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Writing Postindustrial Places

Technoculture amid the Cornfields

Michael J. Salvo

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Exploring the relationship between postindustrial writing and developments in energy production, manufacturing, and agriculture, Michael J. Salvo shows how technological and industrial innovation relies on communicative and organizational suppleness. Through representative case studies, Salvo demonstrates the ways in which technical communicators formulate opportunities that link resources with need. His book is a supple articulation of the opportunities and pitfalls that come with great change.

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Introduction

What does it mean to write a postindustrial place?

This book supports those interested in technical communication and rhetoric to take advantage of the opportunities inherent in the postindustrial world. Advanced materials, next-generation manufacturing, clean energy, agricultural production—all require rhetorical as well as technological interventions. Numerous opportunities change the image of the rustbelt of the industrial Midwestern United States into the postindustrial heartland, and I have had the privilege of learning about workplaces and organizations leading the revitalization of manufacturing and of tracing global connections that bring prospects for meaningful high-technology work. But as the next chapters assert, this impression is not assured. While many exciting, groundbreaking, and truly world-class organizations that rely upon long-lasting traditions have made this region strong in the past, and these organizations are the raw materials from which a bright future can be forged, that future must still be made. Imagination and creativity can reconfigure what exists in nascent form into what is needed. The source of that innovation drives this study. It comes from everywhere in an organization and the context surrounding it. The challenge is creating an institution made to absorb and improve as it transforms.

This project began in Boston many years ago. I had left West Texas with what was then a brand-new degree at Texas Tech, Technical Communication and Rhetoric, and I had been working in Boston, Massachusetts, for three years. The economic downturn that followed the terrorist attacks on New York and Washington, DC, had shuttered a number of the high-technology industries where I had made research contacts along Route 128 west of downtown Boston in the so-called "silicon suburbs." In the economic downturn following 9/11, not only did I lose my contacts, but many of the firms I had been working with simply disappeared. Because of the nature of these firms, I sometimes had inaccurate phone numbers or email contacts that no longer worked, perhaps where contacts had moved on to other positions. Perhaps a contact had been laid off; perhaps they had doubled their salary through promotion. Or perhaps they had cashed in their newly vested stock options and, as in one case, moved to Norway.

More than one call ended with a machine-generated operator's voice telling me that not only the extension but also the entire firm's phone number bank had been disconnected. Entire organizations were being eliminated and no trace remained. There were many "for rent" signs visible from the highway along Route 128, and those signs represented a true desperation as an entire economic sector of the economy sputtered. Doug Henwood (2003) narrates the aftermath of this boom-and-bust cycle admirably, and I will leave that story to him to tell. For my story, this bust meant that many of my digital-economy contacts and research sites were gone, and I was starting from scratch.

Having come of age during the dawn of the internet, I thought I understood the high-tech creative economy, and I enjoyed mentoring students who were getting snapped up as professionals in emerging fields of information design, user experience engineering, usability, and information architecture. The technology, and the jobs supporting high-technology industry, morphed too quickly to build specific programs to address their swiftly shifting needs, and education was under considerable pressure to accommodate new digital technologies and the pace they bring. Now, graduates of the professional writing program I direct are joining gaming firms as storyline consistency experts and user research experts, working as social media experts for national and international journalism companies, and as communication logistics analysts: job titles I could not and would not have guessed when they began their studies. It is exciting and unnerving both to know that the future is both liquid and somewhat unpredictable yet built on historical patterns and planning. Neal Stephenson famously said, at the dawn of the internet age, "The future is already here—it's just not very evenly distributed." My findings presented in this book are consistent with this observation, but I go further to argue that educators can (and *should*, indeed, *must*) reconfigure ourselves to help our students prepare not for existing jobs but to recognize the elements of what my colleague Patricia Sullivan asserted is "the constant of change" in which not just jobs but work itself is being redefined. In this postindustrial age, technical and professional writers become increasingly valued and valuable, as technorhetorial work achieves so many promises of the postindustrial age.

