Chapter 5
Big Data: Information Technology as Control over the Profession of Medicine

Introduction

All across the globe, there are promises for practical technological solutions to critical issues confronting societies, from artificial intelligence (AI) detecting sensors in at-risk flood areas to snow melting sensors on glacier disappearance, smart grids to power up after blackouts, autonomous cars (which may require AI traffic control), lamps on Wi-Fi for crime prevention, connected “smart cities” (Huber, 2020), surveillance over tree thieves in rain forests (Ives, 2019), a substantial variety of business applications (Using Artificial intelligence to power better business decisions, 2019), and many more. These practical improvements hold great potential for saving lives and the environment, as well as for property. Health sector applications have also been zooming with a greater number of applications on the horizon promised.

Yet, the technology of artificial intelligence (AI) holds significant dangers, especially in the hands of politicians with varying objectives of maintaining social control over populations; Kendall-Taylor, Frantz, and Wright (2020) explain how technology strengthens autocracy by enabling surveillance tabs on virtually every aspect of citizens’ lives. AI in the hands of corporate managements bent on extracting huge profit streams moves forward without being subject to either regulatory oversight or ethical considerations.

Historically, it has been well reported that the embrace of new technologies has profoundly altered societies and the entire world: from the radio and television to the Internet and smartphones, and now AI and 5G. A post-embrace analysis of any one of the above technologies would reveal unforeseen social implications. Therefore, what can we as a society now assess before AI, 5G, and more technology comes to occupy our daily lives with multiple unforeseen implications?

As artificial intelligence engulfs more of our American society—and as the giant IT firms encircle the healthcare system in significant ways—it might be worthwhile
to urge more than a modicum of caution from medical professionals to keep watch over their future. This is crucial in that both healthcare issues and the COVID-19 crisis are being framed within information technology and Big Data “solutions” and these will not be neutral.

**Chapter Purpose**

This chapter will describe how information technology solutions are becoming widespread in the healthcare system to address cost, quality, and accountability issues. As medical decision-making is increasingly scrutinized, opportunities for small and giant IT firms are opening, as well as for other for-profit entries with sweeping private investment in health care. The chapter will examine beginning efforts by the powerful and pervasive FAANG entities (the acronym used to describe Facebook, Apple, Amazon, Netflix, and Google), plus numerous other corporate groups, that collectively amounts to rather significant healthcare involvement. The following descriptions of several firms with this preliminary analysis point to some implication with potential sources of danger. Beyond this summary analysis, greater attention is now warranted. These cautionary notes should be carefully observed over the coming months and years since the pace of movement among IT firms goes amazingly fast, especially given the post-COVID-19 pandemic which has inspired many new activities. Multiple opportunities are being carved out by these cash-rich companies.

The degree that the American healthcare sector comes under tighter corporate profit-making is a major threat today; it remains unclear how or whether this marketplace grip will ever serve the public’s health. While the summary here may be brief in terms of its complicated, multi-faceted directions, the chapter’s purpose is to delineate issues that health professionals and policymakers may want to know and follow. The current IT investments and the huge resource base of these Silicon Valley behemoths in cash and expertise suggest that what is at stake is not easily predicted at this stage. As with the current corporatization of health care described in Chap. 2, the key question will be “who benefits?” Investors or the public’s health?

**Artificial Intelligence Concerns**

In a *New York Times* special section on artificial intelligence in October 2018, a panel of industry experts were interviewed to discuss the ramifications of a data-informed world (Behar, Five Voices on Artificial Intelligence, 2018, p. F2). Behar (2018) believes that our thinking on AI might not be broad enough in that it could be used to monitor the health of individuals currently in need of greater oversight,
e.g., patients with needing care titrated on a moment-to-moment basis. Anderson (2018) thinks that AI can alter our perceptions of what humans are and what they can be, personalizing our medical treatments and improving both our mental and physical capabilities, which creates moral dilemmas about how much is too much. Five Artificial Intelligence Insiders in Their Own Words (2018) postulates that AI can perpetuate biased systems and societal distributions in a way that heightens current inequities and thus only serve to justify the existence of those who preside over society now. Haenssle (2018) makes the point that AI using algorithms can improve diagnosis of certain skin cancers over that of experienced dermatologists. Lastly, Ibrahim (2018) makes the case that AI can vastly improve our lives and lifespans but at the same time we must be wary of the moral ramifications brought about by consequences neither seen nor predicted at the outset of implementation. Behar (2018) feels thinking about AI only for search, security, and social media is limited; its potentials should be seen in new contexts, especially for its healthcare promise. Anderson (2018) sees radically new personalized medicine, but it may require broader conversation beyond merely scientists and engineers, which Five Artificial Intelligence Insiders in Their Own Words (2018) identifies as an insular subset of society (code writers) making the rules. Will their decisions be biased? Beyond practical applications and awareness of unintended consequences, is there sufficient urgency about the risks of AI (Ibrahim, 2018)?

How will societies reckon the mounting issues of AI when they go unexplored, and untested, until they are well embedded across industries, in addition to our work and daily life? Upon us now are significant displacements in the labor force and a completely redesigned nature of work. Automation here at home, as well as flight of multinational capital abroad, was responsible for America’s deindustrialization and the resultant huge job loss since the 1960s. When the unemployed are finally called back to jobs post-COVID-19, will they be there for them? And how will firms “going Lean” and intensifying automation efforts now post-virus outbreak come to affect the nature of work?

For health care, we must ponder how AI may impact all facets of the nature of doctoring, along with costs, quality, and finally our population’s health status, while it is ongoing now.

Siegele (2018) in a special report in the Economist was forthright in stating that the Internet—now 50 years of age—turned out to be much less decentralized as promised and certainly not always an uplifting and hopeful presence in our lives, as if one couldn’t have found that out by scanning Facebook, Twitter, and Instagram to ascertain how much social media, and the Internet in general, has taken on a rather cesspool character.

While many folks celebrate technological progress, Henry Kissinger (former Secretary of State under Presidents Nixon and Ford) saw AI systems in flux with certain upheavals in many quarters, as well as doubts about its awe-inspiring promises (Kissinger, 2018). There remains questionable impact from self-learning machines that acquire new knowledge through their own processes. It is not yet well
understood in various applications how machines interpret goals within search
engine algorithms (like reducing medical care costs). If managers seek a higher ROI
next year, what changes in care patterns may be automatically instituted without
clinicians’ thorough review?

Kissinger noted that the Internet can amplify and distort knowledge by being
able to capture the huge amount of data and use it to further one’s particular end. At
that end is becoming less about us as individuals and more about us as data points;
the use of that data, especially when taken out of context, can overwhelm moral
decision-makers (Kissinger, 2018).

Reflecting on Kissinger’s notions above for healthcare applications, profession-
als might want to note that not much knowledge nor critique is currently being given
to the overall health information technology (HIT) trend; most if not all HIT is
being seemingly heralded in all quarters; technology’s wonders are praised while
objections are more often personal or argumentative, rather than analytical. There
are, of course, occasional luddites writing across the media, but it should be pointed
out that objections rarely explore deeper ethical transformations currently under-
way; there is a great absence to counter the mere marketplace advancement being its
leading force. Many people eagerly succumb to tech consumption. In health care, a
real and present danger with profound implications may be witnessed earlier than
professionals may think. Pay careful attention to the rapid march toward utilization
management and performance monitoring (Feinglass & Salmon, 1990).

Thus, when AI implementation is ill conceived, and systems are poorly executed
(as according to many physicians when electronic health records began), how can
we be assured that serious political and ethical concerns will be considered before
being built into ongoing AI applications? What might be considered reasonable
applications, and for whom, beyond their corporate sponsors and players seeking
higher returns on investment?

The corporate domination of the IT industry with its phenomenal growth and
size, as well as its political and cultural power, is sweeping into the US healthcare
system with alacrity. Financial Times Intelligent Business had a special section that
heralded that AI ushers in an era for business that will use Big Data to become
closer, bigger, safer, and more efficient, which will fundamentally change the way
we do business and not necessarily for the better (Sen Gupta, 2019, p. 3).

Blockchain is extolled for tackling supply chain inefficiencies to regulating city
transport companies, and consumers are beginning to see the effect for themselves
beyond the Bitcoin fascination (Bennett, 2020). Changes are starting to blur the
lines between professional services (including medicine, law firms, and consultan-
cies), with 160 blockchain-based proof of concept projects underway. Software
companies are muscling into a variety of service firms to make services more effi-
cient and secure with blockchains. Other examples are given where IBM Global
Business Services works with counties on a variety of projects to coordinate care for
vulnerable people in local communities. Cloud-based apps are provided that bring
about better public services (2019, p. 4). Other examples are provided as case stud-
ies in new technology applications.
Artificial Intelligence (AI) to the Rescue?

As the tech industry encircles not just health care but also numerous sectors of the American economy, and worldwide, artificial intelligence (AI) is being blasted across the business and popular press as the salvation for companies tackling their concept of “Big Data.” Machine learning has great significance in numerous applications as an increasingly useful tool for business. Algorithms aid computer learning to replace humans to improve efficiency and enhance quality and with much less error. Evidence of this abounds with new software beating humans on complicated video and board games, through reinforcement learning.

Computer vision allows facial recognition, as well as self-driving cars, which allows for safer transactions, as well as safer driving. Neural networks sift through data to identify patterns, and when mixed with machine learning, it makes for deep learning, which can calculate and crunch enormous amounts of data and help humans detect obscure patterns and meaning. Finally, and more importantly, natural language processing allows computers to understand and react to human speech, which has been improving quickly to lessen errors and misunderstandings (Harper, 2018).

Fortune’s (2019) CEO survey found 60% of firms using AI to improve efficiency and to reduce costs. Twenty-two percent of firms were reported using AI to create new products and services (Murray, 2019). Financial Times projected growth in an army of data labelers for AI, mostly workers underpaid in areas in need of upgrading ethical supply chains from countries like Kenya, India, and the Philippines (Murgia, 2019). Meanwhile, worldwide spending on virtual reality (VR) and augmented reality (AR) technologies are expected to be larger than $20 billion in 2019, up to 69% from the previous year; both VR and AR are rapidly spreading into enterprises (Torchia & Shirer, 2018).
Marcus and Davis (2019) writing in the *New York Times* state that AI has a trust problem, and it hasn’t yet earned our confidence in terms of time, space, and causality, which are significant theoretical and practical challenges. These authors argue the need to look at AI differently so that we can develop devices that will understand the context in which they operate well enough that we will not have to fear any unintended consequences (2019, p. A23).

*AI in Health Care*

Applications in health care are being widely touted in the literature (Adamson, 2015). This surge combines many Silicon Valley entities making substantial investments, along with smaller proprietary firms developing some capabilities; many such players are hoping to find a niche inroad to lead to an absorption from the larger IT firms. M&A has been prevalent among IT firms across their history, so extensions into the health ventures are merely how they will expand into another lucrative market. Amazon recently added a new division to focus on health and wellness. Google is obviously planning to use AI in its insurance venture with JP Morgan Chase and Berkshire Hathaway (Scott, 2018). Dozens of other firm positionings regarding their benefit reorganization can be found in the business news. The vast data warehouses by the pharmacy benefit managers have been ripe for AI once the insurance company mergers are consummated for the combined clinical and drug data amalgamations; potentials were never actually explored in the PBM industry for public health improvements (Salmon & Dedhiya, 1998).

Clinical variation is said to be a significant contributor to health care’s multibillion-dollar overuse problem, which could be as high as 20% of clinical care spending (Frakt, 2019; Shrank, Rogstad, & Parekh, 2019). Thus, AI is being touted to reduce clinical variation (Cohen, 2019a, 2019b) in efforts to standardize care and eliminate unnecessary services, which drive up costs and create additional clinical complications. For providers under value-based care, this creates a tremendous market for artificial intelligence, but hopefully with decent data analytics under professional guidance. Without such, AI is also being proffered to prevent the widespread physician burnout. This burnout issue among physicians (thought to be as high as 68%) has been framed as a crisis; nevertheless, its dimensions are much broader than a mere tech solution (Mazzolini, 2019). Rosenfeld (2019, p. 1) believes that record physician burnout is being caused by electronic health records (EHR) that are being used to administrative and regulatory oversight.

While numerous businesses may march forward toward AI, how prepared are health providers for machine learning, given that most applications remain in the research stage (Wilson, 2019)? Much of the heterogeneity of data is institution specific, as many in the field are coming to realize. Pilot testing is necessary to assess how each application works in the actual provider to avoid mishaps, which not only slows down implementation but remains quite costly. Sophisticated expertise on site
is usually required, which is rarely found and expensive. Care must be taken to evaluate the sales pitches of vendors.

Computers with AI capabilities can be trained to analyze patterns in large swaths of data. Applications to improve the workflow of radiologists are expanding widely (Wilson, 2019). Virtual cardiac rehabilitation is being explored (Funahashi, Borgo, & Joshi, 2019). Medical academicians and clinicians are trying to leverage AI for decision support in several specialties with a bullish hope for greater meaning to doctors and doctoring through teamwork (Shah & Lee, 2019). Physicians get to do more of what they are trained to do, that is actually more “conception” tasks and less tedious “execution” tasks.

Tackling some routine chronic disease care problems is also on the horizon, for example, the care of diabetics is also being flagged as being vastly improved by new technologies, by assisting patients with lifestyle changes through self-management, education, and support (Kent, 2020). Platforms for remote patient monitoring have potentials for ambulatory and home care services, including web-based care coordination and use of mobile apps focused on the patient experience. A variety of providers are implementing these with databases being created that can be explored by AI-powered systems.

Five Safeway grocery stores in Phoenix have launched virtual health clinics to improve access to care in certain neighborhoods to leverage AI and augmented reality for patient guidance through the entire diagnostic process. CVS Health also has retail stores turning into healthcare hubs in some communities it serves (Japsen, 2019). In addition to finding ways to engage consumers onto “better health pathways,” acute care venues continue to provide low acuity conditions where phenomenal wastage from overutilization and fraud and abuse is really one of the best potentials for AI applications. With the rise of urgent care centers, retail clinics, telemedicine, and the like, trends in utilization of newer care venues and emergency departments of hospitals provide for much opportunity for decreasing care, thus saving money for insurers, or for payers (Poon, Schuur, & Mehrotra, 2018).

Advances in artificial intelligence within health care will be significantly contributing to the projected $15.7 trillion economic boost related to machine learning, according to Price Waterhouse Cooper (PWC) Consultants (www.pwc.com, 2019). This will give rise predictably to a 14.5% increase in North America’s GDP by 2030, driven by the increasing efficiencies and ability to make decisions of AI (Bresnick, 2018a). The report maintains that all of health care will be effected by change including payers, providers, Big Pharma, and consumers as artificial intelligence is meshed into their lives. Preparation for deeper integration of AI is underway in many quarters, but certain entities surely will lag behind (Kent, 2019).

In addition, retail, logistics, and financial services are immediately finding obvious automation, but without the stricter privacy and security regulations that health care may surely need. Usually played down are the job losses that are going to come from this improved “efficiency” and for corporate leanness. The introduction of clinical decision support will require slow and carefully planned
introductions in order to overcome resistance and encourage greater adoption. Physicians will be mindful of the difficulties during Electronic Health Records (EHR) implementations, and this will give rise to conflicts and slow down processes. Will they be skeptical of decisions being automatically made by algorithms, maybe not for routine services, but for the more complicated procedures and by specialists? Nevertheless, AI will be able to automate administrative tasks and financial transactions; these areas are getting significant attention by administrators in revenue cycle management, so issues of surveillance and speedup may generate conflict issues.

As the phrase goes, “The train has already left the station,” and PWC (www.pwc.com, 2019) has said that AI can alter the healthcare landscape in such a way to fundamentally alter what are considered well-established businesses and business models and render them obsolete. So, the multitude of cheerleaders for AI are lining up to “transform medicine.” The main thrust is on the side of administrative bodies who intend on reducing waste, standardizing services, and eliminating inefficiencies.

Lewin and Balser maintain that the exponential ongoing growth of computational power and datasets create the potential for AI to impact health care widely, meaning that we will invest in building infrastructure, competencies, and collaborations so that we can become reliant on the help of AI to look at available options, determine the best course of action, and then proceed with that plan (Lewin & Balser, 2019, p. 27).

