

Introduction

Journalism and Technology

We tend to overestimate the effect of a technology in the short run and underestimate the effect in the long run.

—Roy Amara

In the final days of 2012, the *New York Times* published the story “Snow Fall: Avalanche at Tunnel Creek” on its website. It was a landmark event in web journalism. With stunning visuals and interactive features, the documentary-like story by John Branch simulated a deadly avalanche in Washington State’s Cascade Mountains that claimed the lives of three skiers. Merging text, photos, animations, maps, and videos, it was ingeniously designed and absolutely pleasing to the eye. The production team consisted of dozens of people, including reporters, graphic designers, videographers, engineers, and even a physicist who re-created an avalanche model.¹ They spent more than six months putting the piece together. The story was a sensation in journalism circles and received both Pulitzer and Peabody awards the following year. It was hailed as a future of journalism.²

However, when I asked the students in my “Introduction to Journalism” class to read and enjoy “Snow Fall,” I was surprised that their reactions were lukewarm. Granted, it has been some time since the piece was published and the wow factor might have gone in this fast-changing techno-journalism world. Still, the story’s compelling narrative and the presentation’s creativity and aesthetics were there. When I asked the students why they didn’t appreciate it as much as I had expected, there were several answers. First, few of them bothered to read the story. “It was TLDR!” a student said, meaning in internet slang “Too Long, Didn’t Read.” Many students were overwhelmed by the fifteen-thousand-word opus and got distracted by a variety of different video snippets, sound effects, photos, and interactive graphics that seemed like too many bells and whistles. Other students wondered why

the *New York Times* spent so much time and resources for this particular event—an avalanche in the state of Washington. “It is too much. It is like they are showing off that they can do this kind of thing,” another student said.

2 Make no mistake: “Snow Fall” is a good story. It is an exemplary digital work that incorporated a poetic narrative and sensory experiences enabled by multimedia. Not just the artistic presentations but also the research and newsgathering work done by reporters are extensive and meticulous. But let’s face it, few people finished reading the story. It is said that a visitor to the story’s site spent an average of twelve minutes there.³ While that is a considerable amount of time by today’s web metrics standards, it is hardly enough time to reach even the middle of the story. It was very likely that the visitors just clicked parts of the story instead of actually reading it. And many of them, like my students, must have been entertained by the compelling photos, graphics, and interactive features that took their central focus away. So, after surfing the story randomly, visitors are left with little substance to remember. The technology behind the story must have been impressive to the visitors initially, but soon, they will likely find it obsolete. Besides wowing the visitors for a brief period, it is unclear how much the story actually engaged them so that they could appreciate a good piece of journalism and become more loyal readers of the *Times*.

The case of “Snow Fall” makes us wonder whether this kind of multimedia-rich, technology-driven story is what readers want and what helps them better understand the world. Technology columnist Farhad Manjoo sums up the problem with “Snow Fall,” saying it is “an example of excess, a moment when designers indulged their creativity because they now have the technical means to do so, and not because it improved the story or readers’ understanding of it.”⁴ In other words, “Snow Fall” was a story created more for the sake of reporters and storytellers than with the audience experience in mind. It was a story that lacked a careful consideration of audience reception and engagement. With all due respect to its painstaking newsgathering efforts, it was also a story led by technology, not by reporters.

Throughout history, technological innovations have been closely associated with journalistic practices. The invention of the printing press in the fifteenth century allowed the creation of a reading public, which was essential to the growth of journalism; costly and unreliable communication through telegraph in the early nineteenth century sparked journalists to develop the “inverted pyramid” style of writing, in which the most important facts are presented first in a condensed story format. The internet destroyed the advertising-based economy of newsrooms and thus bankrupted

traditional newspapers, while contributing to the rise of citizen and alternative journalism backed by digital tools. And the technological affordances of the web platform would allow transformative storytelling experiences like “Snow Fall.” As will be illustrated throughout the book, however, these cases are not so simple, such that one cannot make a wholesale, technology-deterministic argument that technology transforms journalism. There are cultural, social, economic, organizational, and political forces at work in the relationship between technology and journalism.