As I moved from one research and development heart in Boston to another in Lafayette, Indiana, I was at first shocked by the differences, but Indiana is no less high-technology or future-oriented than Boston's silicon suburbs. It's just interested in the future of different technologies, such as manufacturing processes and materials, in automation, in robotics, in technologies of flight and of space exploration, as well as in the future of agriculture and farming technology. I now live in a research and development cluster centered at Purdue University which, as a land-, sea-, and space-grant institution, has varied interests and seeks to cross-pollinate fields by transferring ideas from one realm of

knowledge into others. It is a world that was unknown to me. And after working so long with ephemeral digits and virtual worlds, with people building online and web-based services, the turn to studying the making of tangible *stuff*[1] was refreshing, even intoxicating. What has become clear to me is that every industry now is a high-technology company. Every workplace needs experts in communicating and connecting—designing—communication and knowledge-making practices both inside and outside the organization. While there may be a high-technology sector to the overall economy, there simply is not much sense to discussing separate digital and manufacturing economies. The boundaries have become fuzzy. Indeed, these sectors have much to learn from each other.

Early in this transition to studying manufacturing, I was invited to visit the Braun Corporation in Winamac, Indiana, where I was struck by this small company's unique place in auto manufacturing and accessibility. Unlike companies that have built from-scratch products to assist people with mobility constraints, Braun customizes after-market minivans and SUVs to meet user-specific needs of differently abled bodies. An entire study can be done at the site of accessibility and design; Graham Pullin's *Design Meets Disability* (2011) is an excellent introduction that interconnects an activist position with industrial design, as Dolmage (2016) traces the language of disability and differently abled bodies.

By using another industrial product and relying on partnerships with other manufacturers and institutions, Braun exemplifies the postindustrial. According to Bell's (1973) forecasting, there are three major components to a postindustrial society, all of which have come true to a greater or lesser extent and can be seen, to some extent, in Braun: one, a shift from manufacturing to services; two, the centrality of new science-based industries; and three, the rise of new technical elites and the advent of a new principle of stratification. It seems beside the point to debate whether these changes are good or bad. They are disruptive and have been ongoing for quite a long time.

Unlike companies that have built from-scratch products to assist people with mobility constraints, Braun specializes by customizing after-market minivans that meet user-specific needs of differently abled bodies. At the assembly facility in Winamac, I first articulated the phrase *Technoculture Amid the Cornfields*.[2] This production facility, a high-tech factory set in rural farmland, seemed an unlikely location for a globally competitive firm. Yet I recognized my own bias in assuming that the setting would somehow preclude high-technology work. Braun lifts and vehicles were being prepared for shipment to Asia, Africa, Europe, South America, and Australia from this shipping dock at a small manufacturing facility in Winamac, Indiana. As I would find out, Braun resides at the edge of the automotive cluster of institutions centered in Detroit as well as on the edge of the medical cluster centered in Indianapolis—perfectly placed to participate in global economic

trade. Enrico Moretti's *The New Geography of Jobs* (2012) articulates this notion of clustering and allows the first glimpse of the importance of place in the network, of gathering related industries together around research and development hubs, around which interwoven organizations intersect skills, expertise, and best practices in sustainable and mutually supporting relationships. Out in the cornfields, I was just beginning to recognize the networks in which Braun was participating, dispelling my own assumption that industrial meant urban.

In 1971, David Ward in *Cities and Immigrants* called the four-state region the East-Midwest. He included four states, Michigan, Illinois, Indiana, Ohio, in this area synonymous in the mid-20th century with industrial production from steel to automobiles and from glass to rubber. Pursuing an understanding of new and emergent work and writing practices, I have restricted my focus to Ward's East-Midwest, and traveled to sites as far north as Ludington, Michigan, west to Decatur, Illinois, east to automobile assembly plants in Youngstown and glass research in Toledo, Ohio. I have traveled all around the state of Indiana, learning about competitive manufacturing concerns, witnessing and narrating processes of globalization situated amid the cornfields.

Indiana's economy, often assumed to be about corn and soybeans, leads the United States in employment in manufacturing. The Economic Policy Institute (EPI) is a self-described "non-partisan think tank created in 1986 to include the needs of low-and middle-income workers in economic policy decisions."[3] The EPI report of 2013[4] asserts that Indiana leads the nation with 491,900 jobs followed by Wisconsin, Iowa, and Michigan. Even after decades of declining employment in manufacturing and production, the EPI report asserts that the sector continues to account for 12 million workers in the United States, or 8.8% of total employment. California employs over 1.2 million of its citizens in manufacturing jobs, while Texas, Ohio, Illinois, Pennsylvania, and Michigan all employ more than half a million Americans in the direct production of manufactured goods. Indiana is seventh overall, and the focus of this book includes 4 of the top 10 manufacturing states. Postindustrial manufacturing testifies that while industrial *production* has not left the United States, it is industrial *employment* that has decreased.