Will AI restore the doctor-patient relationship (Inserro, 2019)? A visit to the doctor these days involves many of the same prompts, but instead of the doctor jotting down notes in a paper chart, he/she is typing into a EHR interface. This makes the data available to anyone who has access to the organizational EHR which and increase the risk of privacy breaches which can negate security guarantees. Coupled with the very fact that most AI algorithms cannot be fully explained, each new AI inroad will likely worsen disarray and expose a host of ethical quandaries (O’Connor, 2019).

One major question is how patients will accept the coming AI in medicine? If properly informed, patients may come to appreciate AI’s reduction of repetitive error-prone tasks, as well as use of new massive amounts of data being analyzed by healthcare teams to discover optimal treatments for individuals and populations, e.g., making sure that physicians don’t prescribe a potentially lethal drug that would interact with other medications the patient is already on. AI could also be welcomed by consumers to improve hospital operations, which could improve scheduling, costs, billing, and insurance issues. Nevertheless, if assembly line cultures result—and, in fact, are deepened—consumers are likely to rebel in a variety of ways, particularly if technology change gets interpreted as means for just enhancing provider and payer profits and not actually improve care in any meaningful way (The AI Will See You Now, 2019).
Era of Big Data

In the 1980s, the Age of the Internet—now 50 years old—gave rise to a plethora of dot.com entities that yielded several powerhouses in Silicon Valley and Seattle, with the subsequent decade viewing the dot.com tech bubble for Wall Street and the economy. The larger surviving firms set off a consumer buying rage for the latest tech innovation and propelled computer science programs within colleges.

The miniaturization of the computer to palm-sized smartphones with the advance of microchips propelled people’s wonderment on how technology could “improve” their lives. As the industry produced search engines, now dominated by Google and Microsoft’s Bing, ever refining search programs have been “perfected” to serve different business and consumer bases. Stern (2019, p. 1) reports that the smartphone changed over time, while it was changing us. A New York Times Magazine article stated that Google has succeeded in global domination where others have failed (Duhigg, 2018). Though estimates may vary by region, the company now accounts for an estimated 87% of online searches worldwide. It processes trillions of queries each year, which work out to at least 5.5 billion a day, 6300 a second (Duhigg, 2018).

Today microchips run everything from iPhones to ATMs and now with the Internet of Things (IoT) for everyday life. Each wave of chip advancement has given a reboot to the Internet to transform American society (Karlgaard, 2018). Of the current IT giants, which ones will find the potential and financial position to jump new social and economic hurdles?

Many have said that Big Data is rapidly transforming medicine, promising greater transparency, improved efficiency, and new ways of delivering care (Glorikian & Branca, 2017). A plethora of news reports appeared in 2018–2019 extolling AI applications in health care: algorithms for cancer detection (Towers-Clark, 2019); reducing medication risks (Grissinger, 2019); AI diagnostic diabetic retinopathy matching specialists (Wise, 2018; Frellick, 2018); monitoring brain attacks (Mirtskulava, 2018); predicting sepsis (Chettipally, 2018); and numerous applications in the pharmaceutical industry (Wince, 2018).

Software systems are advancing rapidly with “Digiceuticals” catching the eye of Big Pharma (Sweeney, 2018). The former US Food and Drug Administration (FDA) chief supported quick review of AI, and the agency has approved its first autonomous AI diagnostic system (Murtha, 2018) plus an FDA-approved AI diagnosis tool (Arndt, 2018a, 2018b). An AI in Medicine journal is now being published (AIMED, 2018).

Within this surge of both interest, investigation, and applications, AI, Big Data, and IoT will attract opportunities for growth across health care. Bresnick (2018a) sums up opportunities for vendors, developers, and their clients: the $3.62 billion segment of computer visions was predicted to reach $25.32 billion by 2023. The IoT sector will grow to $60 billion of smart appliances, manufacturing of sensors,
and security cameras, in addition to healthcare industry areas to zoom 70% by 2025 to $40 billion. Amazon now offers more than a dozen devices for its Alexa voice assistant which can sate any problem or need the user may or may not know they had (Weise, 2020a, p. B1). Wearable sensors are poised for major growth also, smart watches that will perform fitness tracking, in addition to multiple health functions to climb to a billion dollars by 2025. The insurance analytics market is predicted for a 12.5% surge to $6.63 billion by 2023 to integrate Big Data from multiple sources. Analytics are intended to equip payors with tools for making improved decision-making during uncertain times (Bresnick, 2018a, p. 4). Allen states that everything that is out on the Internet about you will be used to determine your health insurance rates (Allen, 2018, p. 2).

All of this necessitates great carefulness that must be heeded over such future direct to consumer sales in order to keep track of the parties who are supposedly keeping track of yours and the public’s health.

Beyond the widespread concern for privacy of patients’ medical data, the burgeoning area of genetic explorations poses another problem that exemplifies how fast technological changes are taking place with apparently wide consumer acceptance. How far behind are any regulatory actions, let alone concerning insight and respective solutions for what to remedy? Millions of Americans have willingly given over their genetic information to two prominent commercial outfits, which made it collectively a valuable commodity sold to numerous parties, and we would like to wish, de-identified. Medical providers, pharmaceutical companies, and information technology companies are now engaging in widespread search to identify disease-causing genetic variants to aid the discovery of new drug targets; thus, compound issues of genetic data privacy are important to consider for discussion in public policy forums, and not left to the private marketplace. Berger et al. listed 38 studies using data that had varying degrees of criticality in what might (should) be considered for tighter privacy (Berger & Cho, 2019).

Cryptographic techniques are being used to secure data analyses if individuals choose to contribute their genomes to scientific studies. Yet, should the researcher be able to share data across the scientific community without safeguards, nor no knowledge of the subjects? Are protocols needed in this area? More importantly, investigations into cold case crimes use DNA matches for law enforcement purposes, so can these be trusted? Do consumers and patients realize their data has been commercialized and became property of a corporate entity to use whatever way it desires? Beyond personal privacy, security over genetic data requires much greater public oversight. Hacking is still all too commonplace of late with the ransomware shutting down several large computer networks leading to compromised personal information as well as large ransom payments for those users who don’t regularly back up their systems. The threat of hacking and ransomware has led to a new market for cyber liability coverage. Insurance companies have arisen to specialize in this area given the huge number of cyberattacks and continual ransomware in the health sector over the last decade. While digital privacy and security concerns have become paramount amidst revelations of outside surveillance, incidents have become highly publicized, embarrassing, and costly. Precautionary IT systems have fended off hackers, but not to the degree that may be necessary, with hackers getting
more adroit at getting at data and circumventing cybersecurity. Such sophisticated technology is adopted often with *security as an afterthought*, with many health providers now trying to speedily construct cyber defense plans.

### Regulation of the IT Industry

The beginnings of regulatory attention to Big Tech had much to do with outsized company political clout and power within the economy, and throughout the society. In October 2019, five investigations into Big Tech led the *Financial Times* to claim the corporate power of Google, Facebook, Amazon, and Apple was threatened in US antitrust probes (Stacey & Shubber, 2019). Was this the beginning of a new front in US antitrust enforcement, and how would Big Tech change as a result (Stacey & Shubber, 2019, p. 4; Condliffe, 2019)? The Department of Justice, the Federal Trade Commission, Congress, and several states’ attorney generals (Stacey et al., 2019) all seem to have an overbearing concern for the concentration of corporate power that may have been leading to consumer harm.

Investors are constantly searching for overperforming stocks (Wigglesworth, 2018). This constant pressure for stock market performance and return on investment (ROI), along with congressional regulation talk, has led to a lot of market uncertainty and surely affects the overall economy. Increased antitrust investigations are only going to lead to more investor angst and increasing market volatility (Stacey, Shubber et al., 2019). Meanwhile Britain, Australia, and the European Union (Condliffe, 2019) have legislated controls on social media; each nation is looking for stricter legal interpretations, particularly with an eye toward a more “ethical AI.”

It is important to point out that other corporate entities across the US economy are reported to voice a large increase in the number of complaints against Big Tech monopolies, (Stoller, 2019) where the smaller-sized seek market freedom according to a writer in the *Wall Street Journal*. Regulatory talk has emerged as a *bipartisan critique of IT reflecting public sentiments* about Google’s 90% of the search market and Facebook’s advertising market under its social networking. With market power concentrated in few large firms, they have become the go-to source for all of our more important needs (Stoller, 2019, p. C3), thus making it more difficult for so many smaller businesses to survive let alone grow. Critics have maintained that the huge fines against these behemoths are not enough to remedy ingrained behaviors (Condliffe, 2019). Facebook settled a $5 billion fine with the Federal Trade Commission in July 2019 over its mishandling of user data, but the settlement did not change any privacy practices that would have ensured users’ data privacy (Condliffe, 2019, p. B5). It remains difficult to prosecute companies that provide “free services,” or low-cost cheaper services, than historic antitrust investigations have targeted. Nevertheless, the Department of Justice may examine multiple fronts of different firms to investigate based on market-based competition.

An editorial in the *New York Times* advocated for “the Internet bill of rights” which would protect individuals against data breaches and not give technology
companies immunity from bad behavior. The notion that social media is free must be countered with the message that our information on these “free” platforms is being used to sell us stuff, attack us, and steal from us (Swisher, 2018, p. 9).

When one realizes the pharmaceutical industry’s solid grip on Congressmen, documented K Street annual lobbying by the IT industry for 2018 to win influence inside the beltway reveals a flood of cash, according to the Center for Responsible Politics: Alphabet spent $21.7 million, Amazon spent $14.4 million, Facebook spent $12.6 million, Microsoft spent $9.6 million, and Apple spent $6.7 million (Tech Does K Street, 2019, p. 100). In all for the industry, $428.8 million was spent on lobbying, with one of the largest industries increases per year. The current Speaker of the House, Nancy Pelosi, said that she will push to get the industry in line, but she has been obviously distracted by action against the President over his quid pro quo with Ukraine. Like reigning in drug prices, this set of issues will tarry after 2021, if even then. Bad behaviors are very difficult to correct, and self-regulation or regulatory capture by the companies themselves have not helped. While Facebook has lost considerable market value in July 2018 (Eavis, 2018), they were being punished for bad financial performance and not bad intentions or behavior. And what appears to be a free service to consumers is quickly found out to be a way to gather data on subscribers in order to sell them more stuff. Instead of changing their behaviors, they blame the victims instead, telling them to disconnect from the service (Eavis, 2018).

Expecting marketplace discipline for keeping IT bad behaviors minimal is clearly insufficient in fixing the problem. As more health sector insiders grasp future possibilities from the IT firm invasion, their recent embrace may temper amidst a greater crescendo of voiced criticisms.

**Threats to Health Sector**

Since the Reagan Administration-imposed market-oriented standards of economic efficiency have been foisted on the health sector which stimulated price and product competition rather than access expansion, it did little to rein in health costs. Twenty years after the Institute of Medicine (IOM) publication of *To Err is Human* (2000), the estimated number of Americans dying from medical care (98,000 annually) seemed to shock the public; but unfortunately the flurry of provider response was clearly insufficient to improve quality of care across the nation. In 2012, the IOM (2013) estimated $750 billion of annual healthcare spending was wasted; more recently an article in the *Journal of the American Medical Association* (Shrank et al., 2019) plugged the figure between $760 and $935 billion that can be deemed as waste. This amount includes unnecessary services, excessive administrative costs, fraud and abuse, inefficiently delivered services, and built-in system missed opportunities for prevention and earlier treatments. Reports indicate a few health systems are attempting to voluntarily remove services that don’t add value for the patient
ahead of perhaps some regulation; yet, the group is avoiding tackling prices and administrative costs, which are typically the source of most waste in the system (Castellucci, 2020, p. 19).

Such a legacy of built-in system waste essentially means that rationalization of medical care is highly necessary for cost control and quality improvement, but should not necessitate service cutbacks to more vulnerable population cohorts; nevertheless, the variety of means for this rationalization to be pursued are apparently still up for grabs. Feinglass and Salmon (1990) wrote more than two decades ago:

To be effective in boosting profitability and market share, these interventions will have to penetrate deeply into the clinical settings where most of the providers’ variable costs are generated, and where research on medical practice variations…has revealed gross examples of waste and overutilization by physicians. Just as the corporate business sector has fostered a “computer literate” culture in other industries, large numbers of health care employees are now obtaining the requisite training and experience to advance computer applications for medical records and medical decision making. This advance of personnel and firms in the health information technology segment of the industry has moved forward phenomenally in the last 26 years. There has been a virtual explosion of IT firms, personnel, and applications that have marched forward rapidly and taken root in the beginning transformation of providers. While much is in the administrative realm for addressing areas where costs can be shaved, much of this is taking root in new ways aimed at medical practice variations and medical ineffectiveness. (1990, p. 236)

Apparent policy directions influenced by market forces are value-based reimbursement for services, evidenced-based solutions, integration of care models under combined larger organizational units, reduction of administrative burdens, and, foremost, information technology to promote exchange of information.

It should be remembered that technology costs a lot in terms of software and hardware purchases, but many organizations find that the implementation costs much more than originally projected and unforeseen mistakes pile up during implementation and usage. Thus, management remains more intent on not wanting to lose control as processes move forward regardless of whether or not EHR operates as intended in improving quality and reducing error.

The acronym FAANG (Fernando, 2020) includes Facebook, Apple, Amazon, Netflix, and Google—the biggest titans of 2020s American capitalism—but oddly enough does not include former tech goliaths Microsoft, IBM, Huawei, Samsung, and several more. Nicas, Weise, and Issac (2019) assess the administrations of Big Tech that has attracted government scrutiny in Washington and Brussels over using their corporate size and wealth to squash competition and expand their respective domains; too much power lies in the hands of too few companies! Several state investigations are underway, as well as the House Antitrust Subcommittee for Amazon favoring its own products over third-party vendors and Apple’s control over the App Store to get more spent on Apple itself. Facebook has the Federal Trade Commission (FTC) investigating its policy of acquiring its competitors in social media such as Instagram; Facebook has bought over 70 competitors over 15 years. Google’s search (90% of the market) dominance is a target of antitrust regulators as it stands accused over how it presents its search results, as well as other anti-competitive behaviors, in that Google makes most of its money from ads and
can target algorithms to highlight paid advertisements at the top of any search list. In addition, regulators are considering whether Google unfairly leverages Android software on over 75% of the world’s smartphones (Nicas, 2018, p. B2).

With the IT industry now staking out the healthcare sector, the United States may be on the verge of an upswing in corporate takeovers. Several giants are already deep into health care, along with perhaps thousands of small upstarts tinkering in modifying electronic health records (EHRs), revenue cycle management, analytics, and a variety of other areas. These diverse information technology ventures may predictably be brought together by the more powerful resources, ingenuity, and general “making a market” by the Silicon Valley mega-corps. M&A fervor in 2018 witnessed a substantial new corporate development, not fully assessed here, but left to the dynamics and likelihood of their significant desired advancement.

Notwithstanding monopolistic behaviors, IT firms do aggressively compete against each other for market share in specific areas, as well as for public favor. Often personality rivalries among billionaire founders and CEO egos play a role in the publicized media disputes.

Americans’ dependence on social media, its pervasiveness in everyday life, with a lack of controls over the firms, has forced social media into the political spotlight, particularly given the Russian influence over the Presidential election, according to all government intelligence sources. The Internet promised so much, but today, loss of privacy, hackers, cyberattacks of large companies, and selling personal data now fill new stories. From the social media addictions and echo chambers created by Facebook, Instagram, and Twitter to the incredible reach of Amazon, the technology behemoths have combined revenues of over $500 billion dollars annually (Duhigg, 2018, p. 37).

As the IT industry recognizes its new healthcare market, will firms pose themselves as saviors to rationalize the sector for greater efficiency? The premises and promises of Big Data may deserve and require examination: the individual companies will warrant a closer watch over time. Microsoft, Amazon, Google, and Apple have reached the $1 trillion market capitalizations, now each with spectacular resources to spend and significant unparalleled expertise, in addition to their pervasive influence over society. Some have argued that the online world is so fast moving that antitrust laws cannot ever keep pace; others recognize the dearth in policymaking circles of folks sufficiently knowledgeable to address industry issues. Nowadays even the biggest titan can be challenged by a tiny innovative startup, called unicorns, if the newcomer has better ideas, faster tech, and ample financial backing to last. Giants typically absorb startups in this industry. Thus, antitrust lawsuits, some digital executives may say, aren’t needed anymore.