Journalism’s pursuit of technology has only accelerated in recent years without much luck. Google Glass was going to reinvent journalism, and many journalism schools created news reporting courses utilizing the product, both of which are now hard to find; robots, or artificial intelligence, are said to be replacing human reporters, though that doesn’t seem to be happening in the near future. The decentralized and transparent blockchain is touted to be saving journalism, but it has gained little traction so far. Worse yet, journalism’s relentless pursuit of technology these years comes with the pressure of “speed.” Granted, the journalism business has always been about speed, breaking stories, and keeping tight deadlines, but journalism’s preoccupation with speed has turned into angst and zeal in recent years as the industry saw many newsrooms going bankrupt after failing to adapt to the new media environment. It is now almost imperative for many news organizations to innovate constantly in order to survive in the competitive and fast-changing market. Whether it is chatbots, virtual reality, blockchain, or the next “next big thing,” the industry is experimenting with new technologies every day, and with great fervor. Indeed, the only constant in journalism seems to be change. Julie Posetti at the Reuters Institute for the Study of Journalism called this tendency the “Shiny Things Syndrome,” referring to newsrooms’ obsessive pursuit of technology in the absence of clear, research-informed strategies.⁵

Journalism’s relentless pursuit of technological adaptations and innovations begs many questions: How important is technology in journalism? Why do we see this obsession with new and speedy technological innovations? Can journalism be successful without resorting to new technologies? What is the relationship between technological and other innovations in journalism? Ultimately, what is the core identity of journalism? Is it essentially a technology-dominant business? Where does that leave the audience? What about the other principles and missions of journalism?

This book attempts to answer the above questions. To that end, I analyze historical and current cases of journalistic innovations as well as

technological narratives around the journalism industry. Surveys of and interviews with editors, reporters, and newsroom technologists will also illuminate how journalism relates to technology. By no means do I argue that technology is an inconsequential factor in journalism. On the contrary, technology has been essential in journalism's survival and progress. My core argument is that while technology is important in journalism, those in journalism circles today believe too much in its power. As they increasingly resort to technological means, hoping that new tools and inventions will rescue journalism from its current crisis, they ignore why journalism exists in the first place. Swept by the technologically deterministic narrative, they forget the field's civic and democratic missions.

And they are going too fast without a clear aim and research, often threatened by the power of such technology giants as Google and Facebook. I argue that viable journalistic advancement through technology takes careful research, trial and error, and, most of all, significant time and ripened social settings. Viewed this way, technology's impact on journalism is not necessarily immediate and sweeping; its true impact is shaped over time and is also affected by various social, cultural, economic, political, and organizational factors.

Toward the end of the book, I situate my critical analysis within the broader framework of "slow journalism." Slow journalism, born out of the larger slow movement—along with slow living, slow foods, and environmentally conscious consumption—refers to the idea that good journalism is not bound by time pressure and is more mindful and sustainable.⁶ The slow journalism movement so far has focused mostly on slow and insightful news reporting and consumption. I expand the idea of slow journalism to include journalism's attitudes toward technological innovations. The slow journalism movement can provide some antidote to the journalism industry's unremitting pursuit of speedy technological adaptations that may come at the expense of good reporting. Ultimately, it makes us think over what journalism means in today's ever-changing technological environment.

Between Technological Determinism and Social Construction of Technology

A logical opening idea on the topic of technology's impact on journalism is surveying the two principal theories that are popular in science and technology studies (STS): technological determinism and social construction (or shaping) of technology. These theories have a long history and are well enough established to inform the roles of technology in journalism. Before

discussing specific cases of technologies in the following chapters, I overview these theories as a guiding framework.