The knowledge-based information sector continues to grow as a percentage of overall economic production, yet has not yet demonstrated the ability to employ the same numbers of workers as the industrial economy. Nowhere is this more evident than in the production of automobiles, which drove American economic development through the mid-20th century, and all the design, materials research, and manufacturing expertise necessary to create automobiles has not disappeared, nor have the clusters of knowledge supporting these communities dissipated.

Automobile know-how from design to manufacturing to insurance to highway design still clusters around Detroit. Another smaller cluster of

specialized medical implants and prosthetics gathers around Warsaw, Indiana. The cluster of medical device firms in Warsaw is itself part of a larger constellation of medical research and development centered in Indianapolis, Indiana, and the historically significant firm of Eli Lilly and Company. Braun, like other firms described later in this text, is placed on the edge of two highly specialized clusters, and circumscribe access to local assets. The Braun assembly plant—its factory—is also within an hour's drive of both Purdue University and Notre Dame University. With easy access to train and truck transportation, and to shipping channels through the Great Lakes, there is nearby access to regional and global transportation. One challenge Braun has is attracting well-educated engineers and effective line workers to its rural site. The industrial corridor of Indiana is only an hour north, yet workers from Elkhart, Indiana, are unwilling to look outside their immediate vicinity. Skilled workers are tantalizingly close yet unwilling to commute or relocate for work.

Designing and creating a facility for building and inventing procedures for assembly for customers without legs capable of reaching the gas and brake pedals in an automobile; rearticulating a van with a new steering interface for a customer without the arm strength capable of turning a steering wheel; reassembling a minibus as an accessibility vehicle; even figuring the logistics of transporting any or all of those vehicles from Portage, Indiana, to Doha, Qatar: these technical and design challenges are *tamed*. However, the challenge of convincing a 22-year-old engineer from Purdue or a skilled welder from Elkhart to move to Winamac presents a different kind of problem—one that is layered, complex, and *wicked*.

This concept of wicked and tame problems comes from the 1973 essay titled "Dilemmas in a General Theory of Planning" in which Rittel and Weber distinguish the two. At the time, they asserted there was little available to them for working through layered and complicated social problems. Since then, a broad range of disciplines including rhetoric and technical communication have developed theories to address messy situations. Iterative design, new hybridities, deep recycling, quasi-objects, and respect for local innovations and practices address wicked challenges. These emergent ways of thinking represent innovations first realized in digital workplaces designed to support new ways of working and of seeing the world. For postindustrial manufacturing, these themes recur in the ways in which firms solve problems. Tame problems become routine and present minimal challenge. They require work but do not pose threats to the existence or identity of the organizations taking them on. Wicked problems present existential threats, such as whether manufacturing remains viable and sustainable in a first-world context like the American Midwest. Such problems pose serious challenges to routine work and require resources in research and development.

From workers' perspectives, the impacts of postindustrialization have been increased instability, loss of employment, and general loss of

opportunities to work. The ground-level impact has been literal elimination of human labor from the factory floor replaced by automation, robotics, and labor-saving devices of many kinds, all of which remove human beings from the site of work. While Braun's practice may not precisely match Bell's decades-old prognostications, the forecast is potently accurate in other ways. Old orders of worker power and influence in the workplace have changed, resulting in "new principles of stratification" in the form of new management philosophies as well as a more active back office where engineers and design professionals get paid more than assembly line workers. The Winamac plant uses finished products—automobiles—as the raw ingredients for building its highly specialized products. These customized vans have a worldwide market based on service in the form of accessible design. Industrial production has not disappeared from the postindustrial, but rather human labor has been removed from industrial processes, mimicking the 19th-century removal of labor from agricultural processes.