It is far from certain what the entry and implications of Amazon, Apple, IBM, and other IT firms will mean to the existing playing field in the healthcare sector. As we later examine the cooperation of Warren Buffett, Amazon (Jeff Bezos), and Jaime Dimon (Morgan Stanley Chase)—now to be referred to as BAD—for their employees, it is further unclear whether the overall direct contracting by employers moves portend a nascent beginning for a new wave of corporate class
reorganization of the American healthcare system, as seen when the Carnegie and Rockefeller Foundations reorganized medical education in the 1920s (Berliner, 1977; Brown, 1975) (see Chap. 1).

Will Big Data through AI, 5G, and newer tech introductions finally come to rationalize and/or rescue purchasers, providers, and payers in some positive ways? Or will Big Data dramatically change their historic roles beyond recognition 10 or more years out?

Several colossal technology firms are already deep into health care, along with perhaps thousands of small upstarts that have been modifying EHRs, revenue cycle management, data analytics, cloud computing, and a variety of other IT tinkering. These diverse information technology forays may predictably be brought together by the powerful resources, ingenuity, and general “expanding a market” by select Silicon Valley and Seattle firms. M&A fervor in 2018 witnessed substantial new corporate heights, not fully assessed here, but left to the dynamics and likelihood of their significant desired combinations for rapid advancements.

The following narratives on several IT giants likely add to the readers’ current knowledge of these companies which have for the most part become household names. Their brief descriptions on healthcare activities are intended to convey a sense of the individual firm, besides introducing several issues surrounding the IT industry, in general. It is hoped that the objective of informing on various issues prepares the reader to think about the future of health care under possibly new auspices. It is strongly suggested that the documented referencing be examined to discover the actual descriptions by the expert journalists who intensely follow this complex industry. A few firms will be examined.

**International Business Machines (IBM)**

One of the earliest computer manufacturers for business then later personal desktops, IBM has invested in several health projects, a few resulting in costly business failures (Ross, 2019). In 2019 the company invested $2 billion into an AI research hub in New York partnering with businesses to address several chronic diseases, including cancer, and for mitigating climate change. IBM Data Science seeks to achieve AI-driven insights for proven tools and resources. Such nascent R&D aiming at many firms is for scaling up its AI capabilities and applications (Janakiram, 2018). IBM is also aiding pharma firms with blockchain for supply chain technology (IBM targets pharmaceuticals, 2017). IBM’s new CEO Arvind Krishna will build upon its quantum computing, blockchain, and other technical areas he has led to please investors in this tight competitive turnaround. IBM is also partnering with Pfizer on advanced immune-oncology drug discovery (Japsen, 2016). An entire set of issues seems up for grabs in such new uncharted territory, as policymaking falls sway to corporate pressures for little or no federal oversight. IBM has successively fought against regulatory oversight of health software, spending $26.4 million
lobbying in 2013–2017. What makes software actually a medical device requires
more precise definition perhaps dependent upon its intended use (When is software
a medical device? 2019). In healthcare circles, IBM is most notably known for its
Watson Health Division, which has encountered operational difficulties with its
supercomputer developed in conjunction with Memorial Sloan Kettering Cancer
Center that was intended to meld human expertise for personalized treatment advice
(Ross & Swetlitz, 2017a, 2017b).

Watson has generated some erroneous cancer treatments (Ross & Swetlitz,
2017b), indicating that such medical software projects may require longer periods
of evaluation prior to being brought to market. IBM Watson is partnering with
TEVA, the Israeli generics firm, to develop a systematic approach for “drug repur-
posing” and “data-driven” pro-active “chronic disease management.” Yet, the 21st
Century Cures Act, bolstered by former Vice President Joe Biden, grants exemp-
tions so that “clinical decision support” systems will be able to use Big Data in the
private hands of IT firms’ machines.

In a surprise move after a lengthy transition, IBM replaced its CEO with a
30-year veteran technologist to change direction toward cloud computing in order
to directly compete with Microsoft, Google, and Amazon (Waters, 2020; Lohr,
2020; Rosenberg & Fried, 2020a, 2020b). The company’s previous software acqui-
sition of Red Hat for $34 billion, which enables customers to pursue a “multi-cloud
market,” is an important new front in the area of cloud computing, and they are
attempting to do so by drawing more developers to improve on its technology
(Waters, 2020a, 2020b, p. 12).

The Digital Transformation of Healthcare (Contreras, 2019) identifies a world-
wide market for cost reduction in health care to promote “ecosystem transitions”
from a value-based care to new point-of-care models enabled by digital tools. The
intersections of medical technology with the IT industry, moreover, are off and run-
ning with a variety of pharma firms also. While the healthcare market may be highly
appealing at this juncture on its surface, IT firms are used to making monster profits,
and their individual stock market stake will have investors insistent on keeping
those high margins and consistent dividends. The international arena of healthcare
systems is not to be overlooked, for over the coming decade, many nations will
await the infusions of funding by IT firms. Tech firms must then adapt to what more
rudimentary health systems may have already installed (as many domestic hospitals
here), so IBM’s approach seems to be moving in a calculated direction.

Microsoft

With its $125.8 billion of 2019 revenues, Microsoft’s Windows software dominates
worldwide computers today. This firm is having its strongest annual growth in over
a decade, mainly from its cloud operations. A New York Times article has high-
lighted Microsoft’s attempt to become a moral leader as compared to both
Facebook’s and Google’s technologies which can spread misinformation, as well as
Donald Trump’s regular targeting of Amazon’s market power, while Apple’s pioneered smartphone is viewed as addicting (Wingfield, 2018, p. B3).

Microsoft is no longer seen as the bully running roughshod over its competitors like a few decades ago with antitrust battles (Stacey et al., 2019); it is interesting to note that they issued a book cautioning about artificial intelligence (AI), which appears to be at the forefront of the IT industry. This firm’s growth expansion is in cloud services, maybe being the biggest cloud platform among a small oligopoly to dominate a large slice of the IT industry (Wingfield, 2018, p. B3). The key factor is the sheer scale of spending needed to compete in cloud computing.

Morgan Stanley predicted aggregate capital spending by 14 of the biggest cloud groups to jump 29% in 2018 alone, with 3/4 of that growth coming from Microsoft, Google, Facebook, and Amazon. The $135 billion video game market depends on cloud computing, so Sony and Microsoft joined forces going up against Google, Amazon, and Apple (Bradshaw & Lewis, 2019). All this could eventually lead to more takeovers, with the biggest platforms observing the suppliers of main applications that run in the cloud—a remorseless process of consolidation that has happened as other areas as corporate computing mature (Waters, 2018a, 2018b, 2018c, 2018d, p. 14). Microsoft and Amazon are estimated to account for 70% of this highly concentrated cloud market in the future, perhaps a provocation for regulatory attention (Waters, 2018a, 2018b, 2018c, 2018d).

Microsoft had a $1.06 trillion capitalization in July 2019. While Apple was the first to join the trillion-dollar market cap club, Amazon, Google, and Microsoft are bouncing up and down for that top slot depending on their weekly performance in the stock market. Likely due to its past run-ins with the feds, it has been dodging the bullets its peers are currently attracting (Condliffe, 2019). The Financial Times editorialized for investors to beware of the growing $1T tech club for the risks of concentration, their core business revenue growth rates maturing and that these firms’ stock prices surely have great impact on the market and the overall economy (Financial Times, 2020c). Periodically, analysts caution about gyrations among tech stocks and question if the “tech sector is running out of steam” (NPR, 2018; Larson, 2018). Sommer (2018) cautions against the “magical thinking” about the value of tech stocks staying high. In past years, the tech giants lifted the stock market to historic highs, but by Fall 2018, the bull market was led down by the FAANG group leading the market down around Thanksgiving (Larson, 2018). Multiple factors, beyond company and industry dynamics, influence gyrations in the market’s ups and downs.

Duhigg (2018, p. 39) wrote that while the US Government spent a bulk of the 1990s suing Microsoft for antitrust violations, Chief Executive Bill Gates termed it a waste of time and money and predicted that nothing would change what Microsoft did or how they would go about their business. One can assume that the same might hold true for its cloud-based services as it goes after less tech-sophisticated businesses.

Since Microsoft excels in retrofitting legacy systems, commonly found in hospitals, healthcare systems, and physician practices (Bass, 2018), and given its vast cloud capabilities, Microsoft seeks to bring medical device data to EHRs in
competition to the more advanced Apple foray into EHRs (Microsoft, Hill-Rom team to bring, Davis J, 2019).

Besides EHRs’ unpopularity with segments of the medical profession on feasibility of use, these electronic records on patients have been rankled with security breaches in office and hospitals. In 2019, Optum was the largest with over 11.5 million individuals affected, with millions more listed by Modern Healthcare (largest security breaches of electronic health records, 2020). This was before the intended transfer of health records to smartphones.

Elsewhere in health care, Microsoft Genomics is a set of cloud-based processing tools for clinicians and scientists pursuing genomics research, part of Microsoft’s Healthcare NExT to integrate AI and cloud computing. The parent firm just jumped into open source software with a $7.5 billion acquisition of an online code-sharing platform, GitHub. The move brings to Microsoft a new audience of developers with skills to forge new arenas in health care (Waters, Kuchler, & Waters, 2018; Cohen J, 2018; Cohen JK, 2018a, 2018b, 2018c, 2018d). Sponsored IT conferences woo business partners, inspire users, recruit loyal developers, and attract programming talent (tech companies use huge conferences to battle for developer attention (2019)).

Bloomberg Technology maintained that GitHub will be a place for app developers to develop and show their work. It is host to 27 million programmers with 80 million repositories of code, which has increased in the last 5 years from 10 million (Wooing Developers, Developers, Developers, 2018).

On the Pharmacy front, Microsoft manages Walgreen’s data storage with its pharmacy leveraging the IT firm’s AI platform (Kim, 2018) by launching “health corners” in pharmacies to facilitate patient talks with pharmacists over medications and health-tech devices.

Microsoft’s employees—somewhat a liberal workforce—petitioned its CEO with 300,000 names to cancel a contract with the US Immigrant, Customs, Enforcement (ICE) due to objections over the federal agency’s punishment of families at the Mexican border (Frenkel, 2018). Other IT firms are finding employee activism over certain company business decisions. In Bloomberg Businessweek, Brustein and Bergen (2019) delineate tech employee resistance toward their firms’ military contracts, AI contracts with China, use of technologies against immigrants, and general surveillance programs (like face recognition), even though executives still pursue such high-profit contracts. It has been noted that Presidential candidate Bernie Sanders raised more money from Big Tech employees than anyone else as of early February, even with his critique of the companies (Schleifer, 2020). To the firm’s credit, once the outbreak of the COVID-19 became clear just miles from its headquarter campus, Microsoft management early on approved work at home and has taken other steps to shield its valuable workforce from the disease that has ransacked the Seattle area (Weise, 2020b). Managerial and highly skilled technical employees are immensely valued since replacements of sick or deceased staff is highly disruptive and costly.

Perhaps to its credit, Microsoft has litigated four lawsuits against the government over the past 5 years to defend customers’ privacy rights. CEO Satya Nadella
routinely refers to George Orwell’s novel *1984* and Aldous Huxley’s *Brave New World* in his speeches in an effort to ensure that technology doesn’t create a dystopian future that none of us want.

Notwithstanding such occasional warnings, the IT industry contains the most powerful corporations the world has ever seen; IT firms use their resources to fend off scrutiny over their policies and, for certain, they fight regulation, even if and when federal policymakers will be able to know enough to figure out what regulatory actions might be judicious and worthwhile.

Microsoft still dominates the PC software market worldwide with the Windows operating system. IT firms have essentially remained unregulated to date. However, new recent public concerns from late 2017 have surpassed a serious level of concern relative to the IT industry’s power and influence, especially for certain individual firms, like Facebook. IT firms have become so gigantic that a firm’s sheer size and dominance defeats challengers, except when an occasional upstart may get attention for an innovation, but the enormity of existing firms usually prohibits much possibility that challengers might ever arise, but if they do, they can be bought and absorbed.

**Apple**

Apple is the first corporation in history to reach a trillion dollars in capitalization but at the same time has experienced a very rapid growth of its debt level (Foroohar, 2018). This *Financial Times* author cautions that historically this might predict a crisis for an individual firm, or collectively for the industry and larger economy. In 2018 the corporate bond market ballooned with the easy money economy, and it goes on. Corporate debt nears $10 trillion at the end of 2019 (47% of the entire economy), which the *Washington Post* reports the weakest firms accounting for most of the debt growth, much of it speculative and not much better than junk (Lynch, 2019, p. 1). Health insurers have soared their debt over the last decade also (Livingston, 2019). Nine firms calculate $115.5 billion debt in 2018 compared with $24.8 billion in 2009, much related to M&A wars. Could several firms be vulnerable since they need sufficient profits for debt payments if interest rates in the society should climb?

*Portside* considers the $19 trillion in corporate debt that could sink the global economy (Horowitz, 2020), compounded by the coronavirus touching off a plunge in the energy sector and the collapse of the travel, hospitality, and restaurant industries. Federal bailouts of industries along with a consumer cash benefit also doesn’t do much for the federal debt picture either.

After reaching its trillion-dollar capitalization (Bradshaw, 2018a, 2018b, 2018c, 2018d) and the Trump tax cut was signed, Apple used its second quarter profit of $13.8 billion plus ample cash reserves to buy back $100 billion of its stock and paid shareholders a 16% larger dividend (Haefner, 2017). Apple’s revenue ($229 billion)
comes mainly from iPhone sales (greater than 60%), which Wall Street has started to doubt funding its future (Bradshaw, 2018a, 2018b, 2018c, 2018d).

Apple has historically had very rapid growth but has financed that growth with hardware sales. Phillips has cautioned that the 9-year bull market (which has somewhat become a bear market recently as a result of the coronavirus pandemic) was usually led by the likes of Amazon, Apple, Facebook, and Google all leading to a new constellation of firms toward more antitrust concerns. Is this trend toward consolidation and large growth in profits responsible for the socioeconomic issues of slow wage growth, income disparities, and the ever-shrinking middle class in America? Given their sway over multiple political levers, one wonders who will step forward to rein in their excessive power and influence (Phillips, 2018).

Consider that the health sector is ripe for new investment, if not for a further corporate takeover. Will the gigantic IT involvement actually lower care costs, or explode overall healthcare costs, more? With the COVID-19 crisis, numerous opportunities have also emerged for greater IT firm entries, from analytical assistance to governmental agencies through consumer contact tracing apps.

Apple has played not only a vital role in the stock market but also in the larger economy, but more importantly, its products have profoundly influenced American culture; Apple products have acquired a devoted cult-like consumer following. Becoming the first corporation in the world to ever reach a trillion-dollar capitalization (Bradshaw, 2018a, 2018b, 2018c, 2018d), after the Trump tax bill was signed, Apple used its second quarter profits of $13.8 billion to buy back $100 billion of its stock and paid shareholders a 16% larger dividend (Haefner, 2017). Stock price gains offer the executive suite a great boost in their quarterly bonuses and further endear the institutions which are huge investors.

The firm’s revenue ($229 billion) comes mainly from technology hardware (iPhones hold over 62% of the US smartphone market with their sales greater than 60% of Apple’s total annual revenue), a situation Wall Street fears will level off in the future mainly since people only buy one iPhone at a time and given its cost they hold on to it for several years (Bradshaw, 2018a, 2018b, 2018c, 2018d). Growth at some point will level off once the market is saturated with smartphones, and not many new customers can be swayed to join the Apple cult. In light of those realities, the firm has been slowly moving into services, the business strategy of health care being prime for growth, along with Apple TV, Apple PAY, and gaming branching out. The promise of double-digit returns after outlays from new services may be longer term.

Gaming
As far as gaming, the fast-growing entertainment industry (video gaming industry, 2020), it is estimated that 60% of Americans play them daily, with 48% of them being women, and most are adults. The worldwide market (China is the biggest) is growing by leaps and bounds (Gaming’s next level, 2020). A single game in popularity can earn over a billion dollars (Perez, 2019), many are branded to movie themes (now shows like Sleep No More get you to accept new realities, 2020). Games have become political too. This segment of IT is undergoing a shakeup as
smaller platforms get poached of key streamers in a heated-up war (Liao, 2020). Apple seeks to remain a main player.