First, the often controversial yet dominant technological determinism suggests that the development of technology proceeds in an autonomous manner, determined by an internal logic independent of social influence, and that technological change drives social change in a prescribed fashion.⁷ It is a straightforward and attractive idea. After all, when social media connects you with people anytime, anywhere, when 3D-printers churn out almost any physical object, when artificial intelligence writes on your behalf, and when your car is driving by itself, it is difficult to shake the feeling that technologies are changing the world and humans are just tagging along. Indeed, technological determinism is very popular in the business world, where cutthroat competitions for innovations and productivity exist; in popular culture where the power of machine is mythicized in novels, movies, and television shows; and in the intersection of academia and popular culture, where the Canadian media theorist Marshall McLuhan's idea that "the medium is the message"—meaning that the communication technologies humans created have become a central nervous system that may alter the ways humans experience the world—has gained a massive following.⁸

Historians and scholars of technology produced many compelling accounts that affirm the determining power of modern technologies. For example, the invention of the gun changed how combat was waged and determined the winner and loser in warfare—and, eventually, the survival of a civilization. After all, what could the swords, bows, and arrows of Native Americans do against European colonizers' guns firing fast from a safe distance? Other fascinating examples include how the invention of the telegraph revolutionized business communication, by providing instantaneous message transmission, and also expanded police and fire services, which used it as an alarm system in major cities of the United States in the nineteenth century.⁹ In the business world, historian Alfred Chandler's *The Visible Hand*—in which he made a case that modern managerial capitalism was the product of the technological revolution of modern times—still stands as a revered work.¹⁰

At the other end of the spectrum, however, resides the theory known as the social construction of technology. Its supporters, also known as social constructivists, espouse the idea of the social shaping of technology, believing that how technology is embedded in social contexts is essential to understanding the power and effects of the technology.¹¹ It is the idea that the agency, values, and norms of humans are more important than the technology itself.

As Raymond Williams said, “Technological determinism is an untenable notion because it substitutes for real social, political, and economic intention, either the random autonomy of invention or an abstract human essence.”¹² Williams famously argued that an interlock of military, political, and commercial intentions, as well as democratic interests, is at play in the design and use of science and technology. Consider the case of guns, above used as an example of technological determinism. It is easy to imagine that the Native Americans succumbed helplessly to the guns of the early colonizers. But one can argue that it was more of an epidemic widespread at the time—and that their leaders’ failed tactics and psychological gaffes, rather than the guns, defeated them, because their longbow technology was not necessarily inferior to the colonizers’ guns of the time, which were limited by recoil and slow rates of firing. It is inconceivable that an army of eighty thousand Native Americans was instantly defeated solely by the guns of fewer than two hundred Spanish soldiers, as illustrated vividly in Jared Diamond’s masterwork, *Guns, Germs, and Steel*.¹³ And if one looks at how guns are employed across the world today, different human cultures and values determine their usage and effects, giving the idea that society and culture shape the gun technology. Indeed, historians who have looked closely at the relationship between technology and society tend to support the proposition that technologies are not autonomous but are social products, susceptible to social and democratic controls.¹⁴ Scholars have shown that, for example, so-called urban technologies such as telephones, radio, and automobiles have been used differently by rural populations, creating individual versions of “rural modernity.”¹⁵ In another well-known example, it is argued that the evolution of the design of bicycles has been nonlinear, shaped by the needs and concerns of both users and nonusers in various stages.¹⁶

The seemingly conflicting theories of technological determinism and social construction of technology are not necessarily irreconcilable. First, between the “hard” technological determinists (who believe that technologies develop independently from societal concerns) and the “radical” or post-modern social constructivists (who believe that even the truth and nature of scientific knowledge and technical workings of machines themselves are constructed by social processes) there exist moderates who would focus on the degree, scope, and context of technology development and use in society. They would ask such questions as to what extent, in what ways, and under what scope and conditions particular groups of people are able to shape their sociotechnical systems. Phrased differently, the questions are to what extent, in what ways, and under what conditions particular kinds of technology are

more autonomous and powerful in shaping society.¹⁷ So, the task here is to acknowledge the mutual and interconnected influence of both technology and human agency and probe specific contexts where particular factors may be more influential.