Nowhere is this shift more evident than the steel mills of northwest Indiana, northwest of Winamac. Gary, Indiana, produces similar amounts of steel as it produced in the 1960s, and the steel produced is of a higher quality. However, it employs 10% of the workers it once had in direct manufacturing. According to Bureau of Labor statistics, "Over the past 25–30 years, steel producers have, in some cases, reduced the number of work-hours required to produce a ton of steel by 90%."[5] Employment shrinkage has been occurring consistently in "material moving and production" while other industrial occupations are decreasingly more slowly, maintaining numbers, or modestly increasing: millwrights, industrial machinery mechanics, electricians, and computer controls for machine tools.[6] Meanwhile, new employment for engineers, chemists, computer specialists, metallurgical engineers, industrial engineers, mechanical engineers, environmental engineers, accountants, sales agents, various managers, and administrative and clerical workers are all projected to continue to increase in number in steel production in the United States for the foreseeable future.

The *Occupational Handbook* of the Federal Government's Bureau of Labor Statistics continues to forecast strong growth for technical writers and communicators through 2022 and beyond representing "above average" job growth.[7] Yet the Society for Technical Communication (STC) reports significant decreases in paid membership, dropping from "20,000 to 14,000 members" from "2000 to 2007"[8] and currently reports "over 6,000" members, a 60% decrease from its high.[9] Why are paid professional memberships dropping in a healthy job market? Tom Johnson, author of the *I'd Rather be Writing* blog, attributes it to a number of factors, among them a lack of excitement and passion practitioners feel for the profession, "After work, they want to relax, enjoy life, escape the drudgery of click-this, select-that, and so on. Technical

communication is not a passion; it's a paycheck." However much I wish to disagree that the work does not or cannot sustain passionate engagement, there does seem a disconnect between what the work of Technical and Professional Communication (TPC) has been and what careers are possible with preparation in rhetoric and technology. STC appears to represent a population of workers nervous about their status as professionals, particularly after the Great Recession of 2008, who are unsure about their role as documentation specialists and who wish for the return of accustomed roles and levels of remuneration. In other words, they face "The Ubiquity Paradox," where digital technologies are no longer disruptive but have become mundane. Robert Johnson's argument supports discussion of a range of potential redefinitions of the field. Of particular interest is the portability practices developed for an historical moment when software and hardware documentation was the main employment generator in the sector. What might documentation look like in an advanced manufacturing facility like Braun? Do minimalist documentation practices transfer from software to clean energy production? Are there applications for agile practices appropriate for next-generation automobile manufacturing? Smaller task teams, outsourcing businesses, and articulating new and emergent opportunities represent a possible future. Silicon Valley makes its biggest contributions to innovation and seeks to move beyond internet businesses—the Valley is creating innovations broadly applicable to business practices that increase company profitability, job satisfaction, and the redefinition of meaningful work.

After three decades of digital artifact invention and creating new practices and technologies, workplace communication practices are coalescing around new digital standards and technologies. In industries as varied as insurance, education, transportation, mining, and medicine, work is being mediated through nearly identical interfaces. While the work accomplished varies widely, the tools of these sites are largely mediated by the same digital communication technologies. The Macintosh/PC wars are relics of the 20th century, replaced by liquid boundaries where users flit between interfaces to accomplish their work, embedded in technological environments in which attention shifts to the interfaces where things are getting done.

Full-time jobs creating routine documentation in large organizations no longer define technical communication work. The field has been articulating new and emerging opportunities in symbolic-analytical work, requiring a corresponding shift away from a narrow understanding of technical communication as scribal work in support of digital computing technology. Instead, user experience designers, broadly trained in user-centered theory and iterative design, guide the professional communication of subject matter experts. It is simultaneously a shift away from an industrial age definition and a return toward rhetorical

action—professional, technical, and scientific communication in the postindustrial high-technology workplace. The meaning of work remains transitional.

As I found when visiting the plant in Winamac, Braun's management philosophy is decidedly industrial in structure and practice.[10] The assembly lines remain dominated by workers who brought with them an older sense of what it means to work: sweat and toil leading to physical exhaustion at the end of an honest day. While the engineering and design workstations had high-end computers and high-speed internet, digital communication—lifeblood of the networked economy—was discouraged. The label postindustrial fits Braun yet so many aspects of industrial-age work organizations and relationships continue to accurately describe the organization. While Braun epitomizes the postindustrial in many ways it remains industrial, almost traditional, in others, further exemplifying the transitional definition of work and the redefinition of activities that merit reward.