The US gaming market in 2015 is estimated to be over $43.4 billion annually and $91.5 billion internationally, mostly played online, with a third using their smartphones. Most gaming is cloud-based, which makes this market contestable. More devices, platforms, and services are present to provide choice to consumers, but constant updating and streaming over the Internet via subscriptions is catapulting old consoles (Needleman, 2019).

**FinTech**

Just as credit card debt has touched a record with largest proportion of people seriously behind on their payments (Hoffower, 2020), numerous firms are mining the FinTech direction actively trying to find their niche (Galvin et al., 2018). FinTech apps (Venmo, Square Cash, Chime, Coinbase, and more) were key in VISA’s acquisition of Plaid for $5.3 billion (Kauflin, 2020). FinTech startups are maturing; the last quarter of 2019 saw 452 deals spreading to emerging and frontier markets; diverse directions covered personal finance, wealth management, real estate, insurance, payments and billing, block chain, and money transfers, besides capital markets, according to CB Insights (The state of Fintech: Investment & sector trends to watch, 2019), which monitors this burgeoning financial sector.

Facebook’s Libra has dominated the news with early sign-ups of payments companies, venture capitalists, and ecommerce groups (Murphy, 2019), but this new revenue stream for the firm faces several obstacles in its rollout, including regulators in the Group of Seven nations (Binham, 2019). The threat of significant disruption from digital money wars extends way beyond the Bitcoin craze; cryptocurrency obscures monitoring by governments (Vigna, 2019). As the nature of money changes, central bankers around the world are considering adoption of digital currencies; China is close, but should the United States commit (Bagnara, 2020)?

Armstrong and Megaw (2020) note the onslaught of FinTech mergers over just the past few years. Global FinTech deals topped $8.9 billion in the 3rd quarter of 2019, a quarterly record, with India and China battling over Asia’s top FinTech hub. Financial services companies in China are quickly capturing consumers (Guastella, 2020). Amazon has also deeply plunged into financial services to be discussed in a following section.

It will be difficult to predict many of the implications of this rapidly moving trend, and how Apple will fare in its FinTech venture is unknown at this time; however changes in the way we pay for services, as well as engage in financial transactions of any kind, will most certainly change in the next few years.

**Streaming**

More than merely exploring new services to replace falling revenues from hardware sales with services, Apple has yet to find solid profitable streams. Apple entered a very tough competitive fight over the future of American and worldwide entertainment. Disney, ATT, Netflix, Hulu, Amazon, Google, Comcast, HBO, Quibi, and others are vigorously staking out the market for streaming services with a vengeance; big name investors and celebrities are active in designing old and new
content to win in the competition to solidify their customer base (Chmielewski, 2019). Fights over intellectual property may become more commonplace (Jha, 2019). Chen (2020a, 2020b) cautions consumers about subscription overload as people subscribe to multiple platforms with monthly automated payments made which will wind up costing consumers a lot. During the COVID-19 pandemic, streaming has become the go-to entertainment sources as movie theaters and all other forms of out of the house entertainment venues closed. Whether this old form ever rebounded remains to be seen as the virus hangs on.

Becoming a streaming colossal and staying on top will be mighty expensive. The media conglomerate Disney has a big jump ahead with a roster of studios and much experience in entertainment with ABC TV and Hulu (Barnes, 2019). It claimed 26.5 million paid subscribers by February 2020 since its November startup (Allen, 2020). Yet, Disney reported a 60% decline in quarterly profits in November 2019, the result of digging deep in its pockets for Disney Plus. A Netflix style movie and TV service will arrive in 2020. Its streaming service captured roughly 16 million more subscribers in less than 3 months (Lee, 2020). Amazon streaming recently reached 55 million (Nicolaou, 2020a, 2020b, 2020c) out of its 150 million Prime subscribers, surpassing Netflix’s 139 million subscribers (Stat du jour, 2020). Netflix spent lavishly hyping its 24 nominees for Oscars (up from 13 in 2019), in order to sustain its subscriber base against new competition, but it proves very costly (Barnes & Sperling, 2020). Streaming TV time exploded as consumers subscribed to two or more services to get the content they desired (Watson, 2020). Thus, marketing and production costs will be high, sustainability in the competition will get even tougher, and how Apple can secure a desired profit stream from streaming seems an uphill climb.

Apple has new shows rolling out on its Apple TV Plus (Hsu, 2019) utilizing its smartphones and tablets to build its huge market to hopefully develop a fast subscriber base, with likely 5G devices needing to be upgraded, given such 5G networks now being established by telephone firms. Nevertheless, content-related costs will require significant investment by Apple, and the fight to win an increasing market share will be costly, but Disney is betting strongly that this trend will continue (Epstein, 2019). As major media firms reported earnings this past November, new concerns emerged about cord cutting with cable and satellite hookups being cancelled at an accelerating rate (Barnes & Sperling, 2019). As with FinTech, the streaming wars will be disruptive and surely depend on if and when consumers decide to spend in a recessionary economy.

While Apple may play the underdog for a while, the entertainment horse race will be exciting—and eventually far more newsworthy than the Presidential campaign of 2020. Each giant competitor will differ in its strategy to secure millions of subscribers and stay able to maintain them over time (Power to the People, 2019). Netflix, the pioneer producing company and current industry leader, garnered 34 Golden Globes nominations in 2019, indicating the intensity in the streaming competition (Barnes & Sperling, 2020). Due to its strong favored content, Netflix keeps adding subscribers (8.8 million 4th quarter of 2019), even since Apple and Disney announced their entries (Associated Press, 2020).
Apple’s nascent advantage is its 1.5 billion smart iPhone users globally (Gurman & Wittenstein, 2020), who may need, along with all platforms, dedicated subscribers to get 5G smartphones to derive the greatest benefit. As an IT conglomerate reaching out on several new business lines, who will get burnt in the ensuing cost spiral?

Again, a phenomenal effect of the COVID-19 pandemic came with the Financial Times reporting on the binge watching and playing online games becoming global pastimes, as profits rolled in. More than 780 million people stuck at home in China given lockdown travel restrictions became great for gaming giants Tencent and peer NetEase. It was noted that Chinese phone owners downloaded a record number of games from the App store as the coronavirus and their government kept them in their homes, to boost the $150 billion global games industry. Gaming exceeded education, entertainment, and photo and video apps in China, offering fine opportunities for these gaming companies (Lewis, 2020).

Domestically streaming (Poniewozik, 2019) also ballooned with several state lockdowns, perhaps killing movie and live theaters forever. Subscriptions to various competitors along with the complete Hollywood shutdown in California makes a comeback for theaters awfully hard to predict with social distancing in place, or consumers’ fears of gatherings. A few direct to streaming movies, mainly animation, may be the future for Hollywood to return but not necessarily to its heyday. Will Americans go back to theaters, who knows? A few states now “opening their economies” may give some evidence to this, but watching the film with a mask and eating popcorn while sipping a coke may keep folks in their living rooms.

Netflix and MTV made their marks in the 1980s with strong consumer followings on TVs. Today billions of profits are in play with a variety of IT firms coming into gaming and music, too. The cultural prominence of the past led to purchases of consoles for gaming, including Nintendo, Sony’s PlayStation, and Xbox by Microsoft. All are hyping new offerings (Faber, 2020) along with new fancy hardware being designed. Partnerships with brand fashion retailers are seeking to attract and aiming to keep new subscribers (Faber, 2020). Similarly, virtual auctions in the art market seek new viewers, who may not have been used to being online (Gerlis, 2020) noting again the digitalization of more of the old economy. Yet, Sony and Nintendo, which are dependent on greater hardware sales, in China did not do as well due to supply chain disruption with closed-console factories (Lewis, 2020). From 1993 on, piped in Muzak may not have as large an audience with all the closed retail stores and restaurants today and in the future, but online content delivery gives multiple choices over a dozen popular mediums for consumers through their phones and TVs (From Muzak to Netflix, 2019).

COVID-19’s arrival with gaming popularity zooming with lockdowns, price gouging seems like the American way of business in many arenas. Numerous articles have been written about issues in the supply line disruptions that have given entrepreneurs and corporate entities new opportunities to profit, along with the political corruption yet to be fully exposed. Nintendo consoles faced a significant shortage in the growing demands under the circumstances. Despite eBay and Amazon’s policies to dissuade such practices, they only apply to essential items.
The global demand given many supply chain issues, resulted in price gouging (Khalid, 2020) as with many common examples of this market dynamic in America. Another related opportunity for profit-making related to streaming comes from ad-supported video services being attached to streaming services (Rizzo et al., 2020). Fox and Comcast are advancing an estimated $500 million deal as a service to the entertainment giants who may be offering free or lower-cost alternatives to consumers who do not want to pay so high for subscriptions. Such streaming services have programming choices that consumers may like for their attractive content, but also for variance in pricing. During lockdowns, multiple subscriptions were likely to be chosen, so reassessments may lead to perhaps more conscious choices post-COVID-19 (Consumer Reports, The Programs and the Prices, 2020).

Netflix had 150 million people on board in January 2020 and was predicted to remain a blockbuster hit beyond the current crisis, based on its appeal to “hearts and minds” (Schumpeter, 2020). First quarter subscribers rose by 15.8 million, now reaching 183 million worldwide, with new releases being planned for 2020. Nevertheless, competitors may refuse to sell new shows (Disney) or license old shows (Warner Media, owned by AT&T’s HBO Max). All of the industry, including Comcast-owned NBC Universal which started Peacock, may face a dwindling base or even further “cable cutting” when the coming recession gets deeply felt. This entire market will remain unstable as noted that Netflix and Disney shares fell when Apple unveiled its $4.99 streaming service per month, which beats out HBO at $14.90, Amazon $12.99, Netflix $12.99, and Disney $6.99. New iPhone buyers get it at this $4.99 price point (Klebnikov, 2019). Content choices may be confusing at first, but many consumers will engage in back and forth decision-making over time depending on their content preferences. Thus it can be seen that any IT firm may be actually gambling on a huge revenue and profit flow out of streaming services.

It is uncertain how the streaming wars will play out, and if Apple can finagle success against several formidable competitors. Clearly since the stay-at-home orders necessitated from the COVID-19 pandemic, it appears that streaming services are enjoying wide popularity (Barney, 2020). How badly do many Americans need to escape Trump’s society?

**Whither Apple in All of This Diversification?**

Historically, Apple’s business and stock performance has been truly remarkable, so it remains one of the most sought after and studied listings on Wall Street. A lot of investors made a great deal of money from this firm’s stock; its large institutional investment base expects the same future performance. However, this may be problematic as iPhone and other hardware sales have slowed dramatically. Nevertheless, its strategy change toward services has been underway for this company best known for its technical innovation and its large consumer following with nearly a billion iPhones available to download its many apps and direct followers to its new services. A *New York Times* piece details the startling snooping on people’s daily habits
that has grown increasingly more intrusive (Valentino-DeVries et al., 2020); concerns over vulnerability to hacking are discussed over the hordes of apps folks download, not to mention the concept of using the phone to trace the whereabouts of their users by the telecom giants in virus tracing.

The firm lowered prices on iPhone 11 making $51 billion last quarter 2019, but its Airpods and Watch wearables may sustain earnings, along with $46 billion in services for 2019 for a new bullish outlook (McGee, 2020a, 2020b); however, in China with much of its content blocked, it is not clear how Apple will be able to expand its business there (McGee, 2020a, 2020b, p. 6).

Thus, the historical role that Apple has played in the economy and the culture renders corporate objectives to influence how the firm embarks on its healthcare activities, amidst its substantial diversification. These larger pressures will change Apple’s strategy over its emphasis on services and apps with content-based work rather than hardware. Such a turnaround indicates a significant organizational cultural change; it will also be a far different outlook economically for the firm. The cultural change may likely be disruptive to its current workforce and demand careful management along the way.

Then again in business activities, unanticipated events can disrupt a company in a disastrous way: the coronavirus epidemic that arose in China and swept the world within weeks (Global emergency: It is an emergency, 2020). With lagging sales in China already, Apple abruptly shut 42 retail stores and other corporate locations in the country (McGee, 2020a, 2020b) that combined with more multinationals pulling up stakes with the economy (Sheikh, Watkins, Wu, & Grondahl, 2020). The China lockdown of cities due to the COVID-19 spread, its resulting economic downturn and falling trade, will be a heavy jolt on Chinese consumers and eventually spread to the rest of the world just as COVID-19 has done.

In connection to China’s recent COVID-19 epidemic, it has been mentioned that the stock market crash of February 2020 should cause retrenchment in these companies that have not experienced a significant bear market for at least 10 years, and most are not prepared to weather the storm (Heath & Bogage, 2020, p. 2). These companies have become so reliant on international demand to sustain their business model that will be severely tested by closed borders and shut down societies that have occurred in the COVID-19 pandemic (Fried, 2020, p. 3).

Apple’s performance and its needed growth by investors quivers the stock market when things do not go well, as has been the historical legacy (Wigglesworth, Waters, & Bradshaw, 2019, p. 1). Maintaining year-after-year stock price increases is not the only finance issue the company faces. The firm is fighting a $14.3 billion tax bill with the European Union, which comes on top of a tussle over a tax deal with Ireland in 2016 that is being disputed (Apple Can’t Win Its $14.3 Billion Tax Battle, 2019). Apple had an average tax rate of only 5% overseas, which results in accusations that Apple is not paying its fair share in taxes.

Most if not all IT firms are international, which complicates the time management must spend due to much different playing fields in each arena. Apple’s disappointing hardware sales were not just with US consumers, even given resorting to promo deals and trade-ins to boost iPhone sales (Gurman, 2018).
Chinese consumers are also shortening the cycle for phone replacements (Rocco, 2018), and competing firms there are challenging Apple’s innovations and building in other incentives for greater sales. While the lockdown of cities over the rise of the coronavirus infections may have spurred Internet usage, Tim Cook, Apple’s CEO, noted that quarterly earnings estimates will be missed due to the coronavirus (Fried, 2020). It is unknown if many Chinese will have future incomes and willingness to buy new hardware once normality comes back, but how soon and when?

Disappointing hardware sales with US consumers, as well as internationally, may indicate that smartphones had earlier reached a saturation point worldwide. Trump’s trade war with China had begun to shake Apple’s future, not just due to its manufacturing hubs there, but also to his imposed tariffs of up to 25% (Bradshaw, 2018a, 2018b, 2018c, 2018d). Samsung ($205.6 billion revenues) has stepped up its challenge to iPhones as well, domestically and internationally. Samsung, South Korea’s biggest company, produced one of the first 5G Android phones in 2019, again a firm to be affected by this nation’s COVID-19 spread. Apple’s streaming will be available through Samsung TVs in a new partnership. Chinese firms (Huawei, Xiaomi, among several others) are also targeting the broader Asian market, beyond China’s consumers (Zhong, 2019). Such demand dynamics on the international level raise doubts about Apple’s future in the largest smartphone market of China. Chinese firms are challenging pricey iPhones, and Samsung is stepping up competition, while this firm is moving toward cloud-based services (White, 2019). India has become the second largest smartphone market of late (NewsGram Desk, 2020). Such demand dynamics on the international level raise doubts about Apple’s future, in the largest smartphone market of China.

Still, by the beginning of 2020, Apple shares topped a record $300 a share, with 2019 gaining 86% its best year in a decade (Gurman & Wittenstein, 2020). The company has an obvious track record in both consumer engagement and customer loyalty. Now with over 62% of the US phone market, customers don’t necessarily talk on their iPhones, but regularly download apps, including many health-related, for multiple activities, including streaming—as Steve Jobs had likely planned (Fowler, 2019). The firm is producing lots of patented health apps now creating revenues and opportunities for data mining (Fung, 2020).

In sum, Apple is venturing into several new areas for growth, each which will require significant investment along new learning curves amidst the competitive landscapes. Leaving behind the highly lucrative hardware business growth worries investors since the streaming, FinTech, gaming, and healthcare lines necessitate a corporate cultural adaptation amidst demanding a new different workforce. For success, the changing of a corporate culture goes well beyond coming up with the best products; it requires the executive suite consistently treating both workers and customers ethically (Creating the right culture in a business, 2019). Prospects for its new health foray appear quite good as Apple assesses the sector for several ways to make its indelible mark by using its hardware.
One can easily grasp the IT industry, as rich and powerful as its firms are, is moving into many new arenas, only one being health care. A few may do well but others may not. Apple has devoted the firm toward a huge stake in health care, apparently becoming influential.