Some scholars provide useful insights to reconcile the two theories. For example, the American computer scientist and futurist Roy Amara once said that people “tend to overestimate the effect of a technology in the short run and underestimate the effect in the long run.”¹⁸ This adage is now often dubbed Amara’s Law. The point of this clever remark is the importance of time in technology development and adoption. When an invention or discovery appears, people tend to get hyped or overly concerned about the possibilities it may bring: Behold! The cars will drive by themselves, robots will replace the human workforce, and so on. The stocks of the companies associated with the technologies become overheated. But as time goes by, people usually get to observe many failures and, if any, a limited and slow development and adoption of the technology, however promising it was in the beginning. At this point of the technology development cycle, critics also chime in and warn about the hype associated with it. So, people get disappointed and forget about it, but at some point, the technology becomes ubiquitous and tremendously changes their lives. Such were the cases of electricity, steam engines, and computers. All these technologies came with short-term hype, followed by skepticism and, eventually, a fundamental impact on human life that we today regard as ubiquitous and natural. In 1998, against the hype that the internet would bring a new transformative information economy, the Nobel Prize-winning economist Paul Krugman claimed, “By 2005 or so, it will become clear that the Internet’s impact on the economy has been no greater than the fax machine’s.”¹⁹ Predicting the future is a notoriously difficult task, even for a Nobel Prize winner, but this quote today sounds just comical.

As will be illustrated in more detail in the next chapter, many technologies—both historical and modern—followed Amara’s Law. Highly touted contemporary technologies in journalism, such as virtual reality and artificial intelligence, started as early as the mid-twentieth century and their advancement has been slow and painful. What Amara’s Law suggests is that the adoption and development of technologies take time and they go through cycles of hype and disappointment until some of them become more available for use by the general public, which resonates with the findings of some popular academic studies in business and communication.²⁰ In particular, Amara’s Law is well illustrated in the “hype cycles,” developed by the

American information technology and business consulting firm Gartner, which suggests that new technologies and innovations go through five stages of adoption: (1) innovation trigger, (2) peak of inflated expectations, (3) trough of disillusionment, (4) slope of enlightenment, and (5) plateau of productivity.

8 From the perspective of Amara's Law, the theories of technological determinism and social construction of technology may sound not so antithetical. That is, in the longer term, technologies may indeed have a determining impact on human life but, in the shorter term, human agency has more power in shaping and constructing the technologies. Technology historian Thomas Misa supports this point when he observes that technologically deterministic scholarship tends to adopt a macro perspective, looking at larger scales of time and space, whereas social constructivist scholarship tends to adopt a micro perspective, looking at the details of human-technology interactions in relatively smaller scales of time and space.²¹ According to Misa, philosophers of technology who utilize abstraction and macro-level thinking tend to adopt technologically deterministic thinking. They develop grand theories of society and technological changes, as seen in Jacques Ellul's work on technology as a complete social system.²² However, Misa argues that the idea of machines as a powerful causal force bringing change vanishes when historians adopt a more detailed analysis. For many business and labor historians who adopt micro-level analysis, technology is a subject of negotiation reflecting human agency. "Again and again, historians writing large-scale or deterministic accounts deploy the Machine to structure social change, while as soon as the historical microscope is unveiled, the Machine as such dissolves," writes Misa.²³

The attempt to reconcile technological determinism and the social construction of technology can also be found in well-known organizational behavior literature. Gerardine DeSanctis and Marshall Scott Poole, who studied the role of information technologies in organizational changes, supply a middle-of-the-road perspective about the power of technology.²⁴ Their "adaptive structuration" theory suggests that structures in technology and structures in human action are continually intertwined, shaping each other. This perspective is a departure from the decision-making school in organizational behavior that emphasizes technology as a deterministic force that brings productivity and efficiency to organizations;²⁵ it is also a departure from the institutional school that argues people generate social constructions of technology using resources, interpretive schemes, and norms embedded in the larger institutional context.²⁶ DeSanctis and Poole argue that there is a

“dialectic of control” between the group and the technology. That is, technology structures shape the group, but the group likewise shapes its own interaction, exerting control over the use of technology structures and the new structures that emerge from their use. Organizational change occurs gradually, as technology structures are appropriated and begin to change decision processes. Over time, new social structures may become a part of larger organizational life. In this way, technologies can serve to trigger organizational change, although they cannot fully determine it, DeSanctis and Poole propose. Their theory is quite useful as it illustrates that the integration of technologies into journalism is not a simple plug-in process but a complex socio-organizational process. This theory is further utilized in later chapters.

