *Broadcasting & Cable*, 128(51), p. 28.
- Trigoboff, D. (2000, Nov. 5). WBBM drops Marin newscast: Two days after anchor wins Emmy, much admired experiment gets axed because of ratings. *Broadcasting & Cable*, 130(46), p. 28.
- Trigoboff, D. (2000, January 10). Station group heal thyself. *Broadcasting & Cable*, 130(2), p. 4.
- Tucker, T. (2002, November). Fixing lip synch. *Broadcast Engineering*, 42(12), 72-76.
- Usher, A. (1929), *A History of Mechanical Inventions*, Oxford University Press: London.
- Van der Haak, B., Parks, M., & Castells, M. (2012). The future of journalism: networked journalism." *International Journal of Communication* [Online]. <https://go-gale-com.prox.lib.ncsu.edu/ps/i.do?p=LitRC&u=nclivensu&id=GALE%7CA317781187&v=2.1&it=r&sid=summon>
- Webb, C. (2013). Capitalism, democracy and the digital revolution. *Canadian Dimension*, 47(5), 15-18.

Williams, R. (1974). *Television: Technology and cultural form*. New York: Routledge.

Yin, R. (2014). *Case study research: design and methods* (5th ed.). Los Angeles: Sage.

Yu, R. (2013, July 14). Retransmission fee race poses questions for TV viewers. *USA Today*.

<https://www.usatoday.com/story/money/business/2013/07/14/tv-retrans-fees/2512233/>