It should be noted that Apple’s entry into health care was at first gradual, then suddenly building upon its hardware prominence jumped onto a fast learning curve. It plans to keep its large and loyal customer base. Literally, a huge number of iPhone and Mac users do sales work for the firm’s products to family and friends; it will be likely that health apps get pushed with the same vigor by its devoted fans.

In October 2017, the firm explored buying a medical clinic startup as part of a big push into health care (Farr, 2017). Two system takeovers were explored. AC Wellness, a launch of operational medical clinics to serve Apple’s employees, is now enabled by advanced technology. Health care is considered a “build out” on Apple’s retail (Miller, 2017). Its worldwide network of more than 300 retail stores has captured “consumer delight” (Farr, 2018a, 2018b), with the Apple Watch taking off for personal health functions. The firm has hired a cadre of health professionals and experts for its significant health foray, including involvement with the FDA and clinical trials, and using the iPhone for reporting personal health data to their providers.

Apple’s entry into EHRs may open up a “growing marketplace of applications” with its hardware already in the hands of consumers. Thus, a “user-friendly mobile health portal” will likely become widely accepted. Its health records section apparently conquers interoperability that proprietary EHR vendors have competitively squandered over time (Spitzer, 2018a, 2018b). A positive outcome then becomes medical record portability, where existing vendors (EPIC, Cerner, Allscripts, and others) procrastinated on correcting the serious problem of communication and portability between their EHR systems. Finally, CMS and the Office of the National Coordinator for Health Information Technology have unveiled final versions to supposedly make it easier for providers, insurers, and patients to exchange health data by adopting standardized program interfaces (HHS releases final interoperability rules, 2020). Patients will be permitted to use smartphones for their medical records (Schulte & Fry, 2020).

Apple’s relationship with Stanford Health Care had the firm involved in the building of the new $2.1 billion hospital. While in bed, the patient can direct entertainment, room temperature, window blinds, and interface with medical records, as well as communicate with medical and nursing staff. This is all due to the built-in Apple robotics, sensors, to create efficiency and convenience.

While Apple’s use of its technology may make some consumers more health conscious by allowing consumers to monitor their disease conditions in more careful ways, recent criticisms over social media and computerized devices are that they provide, and entice people, for screen addiction (or in this case, health narcissism obsessed with their clinical indicators). Apple is developing an app for addiction...
and excess screen time to make individuals aware that such habits may be deleterious to their well-being. It is not clear to what extent people take advantage of that information to cut back on their device usage. Google with its Android operating system has also come under pressure from shareholders and health campaigners to deal with the constant distraction of people to their phones and computers with compulsive behavior associated with mobile device addiction.

AC Wellness, an operational launch of medical clinics to serve Apple’s employees, is enabled by advanced technology. CEO Tim Cook described the healthcare industry as an area where the company could make significant inroads and impact. Bambrough (2018) goes on to say while health care remains a lucrative field for companies to enter, it appears the entry costs are significant enough to limit entry to the tech giants already in place.

Cook has been forward-thinking about regulations for the tech industry being unavoidable, even embracing it when the market is not working well (Kuchler, 2019). Apple holds many patents that suggest a whole new platform for personal health technology for monitoring clinical signs and symptoms (Edwards & Edwards, 2018). Apple Health Records works with existing EHR vendors for piloting in over 40 health systems across the United States. It records personal health information (including data from apps) to grant increased consumer access to their health information. Apple apps can combine medical information from their notable provider systems and organize the data so patients can share it with any future provider.

In a *New England Journal of Medicine* “Mobile Devices and Health,” Sim (2019) noted that 81% of North American adults own a smartphone that have revolutionize society and changed history and just witness recording police killings and other brutality, as well as how social media enables the massive protests of Spring and Summer 2020. Active and passive sensors, functional assessments, and digital biomarkers and diagnostics hold great potential for integrating with clinical care, but much remains to be determined in the direction of this $8.1 billion market growth from 2018, including the potential of harm.

**Wearable Technology**

Fitbit was the pioneer in wearable fitness technology, and it became somewhat of a pop culture accessory from basic tracking of activities, such as running, cycling, and swimming, heart rates, and sleep patterns to now gathering a greater share of health data for the consumer. Currently, there are 28 million online active users worldwide with over 100 million devices sold (O’Brien, 2019) now under the control of Google.

Apple is also launching studies on its watch’s ability to monitor hearing, mobility, and women’s health to bolster its medical research potential (Robbins, 2019). Medical grade wearables are now becoming reimbursable, which is helping doctors to accept them if they get paid to spend time trying to interpret remote data transmitted to the provider (Al-Siddiq, 2019). Apple and Google’s Fitbit will eventually be backed by advanced biometrics to promote this real-time monitoring that is expected
to spur sales significantly both of the devices and the apps that will upload information to the cloud for use by physicians and others.

Digital medicine is zooming ahead with personable wearables beyond the Apple Watch and Google’s Fitbit. The latest wearables are able to monitor signs and symptoms and then call your doctor if potentially serious problems may arise, such as atrial fibrillation (AF). This is being studied at Stanford University (New England Journal of Medicine, 2019) with watch-notifying the patient to call for help if vulnerable data presents. This appears to be a useful function of many devices coming up under IoT, some going directly to the provider (glucose monitoring, CPAP sleep machines, compliance with pharmaceuticals, etc.). In the case of the AF data, Apple owns it—not the patient or provider—which causes some concern over privacy (Park, 2019).

Apple is also launching studies on its watch’s ability to monitor hearing, mobility, and women’s health to bolster its medical research potential (Robbins, 2019). A larger UK insurer has followed the car insurance utilization model of the black box to invoke loss aversion as a preventive medicine intervention in the NHS (Neville & Atkins, 2018). Data from 400,000 people were compiled from watches to find increased activity for calorie burn, which may mean “extra life years.” Medical grade wearables are now becoming reimbursable, which is helping doctors to accept them if they get paid to spend time trying to interpret remote data transmitted to the provider (Al-Siddiq, 2019). Apple and Google’s Fitbit will eventually be backed by advanced biometrics to promote this real-time monitoring that is expected to spur sales significantly.

In recognition of this market for sales, as well as its massive data repository, Google swept in to pay $2.1 billion for the Fitbit company when its financials were not doing so well. An alarm was raised (Feibus, 2019) over privacy of the personal data and what it would mean in terms of higher costs now under the Google auspice. The new owner’s analytic capabilities could lay the groundwork for better insights from the stream of data from wearables. It is not as though Fitbit owners made the choice that Google should be the keeper of their health data as Feibus mentioned in USA Today. Feibus went on to say that privacy of one’s data is a fungible asset that can be collected and used without consent, while at the same time that we’re being assured that these companies take our privacy seriously (2019, p. 3b).

And if people are unhappy with one provider changing to another, it will not be easy as one’s data will not be transferable or available unless one continues to pay the monthly fee. Apple and Samsung are obviously scrambling to make the migration from Google’s Fitbit as easy as possible.

While numerous employers have purchased Fitbits for their employees to track their performance, the push for wellness perhaps has gone a little too far with a program called “a Fitbit for the brain.” Several employers are buying this idea to understand and monitor the mental health of their employees, who often are not performing at peak levels in the office. The program will measure things like memory, focus, and decision-making, crucial variables for worker productivity. If Total Brain feels an individual may have a mental disorder, it can refer them to an employee assistance program or a licensed professional who can provide a deeper analysis of what the issue might be, or fire the worker. The opportunities for
employers to have all sorts of personal health data and use them for all sorts of reasons such as promotions, and worse discipline and terminations, will be unlimited. As Wall Street and tech insiders are figuring out the implications of Google’s purchase of Fitbit and lining up hardware products, Robbins and Herper (2019) also questioned the implications for health and privacy from the acquisition. In the meanwhile, with the 40 million people who have smart watches or fitness trackers that are supposedly monitoring their heartbeats, one study showed that some people of color may be at risk for getting inaccurate readings. Hailu (2019) writes in STAT about the inaccuracy in tracking heart rates that this issue gets almost no media attention even as the smart watches and fitness tracker market has grown exponentially. The potential inaccuracies have broad implications for the scientific research that is being conducted on these wearables, raising the suggestion that existing biases in medicine now have a new overleaf beyond what doctors and providers already display. Any number of employers has been collecting information from their employees’ wearable devices, and it is unclear what actions they do in the realm of human resources that rely upon this flawed data (Hailu, 2019).

In recognition of a whole new territory of data collection related to medical records, the FDA is trying to figure out how to regulate mobile health software and products that use AI (Ross, 2019). Beyond watches, a large amount of voice-activated devices (Chen, 2019, p. 1) are being pitched at consumers. Voice-controlled devices, like robot vacuums, alarm clocks, refrigerators, and other accessories, can be directed from Google’s Assistant (Home) and Amazon’s Alexa and Echo. A Financial Times special report on the growing cyber security issues over IoT spoke to remote hijacking, such as the risk for aircraft and refrigerators. It has been found that lasers shown through a window can hack Alexa and other voice command devices to shut off security systems in order to open doors and windows. As we become more reliant on the Internet to run our affairs and our homes, we also become more vulnerable to those being hacked and controlled by others. While these devices are constantly updated to close vulnerabilities, new ones pop up over time so the cycle continues.

While overly optimistic technology is constantly hyped in the market, much is becoming available, with consumers buying as early adopters. This author has friends who become unpaid salespeople for products once they purchase it. Shortcomings in the safety and use of the technology become noted with voice-assisted hardware, which are just in their infancy today. IoT has newer cutting-edge devices that can perform, extract, transform, and load functions on data gathered locally (Gal, 2019). As folks find themselves surrounded by such devices, it presents challenges to federal consumer protection agencies as well as social scientists to delve into how all this technology changes our lives, and what it means for everyday life in our culture.

Therefore, the Apple firm has been moving into services, the business strategy of health care being thought prime for growth. In October 2017, the firm explored operating clinics as a bigger push into health care (Farr, 2017). Health care is considered a “build out” on Apple’s retail (Miller, 2017). AC Wellness’
operational medical clinics serving Apple’s employees is a kind of industrial medicine control over employees, to make “meaningful impact” (Bambrough, 2018).

Apple is on a fast learning curve in health care building on its track record in both consumer engagement and customer loyalty, which its services ventures wish to capitalize upon, now with 62% of the US phone market. Apple holds patents to engage a new platform for personal health technology (Edwards & Edwards, 2018). Apple Health Records works with existing EHR vendors to record personal health information for increased consumer access to their health information. The Apple app can combine medical information from prestigious institutions and organize it so patients can share it with any provider.

So if your spouse, kids, and coworkers do not listen to you anymore, you can be assured that your personal assistants clearly are—listening to you all the time so they will now give you news broadcasts, even if you are not sure where they get the content, what gets chosen to be sent, and what political affiliation may be there (Krotoski, 2020). Voice-driven gadgets will be advancing even more with voice recognition technology, though Fortune magazine suggested that it still has a way to go for multiple applications. Even the Apple Watch, introduced in 2015, now allows a kind of Flash Gordon experience with a wearable, with significant expenditure for wearable accessories and all the expensive apps for these devices.

It has been reported that Amazon’s Ring and Google’s Nest are aiding Americans to normalize surveillance, as well as turn us into a nation of voyeurs (Harwell, 2020). The camera in the doorbell is sold for a neighborhood watch so that anyone around the world can enjoy the view from one’s front door. Yet, they have been found to be hackable.

Amazon

Amazon thus may be considered one of the biggest disruptive forces on the planet. In a very short while, the online bookstore of Amazon morphed into a huge supplier—across several different industries. Amazon quickly learned how, as a corporation, to control the infrastructural speed of development. It knows its customers very well through their purchases and its Alexa voice-assisted technology that listens and records. It is a global corporation bigger than Australia. A CNN special report, The Age of Amazon on August 16, 2019, reported that 50% of online commerce is handled by this firm. Many small manufacturers must use Amazon’s platform to sell their products since Amazon’s logistics give each a phenomenal advantage in the online marketplace, which has increasingly left out bricks and mortar establishments.

Indeed, the retail industry has been transformed in a short period of time as Amazon warehouses have mushroomed across the nation; their automation in filling a purchase, and through its Prime function for next day delivery, has been remarkable and very appreciated by consumers. It is leading in building fulfillment centers,
and creating jobs, in communities across the nation (Diakantonis, 2020)—even during the coronavirus pandemic. As Walmart had plummeted away thousands of mom-and-pop stores and pharmacies nationwide in the 1990s with its huge expansion, Amazon has eliminated many retailers, even large ones like Sears, Sports Authority, Toys R Us, and more.

Even though Amazon pays absolutely no taxes to the federal government because of its lobby for corporate tax breaks, it has been deemed as the second most trusted institution after the military in American society. The firm is starting its four-star stores with consumer-rated local products like a walk-in website (Wingfield, 2018). Since antitrust policies are weak and the market is not competitive (though big IT firms vie with each other and do fight at times), the business practices of Amazon can move forward at a quick speed as it enters retail food and now pharmaceutical distribution. Another implication of the COVID-19 pandemic was the emptying of face masks, hand sanitizer, and other demanded items from its inventory until the firm curbed its warehouse shipments of nonessential goods in March (Lee, 2018).

The main function of Amazon is mining data from its customers and data on their extensive market of manufacturers who use their site. Third-party sellers allow Amazon to analyze their data to assess their businesses. Independent retailers know Amazon’s impact on small businesses, but they have truly little alternative than to cooperate with this powerhouse.

It is still deeply unclear how people’s privacy is currently being violated, and when it constantly occurs on social media and purchases, where do ads come from, how are they being targeted, who pays for them, and whether data is generated where people have never given their permission nor very likely do not know their data was seized in the first place.

The McKinsey Global Institute led off a report “Navigating a World of Disruption” with the following paragraph:

We live in an era of disruption in which powerful global forces are changing how we live and work. The rise of China, India, and other emerging economies; the rapid spread of digital technology; the growing challenges of globalization; and, in some countries, the splintering of long-held social contracts are all roiling business, the economy, and society. These and other global trends offer considerable new opportunities to companies, sectors, countries, and individuals that embrace them successfully—but the downside for those who cannot keep up has also grown disproportionally. For business leaders, policy makers, and individual, figuring out how to navigate these skewed times may require some radical rethinking. (Bughin & Woetzel, 2019)

This report noted that disruption is intensifying; the gulf between those embracing change and those falling behind is growing. Disruption is the word that is constantly used to characterize the Amazon corporation, in several areas where it has forged new businesses, particularly alarming in health care. When Amazon released that it was thinking of entering pharmaceutical distribution, even though it was just selling drugs to hospitals, it put a major scare into the retail pharmacy chains. When it finally decided to become its own pharmacy benefit manager with the takeover of PillPack, it caused reverberations all across the healthcare system.
Within the global economy, the dynamism of the high-growth “outperformers” has gone hand in hand with the rise of highly competitive emerging market companies. By several standards, many of these companies are already more innovative, nimble, and competitive than several Western rivals. This results in something different than the previous decade’s financial overseas flight of US and European multinationals that went with globalization.

Today globalization patterns are changing with the rapid growth in data flows, but we can still witness stressed fluidity within the global economy, which has shifted gears to become much more data driven, according to Bughin and Woetzel (2019). These authors note that global value chains continue to evolve over time, reshaped in part by technology, including automation, which could amplify the shift toward more localized production of goods near consumer markets.

When considering China, India, and other emerging markets, this holds many implications for American multinationals. Businesses are benefiting from IoT, and those in the forefront will be able to reap greater benefits utilizing artificial intelligence, but McKinsey points out that “These technologies still have limitations.” This global management consulting firm still hopes that AI could contribute to tackling pressing societal challenges, which we will wait to see (Amazon vs. The Left, 2019). Despite all the anti-Amazon fervor, there are surely places across the country who love the jobs that are created, as well as the love by massive consumer pockets for provided product services.