Although the literature introduced above attempts to find a middle way between technological determinism and social construction of technology, it appears that more weight is given to the idea of human agency shaping the technology, at least in the short term. Such a tendency is apparent from Misa, who says that “from a shop-floor perspective, the Machine is an irrelevant abstraction, and what makes history is individuals (perhaps classes) in conflict or accommodation.”²⁷ Although not explicit, DeSanctis and Poole, who developed their theory based on the renowned British sociologist Anthony Giddens’s grand idea of structuration, also seem to emphasize human agency. Giddens’s “structuration” refers to the production and reproduction of the social systems through members’ use of rules and resources in interaction.²⁸ Here, “interaction” signals the idea that humans have a say against the larger social structures. In DeSanctis and Poole’s adaptive structuration, they further develop the idea of human agency: human beings exercise *conscious* choices to intentionally adopt rules and resources to accomplish organizational goals.

A similar observation can be made in terms of journalistic innovation. The dominant discourse, especially within the journalism industry, has been that of technological determinism. Journalists and industry insiders tend to regard technology and technological development as an inevitable force that directly causes changes in journalism, as shown in a slew of academic research as well as in chapter 2 of this book.²⁹ In the early days of the internet revolution, journalism academics also took a decidedly technologically deterministic stance, as did many media scholars.³⁰ But later work dealing with journalism and technology favors more nuanced and balanced explanations, placing technology in specific organizational, cultural, political, and

economic contexts.³¹ For example, Will Mari's study of newsroom computerization shows a mutual shaping of technology and human agency such that certain computer technologies give rise to certain affordances compatible with newsroom norms and culture, which influences journalists' sense of control and engagement with those technologies.³²

10 In general, the journalism industry, the larger business circles, and the popular narrative tend to believe in technological determinism. But academics of STS and journalism studies increasingly subscribe to the tenets of social construction of technology. In fact, recent scholarship appears to have discarded the notion of simple technological determinism. This does not necessarily mean that the perspective of social construction of technology is superior to technological determinism. However, beyond the popular and grand narrative of technological determinism in history, and beyond the dominant business perspective that adopts a more technologically deterministic way of thinking, there is a need to analyze more nuanced details of technology-human interactions. As Pablo Boczkowski showed in his study of newsroom technology, this approach does not replace but complements a concern with the effects of technologies on journalism—precisely because the technological effects are potentially so significant that we need to have a better understanding of the processes that generate them.³³ And that's exactly what I plan to achieve by looking at the history of the technological impact on journalism.

Chapter 1 probes technology's impact on journalism in detail, from the printing press to blockchain. A microscopic analysis of historical as well as current technology adoption suggests that journalism's innovations are often determined by sociocultural contexts, rather than by technologies themselves, and that their adoption process is slow and gradual. Chapter 2 investigates why there is so much push for technological innovations in journalism. Utilizing the French sociologist Pierre Bourdieu's field theory as a general theoretical framework, it argues that the professional journalistic field, which is rapidly losing its jurisdictional control, attempts to reassert its boundaries using technological means. This chapter also includes some empirical materials, such as surveys of journalists' roles and attitudes in their workplace, and an analysis of technology discourse in journalism trade publications, showing that journalists today live by the grand discourse of technology, struggling to keep up with the new tools and innovations. In chapter 3, I introduce the slow movement and apply its tenets to journalism and technological innovation, arguing that slow values make journalistic innovations

more sustainable. Analyzing the cases of *USA Today*, the *Guardian*, and *Buzz-Feed*, I then show how journalistic innovation can come from many different dimensions beyond technology, which include people, culture, and norms. In the conclusion, I advance the thesis of the book by arguing that the industry's heavy focus on speedy technological innovation has marginalized journalism's civic missions and democratic concerns. Overall, this book urges those involved in journalism to think beyond the dominant technology narrative.

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