Chapter overviews

I have had the privilege to visit dozens of workplaces that fit the definition of emergent postindustrial hybrids that meld the innovations of the high-technology digital workplace with the knowledge of industrial manufacturing. Some of these places represent completely new ways of working, revealing innovations in need of new ways of creating and then sustaining institutions. Others remix existing practices in novel ways that challenge the people who inhabit these workplaces to create new relationships and definitions for their work and, ultimately, their identities. For this study, I have chosen the most revealing and most interesting for readers who share an interest in what Robert Johnson calls the techno-rhetor. I also use TPC as shorthand for Technical and Professional Communicator. Johnson's techno-rhetor is a more generalist title, used for anyone displaying rhetorical awareness in a variety of high-technology environments, where TPCs are more self-aware and often have formal preparation and/or education. I use these monikers in this study not to confuse but to illustrate core competencies William Hart-Davidson linked together in his important article from 2001, as well as to draw attention to rhetorical capabilities that may be more common elements of what Kimball (2016) asserts is a "golden age" of widespread technical communication in culture.

This chapter introduces the Braun Corporation in Winamac, Indiana, placing it within networks of automotive manufacturing, medical devices, and advanced materials research. This chapter presents Braun as a multifaceted site, mapping the firm geographically as well as culturally (see Sullivan and Porter, 1997), while also constructing the firm as a representative example of a postindustrial site. Because Braun

has implemented some new practices, yet not others, it remains transitional and inhabits the space between the theoretical endpoints of industrial and postindustrial. This oscillation between how the site both is and is not postindustrial is what makes it a valuable representative anecdote, related to but different from a case (see Burke, 1941; Damousi et al., 2015).

These examples of people embedded in their working context cannot pretend to offer a comprehensive vision of the future of work. Rather, I strive to offer compelling and powerful examples of technorhetorical work as a future and emergent form of technical communication. Manufacturing work may directly employ fewer people than at the height of the industrial age, but building things, producing cleaner energy for home and business use, and creating new agricultural/industrial hybrids will continue to drive economic activity in the "East-Midwest." This region that David Ward ascribed as a central industrial region of the United States is dense with legacy networks of goods and skills that, with strategic nurturing and re-investment, become the postindustrial Midwest. But I return to the industrial inheritance as a unique strength that animates the region's future as much as it populates its past. Indiana, Ohio, Michigan, and Illinois are bound together by history as well as geography. My focus is clearly my own specialty of technical and professional communication, but engineers, managers, and entrepreneurs can leverage the insights of the analysis and understand both the advantages and challenges the industrial legacy provides the region. Each site reveals its postindustrial nature in its reliance on design to move from older practices to meet new challenges, wedding innovations developed in Silicon Valley and other centers of innovation, to homegrown invention. Existing relationships are rearticulated in the network to reveal deeper, recyclable skillsets.

Awareness of and response to the impacts of these global networks define sustainability of work. It is no longer enough to specialize, do a task, and do it well. Rather, the task needs to be contextualized—articulated—within the organization's networked relationships. Here, at each site, something new and valuable happens. Iterative and user-centered design, zero landfill, re-articulated and unbound agriculture, deep skillset recycling, pumped storage and cleaner energy, and recognizing the power of local innovation: each chapter emerges from specific places with histories of manufacturing, and each offers disruptive and attendant technologies to offer global networks of the postindustrial economy. These sites were chosen specifically because they represent innovation that requires effective articulation for them to become viable elsewhere—for their value to be seen beyond their local context of development and be both understood and valued—in larger networks. They require technorhetorical intervention to be viable. These are not routine documentation and manual writing jobs, which I

describe as 20th-century jobs, not because they are not important, but because their context of reward and value is fading. Worksites value emergent Technical and Professional Communication (TPC) work where breakthrough products and services develop, and they require rhetorical intervention to make their contribution widely understood.