According to historian Gabriel Kolko, there has been no breakup of large corporations in the United States since the Progressive Era under Theodore Roosevelt; but even then reforms did not lessen the domination of Capital over Labor in this society very much (Kolko, 1963). While the federal government treads softly and will very unlikely ever force a breakup of any American company again, the European Union continues to investigate a host of issues of IT firms and their lack of competition, along with virtually no market entry by anyone else even predicted. Looking below the surface, Amazon has so many partnerships for abundant leverage in policymaking; for example, JPMorgan Chase and Amazon are credit card partners. Most of the IT firms have forged vital business relationships, solid enough to yield great support politically, but the sheer puzzling complexity of this IT industry, particularly as it applies to health care, remains a challenge to both politicians and bureaucrats. Ahead of domestic regulators, the EU has been probing Amazon’s online commerce and its knowing exactly what people want to buy (Bond, 2018). In 2017 more than half of all items sold on its platform came from third-party vendors, and the use of this information to gain market leverage is at the heart of the inquiry by the European Union (EU) (Bond, 2018). The firm’s deeper understanding of why consumers do, or do not, buy things underpins its expansion into private label goods that compete with outside brands and sellers. Data, analyzed for greater sales, drives this firm’s huge growth.

Brick-and-mortar stores cannot compete, and newer generations of Americans prefer an online presence for convenience and price comparison. Every grocery store and other firms followed suit with delivery locally assisted by Uber, Grubhub, and Lyft. Prepared meal delivery has zoomed with the “stay-in-place” orders in
several states. In grocery food delivery, logistics can be difficult with time limits on item availability and perishability that limits the range of what can be sold, so many hybrid models have persisted in the market, segmented highly by generational preferences. Young professionals engage in greater activities outside of grocery shopping, while an older generation views a trip to the supermarket as a social event by the postwar generation. The younger generation has price points to opt for consumer service that they calculate against their time value. Again, with the COVID-19 pandemic, the massive disruption to supply chains, whether in food, pharmaceuticals, or dry goods, and the fallout for the next evolution will be determined over time, but Amazon’s warehouse expansions underway are set to grow with long-term plans now being formulated based upon its overwhelming knowledge of the whole country and its consumer preferences.

But that service and ability to serve the entire nation on a same day or overnight service model comes at a cost. Amazon has been widely criticized for the cutthroat work environment at its filling stations with tough physical quotas imposed upon their workforces. Warehouse workers are disgruntled even with their recent wage rise to $15 an hour, but safety concerns over working in close proximity to others during the COVID-19 pandemic have driven further doubts about Amazon’s ability to continue its market dominance at the expense of the people who work there.

It is interesting to compare Amazon’s US nonunion workforce’s ability to effect change in addressing safety concerns vs. Amazon’s French workforce which is unionized. The latter led to a walkout on its French operations (Alderman & Satariano, 2020). Amazon fought back by putting 10,000 employees on paid furlough, and the case went before the French Supreme Court after a lower court ordered the company to stop delivering nonessential items; that was when Amazon locked down warehouses and told employees to stay home (Alderman & Satariano, 2020). The court’s decisions will challenge Amazon’s ability to sidestep the demands of workers for safer working space (Alderman & Satariano, 2020). Generally known as a major disruptor, Amazon, along with other tech platforms, may be ripening for a major disruption of their operations because of the COVID-19 pandemic (Alderman & Satariano, 2020).

Weise and Conger speak to the anger as the coronavirus spread to more than 50 Amazon facilities employing over 400,000 workers (Weise & Conger, 2020). Because regular brick-and-mortar retailers were closed due to the pandemic, there was a crushing demand for goods during the lockdown and stay-at-home policies. Apparently America’s insatiable demand for stuff can carry on uninterrupted by a global pandemic even though we have no place to go and nothing to do if we could get there.

Bezos’ personality and his management philosophy guides the company. His leadership principles are laminated and posted throughout his plants to supposedly induce greater productivity. Duhigg (2019) explores nuances of this weird corporate culture around Bezos. Workers are digitally tracked and evaluated in all fulfillment centers to spot employees who may fall behind, with reprimands often given. Some workers feel that this truly is “surveillance capitalism.” Yet, the company justifies the very intense work environment so that it can provide free one-day delivery to its
customers. Customers who by and large could wait an extra day or two for their order but have been swayed to pay an extra yearly fee to be Amazon Prime members to gain access to their stuff quicker all shipped for free.

Amazon’s Rekognition service was developed for police use as a tool to assess dangers through facial screening, but accuracy was an issue, and suspicions of misuse with little or no accountability were raised. There is no regulatory oversight of such technologies and how they are used especially by the Government. There are Democrats, as well as Republicans, who would like to see Amazon’s monopoly of 50% of online sales in the United States broken up, even though they do have minor competitors; the same may go for Apple’s 50% of smartphone sales, Microsoft’s 77% use of Windows software, Facebook’s 2.4 million users a month, and Google reaching 87% of searches. Amazon Web Service has grabbed 33% of the $100 billion cloud computing market. In short, each firm’s market power seems formidable (Richter, 2020).

Amazon’s impact on the environment will remain significant, and its treatment of workers over the COVID-19 safety issue, as well as the regular abuse heaped on them, will be disputed for a while. Other folks do not like Amazon’s contracts with ICE and the US Department of Defense. It also has dealings with the Veterans Administration and New York City, so its extensive variety of “partners” who like its services and depend upon them may very well aid in resistance to regulatory oversight, let alone lead to an antitrust regulatory breakup.

Streitfeld (2020), an antitrust lawyer, had her convictions strengthened when the COVID-19 outbreak made Amazon more essential to households, but also more vulnerable. Its visibility has been heightened by its treatment of its workers and other decisions made by management. More resistance will likely follow.

The company had gone through a year-long competition for its HQ2, a second headquarters taking it to New York and Virginia. Stiff community opposition canceled the New York location, but Amazon came away from the exercise with access to huge data files from 200 other cities across the country, who were bidding to get the headquarters put in their place. This bountiful information the company gathered (it is a firm striving for and thriving by information) will be mined for amazing future investments; for sure, it will be used in multiple ways for further growth of the firm. Amazon is keen on lobbying, and with Bezos’ ownership of the Washington Post, which President Trump calls “fake news,” the company stands solid in looking at its future despite bountiful criticism.

Frontline’s Amazon Empire: The Rise and Reign of Jeff Bezos (PBS, 2020) examined the global impact of Amazon and Jeff Bezos’ fantasy of colonizing the moon for the future of humanity. It pointed out deep-set fears over Amazon’s size and aspects of its business operations. Wall Street saw in Bezos’ early book selling that data provided an untapped potential in the digital landscape. His futuristic bookstore, positioned for the world in July 1995, was characterized as “Napoleonic ambition,” but it actually came to be the mainstay of bookselling for the consumer market.

Amazon is considered the second most trusted corporation in America because of its consumer-centric value. Nevertheless, the company is really a massive data
collection organization that has turned data into a commodity, whereby consumer behavior is studied in order to sell more. Wall Street went along with Bezos before Amazon turned a profit, because there were those who believed in the long term for Amazon to gain greater market share. Stock traders still seem to admire the fact that Amazon does not pay American taxes. One factor that allowed it to monopolize the book selling market was that customers pay no sales tax on their purchases from Amazon with free delivery on Prime, which gives it an advantage over brick-and-mortar retail stores although that is changing as states begin to impose sales tax on any merchandise purchase and sent to an address in that state. It was also noted that many smaller businesses have little choice but to adhere to the Amazon retail platform so that they can gain business growth even though they have to pay to ship any goods as Prime customers get free shipping and Amazon merely passes that cost onto the vendor to deal with.

With the rise of this firm in the 1990s, e-commerce soared and took over a large share of book publishers. Outside sellers criticized its “tough tactics” to pay the percentage kickbacks to have their list of books distributed by Amazon. Kindle, a book reading electronic device manufactured by Amazon, allowed for the digital takeover of actual printed books disrupting the industry even further. Publishers saw their long-held business model dramatically changed and their business diminish significantly overnight. In 2005 with Amazon creating its Prime 2-day delivery, there are now 150 million sign-ups; people kept on buying, which was the whole idea. Warehouses, or what Amazon calls fulfillment centers, were scattered around the country creating jobs. Almost every state in the country today has a fulfillment center. They are automated for a punishingly fast pace for nonunionized workers. The Occupational Safety and Health Administration hears many complaints, but Amazon’s job creation over last decade’s economy remains valued by most communities (Evans, 2019). Increased rates of productivity are often objected to by workers, along with the camera surveillance for all the data gathered on keeping up the grueling pace of their tracked work. Safety rules are usually ignored or compromised, according to Frontline, with the automation of workers creating a good deal of stress (PBS, 2020).

Amazon’s philosophy of becoming the biggest is built upon a set of ideals coming from Bezos’ management team. In developing the Prime subscriber base for the services consumers supposedly wanted, Amazon established a network of independent contractors to rival UPS and Federal Express so that delivery could be given promptly to satisfy consumer demand. On this group of independent businesses, there is performance pressure; there have been contractor crashes trying for faster deliveries. There have been reportedly no safety records kept. Now Prime subscribers can get one-day delivery so demands upon drivers have intensified.

It has also been criticized that there are no safety standards on sold products, so it is alleged that unsafe products from Chinese firms were selling on the platform. Sixty percent of what is sold comes from third parties, but Amazon does not assume any responsibility for products; it’s up to each manufacturer, so the history of dangerous products delineated on Frontline does not necessarily impact customer commitment to the site.
Amazon’s obtaining strong consumer-centric services tends to avoid the traditional legal antitrust critique since it is usually pursued against a company driving down prices against competitors. This monopolization, on the other hand, can be an issue since 40% of all new books go through this Amazon gatekeeper. 100 million Prime subscribers make Amazon their main retail outlet. Outside vendors are increasingly being charged higher fees on their businesses; they have little choice since Amazon maintains monopolistic control of this ecommerce.

Nevertheless, Amazon managers’ obsession for maintaining the upper hand focuses on “market segment share” in order to grow. Thus, the latest concern is the monopoly power that the firm exhibits. Additionally, Bezos has purchased the Washington Post, a staunch enemy of Donald Trump, which results in part of his attacks on “fake news” that affects dynamics within the D.C. government arena where the firm does considerable business. Amazon Web Services (AWS) plays an important role in the federal contracting. The President has routinely held the US Postal Service hostage over Amazon’s shipping practices (O’Brien, 2020).

For a variety of reasons, a powerful corporation headed by the richest man in the world is bound to attract criticism. Amazon’s enemies for whatever are numerous, beginning with its own employees some who are upset about climate change. Delivering goods under Prime using gas-powered vehicles leaves a huge carbon footprint, plus Amazon helps the oil and gas industry with cloud computing services. Certain employees have begun using their stock votes they receive to agitate for corporate change revealing their own names. Other employees protested over how the firm handled sexual harassment claims.

Competition has become more bothersome. Google is seeking shippers to build its online commerce. Google Express and Google Pay allow for digital ordering, which has been beefed up assisted by its databases to target consumers (Wakabayashi, 2020). Oracle’s financials have not been living up to Wall Street expectations with his autonomous database coming out against Amazon Web Services, but industry rivals are taking steps competitively (Wheatley, 2019).

But it was Amazon’s decision to find two new headquarters that brought about more trenchant critique, along with additional scrutiny over the firm’s tactics. Cities across America offered up substantial financial incentives or what some analysts called them bribes to the company as they turned over huge amounts of data to entice this corporate giant to build in their towns. Amazon, which is a data mining firm, now can digest all of this for its future growth.

Once deciding upon New York City, Democratic US Representative Alexandra Ocasio-Cortez, known as AOC, engineered a populist triumph over this relocation, along with the Democrat-leaning state Senate objecting to the incentive package (Goodman, 2019). The company was promised $2.2 billion in subsidies to relocate its HQ2 to New York City. The company was promised $2.2 billion in subsidies to relocate its HQ2 to New York City, however, they received another promise by Northern Virginia, where it finally settled after the NYC fallout. Additional investment may go to Nashville, Tennessee (McGee, 2019), but it’s becoming more apparent that Amazon may be mortal after all (Ovide, 2019). It is important to note that the left-wing opposition coalesced for New York City in a different way than
the Seattle-based activists have critiqued Amazon’s political role with many activist groups concerned about all the money they are not paying in taxes, while seeking huge state and local incentives for their operations can lead to further economic inequalities as they become net takers from any community they settle in. Seattle activists were pushing for company contributions to build affordable housing for the homeless (Zakrzewski, 2019).

Bezos, the richest man in the world, gets attention for more than just his role over his Amazon empire. His public affairs department has built his image, and there are many Prime subscribers who are interested in all the company’s new developments. Besides there are a variety of journalists, Wall Street analysts, and paparazzi that follow his routines, one scandalous run-in was with the National Enquirer over his affair and his subsequent divorce ($36.7 billion in the settlement) (Alexander & Tindera, 2020). This series of events became quite newsworthy for over a few months, letting him pursue some international travel with his mistress and tinkering in his billion-dollar investment in his space venture, Blue Origin. His arch-rival Elon Musk beat him out on the space station docking in May. Nevertheless, the COVID-19 epidemic brought him back for more hands-on involvement with the company, when the virus offered Amazon multiple financial benefits from the crisis (Weise, 2020b). Seattle’s early virus outbreak was cited as a need to address working conditions in his home city and nationwide in its warehouses. Criticisms later came in management’s delay to announce actions as the firm was gearing up its logistics, changing its website, delaying Prime Day, and moving to distributing just “essential items”—all seemingly important for a sales upsurge. Testing employees was under discussion, but the warehouse infections erupted and safety concerns at more than 50 facilities went viral.

Bezos’ “outsized” presence in the Washington, D.C. arena extends well beyond his ownership of the Washington Post with huge government contracts by AWS for technology and cloud services and his warehouses providing many goods to government agencies (Foer, 2019). Trump’s personal animosity of Bezos brings a watchful eye to these interactions in D.C. A Fortune magazine article “What’s Behind the Great Big Billionaire Backlash” notes harboring mixed feelings about the ultra-wealthy, where they no longer seem to be admired as much by the public as in past decades (Colvin, 2019). Inequality seen in the wealthiest 1% of US households now accounts for more than half of the value of equities (Wigglesworth, 2020).

Health Care

Amazon has become bent upon revolutionizing health care according to Diakantonis (2020). Early in 2018, Amazon saw its distribution efforts could easily find application in the healthcare sector with its technological expertise in cloud computing and data analytics easily finding willing partners. Announcing its potential for entering pharmaceutical distribution shook up traditional health sector parties, first to the
hospital market, then direct to consumers gaining wholesale pharmacy licensing with the PillPack purchase (Farr, 2019).

The company’s expertise in streamlining supply chains (Kacik, 2018) saw a ready market in hospital procurement to be automated for easy delivery from Amazon warehouses. The firm’s service reputation enabled trimming hospital vendor portfolios and lowering supply chain expenses, which tend to be the second highest outlay after hospital labor. Hospitals could use its Alexa for decentralized ordering of medical supplies and pharmaceuticals. Group purchasing organizations (GPOs) have played a historic role in the hospital industry, along with several large corporate distributors (like Cardinal), but Amazon brings its superior automation and preferred services capabilities (e.g., demand-forecasting) that can be key to improving hospital efficiency; the company has many other new tools besides offering office supplies and numerous other products that hospitals consume.

Amazon Business has forged numerous relationships in the healthcare system (Beth Israel Deaconess teams with Amazon to boost efficiency, 2019). This article speaks to AI support for various projects, and as they are implemented, Amazon studies them in order to take improved programs to other clients. The idea was to disrupt and improve the supply chain in such a way to deal with all recalls on alerts on medical products (Kacik, 2018, p. 14) quotes one hospital spokesperson.

Amazon also uses its Alexa technology for physicians providing a medical transcription service, another area of branching out into the health sector. Diakantonis (2019) highlights the use of the ability to capture patient/physician interactions and then digitize them into the patient’s medical record. Clearly this makes the healthcare provider’s job much easier, but current transcription software leaves much to be desired in terms of accuracy.