Set at the Subaru of Indiana plant in Lafayette, Indiana, Chapter 2 narrates Subaru's commitment to recycling, zero landfill impact, and plans for carbon neutrality. The concept of Kaizen, only mentioned here in the introduction, is described in detail, with extended comparison of the current situation of manufacturing and automation in the automobile industry. Through Kaizen,[11] Subaru profits from its organization structure that welcomes constructive criticism and invites alternative ideas for improving its practices from all areas of its workforce. Not without its controversial elements, this integration of constant improvement is an institutionalization of iterative design. The chapter draws a clear distinction between design used for its own sake, a disruptive application of problematic genius design, insisting instead on the cyclical application of iterations of design. Iterative design distinguishes Subaru from its American automotive manufacturing peers. From its location in Lafayette, Indiana, the manufacturer ships automobiles around the globe, and the new seven-seater design will only be built at this plant and shipped globally.

Chapter 3 moves the study's focus west to the ADM plant at Decatur, Illinois. The agricultural foundation of the Midwest cannot be ignored, and part of the innovation represented in Decatur blurs boundaries between agricultural and industrial products. So much know-how produces the next generation of farm-sourced raw materials that will make their way into both agricultural and industrial products. The artifact, the greenhouse, at the center of Chapter 3 is not possible without the hybrid knowledge of materials manufacturing coming together with technologies and practices of next-generation agricultural production. ADM is practicing industrial-agricultural hybrid manufacturing that represents a prominent economic engine driving central Illinois, from which agricultural products are distributed around the world.

Chapter 4 describes an emergent cluster of photovoltaic glass technology centered on the research and development hub of Toledo, Ohio. Beginning in the middle 20th century, Toledo became an important participant in the Detroit-centered American automobile manufacturing industry. Sometimes referred to as Glass City, Toledo's specialty has been etched into its identity first as a supplier of tempered automobile glass and then later as a production and research hub for fiberglass. That specialty has given glass-related research a special place at the University of Toledo's Launchpad Incubation space that houses the Northwest Ohio Solar Hub (the Hub), the Wright Center for Photovoltaics Innovation and Commercialization, and Clean Energy Alliance of Ohio. Automotive

glass defined Toledo's mid-20th-century rise to industrial prominence, with fiberglass for both insulation and lightweight construction defining its late 20th-century identity. The early 21st century is already defined as high-technology glass research and manufacturing. Glass research and commercialization drive Toledo today, with particular emphasis on photovoltaic glass used in solar electricity technology as well as specialized toughened glass used in handheld computing and telecommunications devices. Today, Toledo is driven by research in solar energy and smartphone manufacturing. As important as glass products have been to Toledo's growth, today, the processes of mass manufacture are perfected and communicated worldwide as information products: shipping not the photovoltaic cells but the knowledge necessary to manufacture solar panels reliably and inexpensively around the globe.

Chapter 5 focuses on a small town that hosts a large energy storage site. Ludington, Michigan, is an old mining and lumber town that rose to prominence around its harbor through which raw materials were shipped to factories in larger southern cities around the Great Lakes. Detroit, on the southeast coast of Michigan and bordering Lake Erie, defines the eastern edge of the central population center of the state, west to Ann Arbor and north to Dearborn and Flint, Lansing, Battle Creek, and Kalamazoo, northwest to Grand Rapids and Holland, northward to Cadillac. This is Michigan's automotive manufacturing belt. Today, the challenge is supplying reasonably priced, plentiful electricity to millions of people. Ludington is part of the energy production network, located farther north than the population centers on the northwest coast of the state. Its pumped storage station is undergoing a billion-dollar maintenance, upgrade, and rehabilitation investment, and it remains a symbol of the never-realized potential for production of nuclear energy in the postindustrial Midwest. Ludington's pumped storage plant is described as a Latourian quasi-object in Chapter 5 that supports discussion not just of the design of the physical plant and its pump generators, but also of the larger cultural networks in which these electricity generation technologies and clean energy become points for discussion and inform the design of similar facilities in China, Scotland, and elsewhere. The chapter concludes with investigation of innovation regulation.

Chapter 6 returns the analysis to Indiana and the smaller innovative organizations surrounding the research and development hub of Lafayette, Indiana, and Purdue University. In order to be valued beyond the sites' immediate surroundings, each site's technological and institutional innovations have to be articulated in larger regional, national, and global networks. Local communities have to be recognized as producing distinctive skills and knowledge that can be traded in globally competitive markets. Additionally, recognizing the knowledge and skills clusters in which they participate reveals unique regional assets these networks can draw upon and leverage to add further value to their products and