All these areas represent extensive branching out from the Amazon core business to find niches for learning and further developing the market for health care intrusion. For its warehousing function, the company received HIPAA eligibility utilizing its AI capabilities for rendering products. Prime customers can use Health Savings Account dollars to purchase eligible items on the Amazon site, a further move into the healthcare space to likely boost HSA favorability among employers and employees (Vivero, 2019). Following the lead of Apple, Amazon has established a virtual medical clinic for its Seattle employees (Pifer, 2019). The company is developing Amazon Care to oversee this virtual medical clinic in an industrial medicine model, which will be testing telemedicine to enter that market, which is expected to become $130 billion by 2025. Telemedicine has gotten a burst of interest given the impact of the COVID-19 pandemic of late (Hollander & Carr, 2020; Dorsey & Topol, 2016).

Amazon’s purchase of PillPack (Farr, 2019) and its new media advertising for this pharmacy benefit manager shook up the PBM industry, as well as chain drug stores. For example, upon Amazon’s entry, CVS, Walgreens, and other chain drug store stocks plummeted (Ellison, 2018). The company is developing a new pharmacy integration app, which will give it a formidable advantage in this field; it is reported that tackling rising costs is a primary objective (Inserro, 2019). PillPack
provides daily packaged prescription drugs for its client in the delivery mode of many other mail order pharmacies. As it develops this PBM area, the company will likely innovate with many changes to achieve improved customer satisfaction; some PBMs are not particularly held in highest favor by their patients. Amazon may likely curry favor with many on drug delivery services and, when stocked up, necessities for preventing drug delivery mishaps, but they will definitely challenge drug stores and other PBMs for business over time.

Meanwhile, Warren Buffet Berkshire Hathaway and Jeffrey Bezos of Amazon joined with Jamie Dimon of JPMorgan Chase, together known here as “BAD,” in a joint venture formed Haven, which will be redesigning health benefits for their 1.2 million employees, with potentially grandiose plans for additional employers (Ellison, 2018; Davenport, 2019). Atul Gawande, M.D., appointed CEO, was expected to carry out multiple investigations with profound implications for cost and quality improvement with a focus on primary care and lowering prescription drug costs. His tenure as CEO ended in May 2020 but will instead be the Chair of the Board for Haven Healthcare. These three powerhouse and very wealthy individuals may eventually lead the way in revamping overall corporate employer benefit design to revolutionize the private insurance industry or do away with the industry. They hope other employers will join them.

Another corporate initiative, Health Transformation Alliance, is a consortium of employers from 2016 also trying to lower their healthcare outlays (Davenport, 2019). Such ventures in direct contracting may not sit well with existing health system players, but more importantly, should the billionaire class be trusted from the top down to change the overall healthcare system (Staley, 2018)?

It is difficult to imagine the lives of the billionaires who have circumscribed the lives of Americans around their corporate personas and vast enterprises. For example, Jeff Bezos of Amazon is worth more than $109.7 billion, even after his divorce where he gave a huge chunk of stock to his wife. Mark Zuckerberg of Facebook has a net worth of $72 billion. According to Forbes Magazine, which heralds the extremely wealthy as celebrities, and backed up by their respective public affairs offices, both billionaires come off as the American Dream writ large.

Clearly, this upper class of ruling Americans has a totally different reality than what most people in America and the world face every day. Conditions of living are just impossible to imagine with this kind of great wealth. It is beyond the fact that they are so detached from the lives of the ordinary people, their employees (who help create their wealth), or the consumers of their products and services (who shovel money toward their corporate endeavors). It is often pointed out that the rich get richer, and the middle and working class and poor do not see anywhere near comparable gains in their wealth, what Bernie Sanders laments as the inequalities beyond the top 2%. In fact, quite the opposite over the last couple decades in America has deepened worldwide wealth inequities (Piketty, 2014).

Staley (2018) in a piece, “Our system is so broken, we’re turning to billionaires like Bezos to save us” questioned the wealth, power, and influence of their wisdom...
and the public’s loss of faith in the super-rich. He points out the rise of social problems during this huge wealth accumulation. Restructuring our healthcare system based on their ideas (particularly on workers’ benefits) may not be judicious.

Direct contracting schemes have been saving costs for some employers for decades. Nevertheless, there are difficulties here, such as growing a good network of providers and obtaining their performance for whom constructing databases and developing analytics based upon ethical studies for good decision-making on costs and quality. Walmart is another firm that engages in direct contracting (Diamond, 2019), but one of the more prominent American corporations to go down this path was General Motors.

Twenty-four thousand of its 180,000 workforce were placed in a 5-year direct contracting program with the Henry Ford Health Care System, circumventing insurance companies. Boeing also contracts in California for its employees. Plans provide discounts to employees who participate, but educating them to choose wisely for the “best doctors” and hospitals can be problematic. Integrating care among the set of providers takes effort, especially if they are not already formed into well-functioning systems.

For 2020, the US Department of Health and Human Services seeks such global feed models to reduce fee-for-service medicine by contracting with physicians who can retain patients based on their satisfaction with their care and their retention of those patients in their practice. It was said that systems should be promoting partnerships with Big Tech companies so the analytics could be developed (Luthi, 2019).

Proven management ideas and methods in the larger corporate trending seem ripe for placing on health care, not always with full consideration that human health and behavior often challenges medicine; dealing with highly educated and highly paid professionals may require a lessened managerial command structure, along with the cost/quality dynamic not being certain.

Moise (2019) asks the question, if Amazon is able to put the customer at the center of its operations and relentlessly drive costs down through efficiency, will this ability also work in health care (Moise, 2019, p. 1)? Many people, from what little has been shared from the Haven venture, are coming to believe that they can indeed do that.

Most large corporations are self-insured and possess the capability of understanding employee health conditions, its relation to productivity, and employee interface with healthcare providers for monitoring both. The rhetoric indicates the trend toward value-based care, utilizing insurance data systems, and the targeting of costly chronic diseases in target and in special programs. Health Transformation Alliance has partnered with CVS and OptumRx, and similar deals are continually being struck in the medical marketplace without much oversight.

For direct contracting to succeed, it definitely requires advanced analytics, with follow through to rein in the costs of climbing employer benefit outlays. An essential question remains: can workers trust their employers to manage their health
care, and will they resist? Will they be willing to trade privacy for better services? Or will privacy be violated as the pressure cost reduction wins over quality? What else will be obscured in benefit redesign over time? Employers have historically picked their insurance company and designed benefits since the beginning of employer-based private insurance in the 1930s. Not too long ago, within the HMO movement, doctors agreed to “gag rules” in their contracts, meaning not to mention to their patients, the best care alternatives for serious illnesses if the employer’s HMO benefit package did not cover that best alternative. This situation involving a loss of the agency relationship with patients provoked a huge loss of patients’ faith in their doctors, let alone when HMOs expelled millions of expensive seniors after the Clinton/Gingrich Balanced Budget Amendments of 1990 which irreparably damaged the sacrosanct doctor-patient relationship (Goold & Lipkin, 1999).

At its January 2018 pronouncement, the Amazon, Berkshire Hathaway, and JP Morgan Chase venture captured the popular and business press, reacting to its formation from favor for the media personalities of Buffett, Dimon, and Bezos to maintaining that it was not a threat or an unwelcomed outside influence, but most commentary centered on the expected coming disruption to health care (Ellison, 2018; Muchmore, Howland, & Byers, 2018).

As an example of the ideological grip regarding health care, an editorial in the Chicago Tribune inferred that while the three business leaders have no experience in the complex healthcare sector, so what? It went further in potshots at government and not solving issues but extolled a couple of billionaires and other corporate firms who have stepped in “when government stumbles…” (Chicago Tribune Editorial Board, 2018).

The corporate entities who consult and advise on healthcare benefits may recognize that analytics alone do not provide the best understanding of what medical care is really about. Employees take interest in their benefits, or the lack thereof when they go through periods of illness in their family, or when an epidemic of coronavirus wipes out all their benefits and places them in the uninsured pool.

Artificial intelligence in health care was reportedly $4 billion in 2019, according to CB Insights (Diakantonis, 2020). Amazon Web Services (AWS) has also constructed a cloud-based medical software called Care Cloud, which provides software to manage medical practices, EHRs, and patient experiences. Amazon technical staff are also tinkering with Alexa to become a diagnostic screen for owners based upon the voice pattern of a sick person. Davis mentions:

AWS Data Exchange is unlocking a number of data sources that have traditionally been locked in silos across multiple organizations, and gives health care stakeholders a scalable and secure service to create new collaborative business models to reimagine how they approach research, clinical trials, pharmacovigilance, population health and reimbursement according to a principal at Deloitte Consulting. The AWS data exchange will provide capability to search, subscribe to, and use third-party data from companies within the cloud. This service “provides integrated cloud-based analytics, knowledge management, and collaboration tools to life sciences and health care organizations”. (Davis B, 2019, p. 1)
Bezos and company have been very adroit in building a phenomenally successful enterprise that is also highly profitable based upon consumer service and satisfaction. It is, however, a data gathering analysis engine geared to corporate growth.

Not only did the firm transform the retail industry in America to online sales, but it has also revolutionized distribution of goods in this society toward greater efficiency and profit-taking. In all its entries, its business model offers auxiliary services to gather greater data to champion in the sector over time. It is based upon utilizing its dominance in networking and logistics. So the game plan for health care will likely follow such lines.

### Google

Now 50 years old, the Age of the Internet in the 1980s gave rise to a plethora of dot.com entities that yielded the powerhouses in Silicon Valley and Seattle, with the subsequent decade viewing the dot.com tech bubble for Wall Street and the economy. The larger surviving firms set off a consumer buying rage for the latest tech innovations and propelled computer science programs within colleges—from desktops to miniaturization into portables and smartphones and a plethora of IoT devices. As the industry produced search engines (now dominated by Google and Microsoft’s Bing), ever-refining search programs have been “perfected” to serve different business and consumer markets and build massive databases. Almost 90% of the world’s searches are conducted “free” on Google (Richter, 2020), and it still is trying to penetrate China for its 800,000 smartphone users. The firm’s huge revenue comes from targeted advertising to users. A New York Times Magazine article remarked that Google dominates the world in a way that many have tried and failed to do before, with trillions of searches performed each year which calculates roughly to 6300 searches per second or 5.5 billion per day (Duhigg, 2018).

Like other IT behemoths, Google is another data gathering operation, in which it turns into selling advertisements on its platform and that accounts for its growth. Its “free” market for searches makes it dominant. Like the other powerhouses in Silicon Valley and Seattle, it gets its share of scrutiny, suspicion, and resentment.

Like all the other tech giants, Google is frequently a target of concern and criticism over its outsized power and influence. Antitrust sentiments against the company are found in both the United States and Europe (Condliffe, 2019). Since most of the firm’s income comes from advertisements, its sophisticated algorithms, which had been developed over years, are very suspicious to many. The company has been accused of unfairly leveraging its Android software, which is in operation on over 75% of smartphones (Nicas, 2018). Since it has rich cash reserves similar to other IT firms, it can easily perform public relations feats to quell doubts about it, lobby heavily, and sweep into new markets; it has ventured into Google Express for shipping and in the FinTech area, now Google Pay.

The company is staking out the healthcare sector like the other Big Tech firms. Its past action several years ago in EHRs ended in a wipeout. Now it is well situated
in the cloud business in order to organize scattered medical data for easier access and use with adoption of new and emergent technologies in artificial intelligence (AI) and machine learning (Murphy, 2018). Google’s Cloud Healthcare API provides the architecture to integrate numerous voice technologies into EHR systems to reduce administrative burdens by digitalization of massive amounts of data. Amazon Web Services and Microsoft Azure are competing to do similar cloud projects (Spitzer, 2018a, 2018b).

This is no small investment by Alphabet, Google’s expansive parent company, putting $375 million to start up Oscar (Reints, 2018) through Google’s Verily to update infrastructure for its Medicare Advantage program. Google also teamed up with Fitbit, which it bought outright to unite patient-generated data into EHRs, with past Fitbit owners needing to decide if they want Google to own their personal data. Apple is similarly doing this with iPhone customers and its Apple Watch (Arndt, 2018a, 2018b). Both operations are behind closed doors for their future biometric data combinations with no regulations for privacy and use over who owns the personal data and how it gets used.

No longer satisfied to be just a search and advertising company, Google is mounting new organizational directions with DeepMind, Verily, and Calico in analytic health research using its expertise in AI. The firm’s trillion-dollar market capitalization is impressive to Wall Street, but its net income is affected by such investment decisions, as well as its costly ongoing operations. YouTube revenues have been good for the company in 2020, and Google Cloud, its computer storage business, is doing well too (Swartz, 2020). Due to the importance of tech behemoths to Wall Street, Google’s decisions and directions are constantly examined and future speculated upon, including when its two founders, Larry Page and Sergey Brin, recently left the firm (Turning a Page and a Brin, 2019).

Google is frequently a target of concern and criticism over its size, pervasive-ness, and power. Antitrust sentiments against the company are found in both the United States and Europe (condliffe, 2019). Since most of its income comes from advertisements, its sophisticated algorithms (developed over years) appear very suspicious to many. The company has been accused of unfairly leveraging its Android software, which is in operation in over 75% of smartphones (nicas, 2018). Since it has bountiful cash reserves and looks for new markets similarly to others, it has ventured into Google Express for shipping and in the FinTech area, Google Pay. As a data gathering warehouse, Google clearly sees that data protection has risen as a key issue as the European Union uses its new authority under the General Data Protection Regulation in May 2019 to examine US tech firms in more depth (satariano, 2018). In an article “Google’s Android Fine is Not Enough to Change Its Behaviour” (2018), it was noted that the firm received a €4.34 billion fine in 2018 on top of €2.4 billion fine on the previous year (The Economist, 2018). The firm also finds itself in the displeasure of Saudi Arabia in its account of the killing of Washington Post writer Jamal Khashoggi along with unrest from employees who do not always agree with top management’s decisions for customers (like ICE, the military, or other foreign governments with perhaps nefarious agendas).
Google handles massive amounts of data in its search capacity, Gmail, chats, and location data from Google Maps besides other apps on personal computers and phones that generate data. Google staff have been creative and utilize indirect ways to understand a user’s place, movement, and purchasing. Personal data is amassed, and its mechanisms are disputed, but it remains unknown how the data is gathered and used and if the user actually ever knows this is happening or ever gets a chance to give permission (Popken, 2018). The Internet has actually developed an echo web system that the publishing, technology, and retail industries have come to rely upon. Spying from phones and computers is not just a Google issue, but Firefox and Internet Explorer also do surveillance, though it is reportedly less than what Google Chrome does. To remember, people download apps on their phones (social apps, local guides, weather apps), in addition to personal data from retailers and credit card companies. While perhaps thousands of articles have been written to alert consumers to actions, they can take to protect themselves, but the machine grinds on incessantly.

PR pieces on tracking tend to explain a few social benefits, like how Google aids police to be digital dragnets to ensnare criminals (Valentino-DeVries, 2019), and it is not just Google but Amazon that cooperates with the police (Files Not Faces, 2019). Such directions indicate that technology moves far faster than a regulatory apparatus, even if it existed and lawfulness discussions do not normally look at the growing ethical dimensions of this dramatic threat to American democracy.

The company is staking out the healthcare sector like all other Big Tech firms. Its past action in EHRs several years back ended in a wipeout, but now it is well situated in its Google Cloud business in order to seek to organize scattered medical data for easier access and use with adoption of new and emergent technologies in artificial intelligence and machine learning (Murphy, 2018). Google bought the pioneer in wearable fitness technology, Fitbit, after it emerged as a pop culture accessory to track movement activities, to now gather greater health data for the consumer. Online active users number 28 million worldwide with over 100 million devices sold (O’Brien, 2019). Much has yet to emerge for its integration. Google’s Cloud Healthcare provides the architecture to integrate numerous voice technologies into EHR systems to reduce administrative burdens by digitalization of massive amounts of data. Amazon Web Services and Microsoft Azure are competing to do similar cloud projects (Spitzer, 2018a, 2018b).

This was no small investment by Alphabet ($375 million) to start up OSCAR (Glazer, Tracy, & Horwitz, 2019) through Google’s Verily to update infrastructure for its Medicare Advantage program. Google also teamed up with Fitbit which it bought to unite patient-generated data into EHRs as Apple is seeking to do with iPhone customers and its Apple Watch (Arndt, 2018a, 2018b). Fitbit was the pioneer in wearable fitness technology, and it became somewhat of a pop culture accessory from basic tracking of activities, such as running, cycling, and swimming, heart rates, and sleep patterns to now gathering a greater share of health data for the consumer. Currently, there are 28 million online active users worldwide with over 100 million devices sold (O’Brien, 2019).
No longer satisfied to be just a search and advertising company, Google is mounting new organizational directions with DeepMind, Verily, and Calico in analytic research using its expertise in artificial intelligence. The firm’s trillion-dollar market capitalization is impressive to Wall Street, but its net income is affected by its investment decisions as well as its ongoing operations. YouTube revenues have been good for the company in 2020 and Google Cloud, its computer business is doing well of late too (Swartz, 2020). Like the other tech behemoths, Google’s decisions and directions are constantly examined and speculated on, including the two founders recently leaving the firm (Turning a Page and a Brin, 2019).

One technology in particular has been given a good deal of emphasis because of its phenomenal spread in use and the host of issues that accompany it. That issue is facial recognition software, now advanced and widely used by governments across the globe and businesses of all stripes. The Google chief has explained that he sees a significant downside here and feels facial recognition is so fraught with risks, he urged a moratorium on its use, while regulators try to create some guidelines (Espinoza & Murgia, 2020). Yet in all these matters, the nascent regulatory and social demands always come up to cost the bottom line (The Economist, 2018).

In “Google’s biggest problem? It can never be as transparent as we need it to be?” (Steinmetz, 2018), Steinmetz explains how the firm’s unrivaled influence over information consumed by billions of people worldwide: the issue comes down to Trust; the transparency creep may be insufficient, but the question remains what is still hidden? Does Google collect too much data?

In reviewing the general situation above with ongoing perhaps irreconcilable issues, how comfortable should the American public be with unregulated IT firms moving full throttle into the healthcare system? Kirlin (2020) discusses how Google burns cookies into people’s personal computers and phones that means will be used for healthcare marketing. By 2022, Google announced a phase out of third-party cookies on its Chrome browser, joining Mozilla, Safari, and Microsoft to render third-party cookies all but extinct. Kirlin was concerned about the implications of user data collection in health care, despite legal mandates and corporate pledges. Already marketers are devising ways to work around any restrictions, striving for cookie preferences. She notes that healthcare marketing will need to adapt by shifting metrics, contextualizing the target, and building first-party strategies that allow drug brands a millisecond advantage to push products.

In sum, Google, as the king of corporate cash piles (Stacey et al., 2019), continues to be scrutinized by investors and others on Wall Street (Wakabayashi, 2018), but like other IT firms, its size, diverse operations, and constant dealings with regulators, dissenting employees, and competitors makes its ventures into health care, like Apple and a couple other firms, potentially precarious on a few levels: whether investors see the healthcare area and the particular Google’s action providing sufficient ROI; whether the complexity of healthcare operations with the uncertainties in federal and state financing; the enormity of the population health problems with difficulties to solve some through information technology solutions; and then, in general, how long-term planning actually can be when attempted in a chaotic
healthcare system post-Republican rule and the COVID-19 pandemic. The current un-insurance rate in the economy has many middle- and working-class people finding their incomes may not come back to what they enjoyed in early 2020. So, will healthcare return to be the booming sector that was earlier salivated for in the later 2020s?

Moreover, the overall privacy concerns may be required to be tied up before healthcare applications come to roost. In a major article, Google was accused of changing search results to suit its ends and not the user’s (Grind, Schnechner, McMillan, & West, 2019). These authors discuss the proprietary algorithms of Google that are presumed to be objective and unbiased but in reality are not. Google’s Corporate Mission statement includes the statement “to organize the world’s information and make it universally accessible and useful” (Google, 2020). Their advertising ecosystems brought over the years’ phenomenal profits as it did with other ad tech companies (DeVynck & Nix, 2019). Google began amassing customer data even while they turned no profit for several years of operations; Wall Street backed them as they did the other IT companies who were amassing mounds of data—it was seen as, and has been, the way forward to advance the economy and build greater and greater revenues and profits. A nation of citizens absorbed in consumption are not as likely to become critics of the economy nor the governmental system, though lately people have come to doubt both concentrations of power against their interests and become deeply concerned over their privacy.

**Facebook**

Americans’ dependence on social media, its pervasiveness in everyday life, and the lack of controls over it have forced social media into the political spotlight, particularly given the Russian interference in Trump’s election, according to all government intelligence sources. The Internet promised so much, but today, loss of privacy, hackers, cyberattacks of large companies, and selling personal data now fill new stories. Critics believe that Facebook engages in behaviors that furthers our need to look at it (the addictive impulse) and then engages us in confirmation bias by sucking us into the world’s largest echo chamber. Like other large IT firms, it determines what we see and when we see it, and they have all gotten so large that their combined revenues are more than $500 billion annually (Duhigg, 2018).

As the IT industry recognizes its new healthcare market, and other expansions, will firms pose themselves as saviors to rationalize the sector for greater efficiency? The premises and promises of Big Data may deserve and require examination, and the individual companies will warrant a closer examination over time. Microsoft, Google, Amazon, and Apple reached $1 trillion market capitalizations in 2019, each now holding spectacular resources to spend, in addition to their unduly pervasive influence upon society. Some have argued that the online world is so fast moving that antitrust laws can’t ever keep pace; others recognize the dearth in policymaking circles of folks sufficiently knowledgeable to address the industry, so lawmakers
listen to lobbyists, and staff accept industry-written paragraphs to insert in the regulations. Nowadays even the biggest titan can be challenged by a tiny innovative startup, called unicorns, if the newcomer has better ideas, faster tech, and ample financial backing to last. Silicon Valley IPOs in 2019 fell short of expectations (Bowles & Conger, 2019, p. B5), which may indicate beginning a new era for technology firms of all kinds. Giant firms typically absorb many of the startups in this industry.

Thus, antitrust lawsuits, some digital executives may say, aren’t needed anymore. A New York Times article (Benner & Kang, 2019) “Antitrust official guided merger of T-Mobile and Sprint telecoms” revealed how the Trump official in the DOJ reversed the earlier Obama rejection of this $26B amalgamation. Politics as it has lately become should provoke skepticism over future IT developments facing much scrutiny.

As we close the writing of this chapter, the news media is ablaze with Mark Zuckerberg’s relationship with Donald Trump over the broader dispute with content management on Facebook and other social media. Zuckerberg found himself at odds with a group of his employees over how to handle Trump’s posts, while Jack Dorsey at Twitter shielded his message, “When the looting starts, the shooting starts,” as a call to violence (Frenkel et al., 2020). Snap Incorporated went further to state Trump’s promoting racism and violence in public statements so removed his content (Newton, 2020). In an unprecedented move, Facebook employees staged a virtual walkout against Zuckerberg’s disagreement (Frenkel et al., 2020). Kuchler (2019) had reported that Facebook’s employees were overwhelmingly Democrats, perhaps why they objected to Zuckerberg’s cozying up with Donald Trump.

A 2018 poll found out that the public thinks tech companies should be regulated (Smith, 2018). Facebook and other social media companies have long been promulgating disinformation due to their passive policies. In an attempt to quell the issue, Zuckerberg pledged $10 million to groups working on racial justice after the George Floyd protests (Frenkel, 2020).

But the challenge from within to Zuckerberg was unprecedented, but he stood firm in his position (Issac, Kong, & Frenkel, 2018). The resultant firestorm spread across civil rights groups and others who were chiming in with their comments. The Facebook owner is said to rely upon a small circle of staff and friends for advice (Kuchler, 2019). Grillo, in Axios (2020), maintains he won’t compromise on big essential issues, often makes cosmetic gestures, and focuses on influencers. The game is rarely changed by investigations and big record fines.

Back in 2018, 72% of Americans thought Facebook and Twitter had carried political views that brought to light the content management issues over the years (Smith, 2018). Republicans have accused Facebook of censoring right wingers on religious and conservative political content (Rosenfeld, 2019). Yet BBC (2018) questioned whether the platform harbored extremists or even helped create them, based upon violence that broke out in Myanmar (BBC Trending: The country where Facebook posts whipped up hate, 2018; BBC, 2018).

With Facebook the largest and most influential communication platform in the world, Zuckerberg has made controversial decisions on content (e.g., not barring
Holocaust denialism on the site in 2018) (Manjoo, 2018). Extremist recruitment has often been found on Facebook according to Bloomberg Business Week (Silver and Frier (2018). The company has been blamed for slow moves, fixing little, and taking no stand on parts of criticism, but later Facebook did remove an Iran-based network for disinformation (Issac & Frenkel, 2018) and for its attacks on Trump. Several foreign groups had been earlier using Facebook following the 2016 patterning of misinformation tactics triumphed by Russia. The firm has frequently come under fire for how it has handled the speed of fake news spreading and the misinformation that has become prevalent on the site (Brody & Simon, 2018). In 2019 Facebook said it was removing more hate speech, seven million instances (Perrigo, 2019). Here is where its capabilities in artificial intelligence have advanced and will find usefulness.

There is an important issue here: private corporations making content decisions arouses free speech advocates. Fact-checking may be worthwhile by social media firms, but should they be forums for free speech from hate groups and allow interfering with American elections? These are difficult issues to navigate for each IT firm while necessarily listening to the broader societal discussion on how to limit false, misleading, and troubling posts while allowing its users the freedom to speak their minds. Hopefully, firms consider taking the public into account. The companies are shielded from legal liability since the content is posted by users; firms are merely platforms they maintain, not publishers.

On the decisions by a few firms to review Trump, he fired back with an executive order that called on the federal government to review Section 230 of the Communications Decency Act of 1996, in essence threatening to take action against social media firms that “restrict speech” including Twitter and Facebook (Twitter and Facebook, 2020). Social media firms face the dilemma of how to stay out of politics, particularly as the 2020 Presidential election campaigns gear up as major sources of revenue (Rogers, 2015). Political campaigns, like the World Cup and other highly viewed events, bring flocks of people to the platforms, and ad revenues blossom. Vice President Biden plans to pour $5 million into Facebook ads as of June (Goldmacher, 2020). His campaign before this spend had dumped staggering sums on Facebook, as the Trump campaign has historically done. Most Democrat and Republican Senators and Congressmen will also be running to the site to buy ads for the Fall election season. Zuckerberg’s decision not to change its basic rules on political advertising, unlike Google and Twitter, before the 2020 election seems to have been calculated on this monetary gain (Romm, 2020).

Due to Facebook’s size, notoriety, and the sheer dependence of so many of its users for its being their main source of news, this tech giant seems to find and dive into repeated media-discussed scandals. In the 2016 election, the firm ignored Russian influence, as well as the manipulation of its website. Then there was the ugly smearing of left-leaning billionaire George Soros in a negative way, along with a smear against its competitor Apple.

There are no easy corrective steps for any IT giant to rectify compounding circumstances after they pop up as media storms, especially if they stand to monetarily benefit from their laissez faire attitudes. Meanwhile, after his posts were flagged by
Twitter, Trump signed an executive order that seeks to limit liability protections for the social media companies (Sink, Egkolfopoulou, & Fabian, 2020). Trump responded with his usual outrage that he could never be censored, because he sees himself as the ultimate protector of the first amendment and free speech.

Two years of ceaseless controversy followed the Cambridge Analytica scandal that shocked hundreds of millions of Facebook users and brought up the critical issue of Trust (Confessore, 2018). Reportedly, Zuckerberg was criticized along the way in terms of how he personally handled it. Many of the public became disillusioned about the tremendous power that the social media platform had over what we see and hear. As an outsized corporate celebrity, Zuckerberg became the focus of everything that the corporation was about.

Facebook and social media are about making money, and the election of 2016—just for the advertising spent—is supposed to be good (Osnos, 2018). Trump had used Facebook to raise $280 million for his campaign. Zuckerberg has downplayed if ads can change people’s vote in his denial of Russian influence on his site. He has been criticized, however, for many blind spots and his excessive optimism while attempting to contain the damage from the fallout. The firm spent $11.5 million on lobbying in 2017, which has increased annually after a series of scandals. Facebook’s psychographic techniques to manipulate voters’ behavior have been revealed, as the FBI, Security Exchange Commission, Department of Justice, and Federal Trade Commissioners have investigated the Cambridge Analytica case.

The reaction among users were many who struck out at the firm in commentaries and news pieces, or just left the site as users. Osnos’ piece (2018) in the New Yorker attempted to provide some personal insights into Zuckerberg’s history, experiences, and personality. The other unflattering portrayal came in David Fincher’s Oscar-winning movie The Social Network in 2010 that traced this Harvard dropout starting the platform and discussed when he discovered the power to affect people’s political behavior. Early on Facebook used advertisers and got people’s profiles, raising privacy concerns along the way, but his financial drive can be best seen in Zuckerberg’s paying a billion dollars for Instagram, the photo sharing app, that now is over a hundred times that value of what he paid. Such allows him, like Gates and a few other tech capitalists, to initiate some charitable gifts with his wife Priscilla Chan, in an attempt at more public relations to limit damage. Like Bezos, Zuckerberg has not been at the forefront of donations from his wealth.

Thus, issues of Trust over this social media Titanic linger. Biddle (2018) describes the artificial intelligence models Facebook is developing to predict consumer behavior. The firm is concerned with suicide prevention using speech recognition, language processing, and other technologies to identify an application, possibly used in preventing suicide among veterans. Facebook has been reported to be obtaining medical records from several healthcare systems so they could analyze it and model bringing in social and economic factors, but these data sharing agreements have been cautiously approached after Cambridge Analytica fiasco in which 87 million users’ data may have been shared.

So data privacy in its newfound ventures in health is immediately raised as a deep concern. In an effort to demonstrate a concern in health care, Zuckerberg sold
$13 billion of his stock to help examine major diseases (Spitzer, 2018a, 2018b). Zuckerberg and his number two, Sheryl Sandberg, have become increasingly unpopular within the Silicon Valley crowd, obviously the lesson of Bill Gates and his charitable giving after he left the “despised” Microsoft; he quit to be part of a larger plan to change their waning popularity in the tech world (Madrigal, 2018).

Following the lingering story of Cambridge Analytica, the worst data breach in Facebook history (The Economist, 2018), there was a $5 billion payment to settle data breach according to the FTC (Glazer, 2019). In this agreement, Facebook was seeking broader immunity for past mistakes too, but it got held up in court negotiations. Dispute over Facebook’s infrastructure and its privacy practices is a very complex issue debated by hordes of lawyers and the intransigents of the firm harvesting user data for different business purposes. As these breaches, subsequent investigations, and court cases pile up, Trust becomes paramount with Facebook’s figuring out what are its obligations of privacy to its users? Facebook was trying to provide in 2018 huge amounts of data to be shared with researchers in response to claims of Russian interference in the election (Frenkel, 2020), but Facebook has failed to deliver at the speed to approved researchers.

Steinmetz (2018) wrote about another news cycle for Facebook, this time 50 million user accounts over a security issue. Attackers had penetrated the Facebook platform with the question of should users trust Facebook after several promises to improve defenses, but not having them work. Facebook staff’s devotion to improving such defenses appears to have intensified after warnings from the FTC and Congress for much stricter oversight of user information.

Tough issues raise a key question about Facebook, so even if asked permission to share one’s health data, should users be willing to do so? What also are the cryptographic techniques that will guarantee assurance over what is not to be hacked, or what disclosures will be used over what data, and for what purposes? In terms of their securing data from several large healthcare systems, Facebook has maintained in 2018 that they are still in the discussion phase (Farr, 2018a, 2018b). In the meanwhile, Zuckerberg has pushed for a campaign to get users to think about organ donation (Tsukayama, 2012). The company continues with other ventures in the health sector also.

The trust issue on multiple levels cannot be removed from big IT tech companies moving into health care, nor can it belie the reality that these cash-rich titans are eager to enlarge by seizing the multiple moments given by the coronavirus pandemic, the economic slump worldwide, and just the fact that they are still unhampered in ways as other parties (especially those currently in health care) appear to be through this 2020 crisis (Isaac, 2020). This New York Times reporter speaks to Amazon, Apple, Facebook, Google, and Microsoft sitting on top of $557 billion of cash and looking for a pace of acquisitions and investments like when the economy was humming along in 2019. Facebook was noted as capitalizing on the momentum by bringing forth new products, introducing messenger rooms and group video chat services. Facebook swooped into India, building a stake in Reliance Jio and also secured Giphy to integrate into Instagram and other investments that would keep its international front booming.
As users worldwide become more enmeshed into Facebook’s corporate web, it is difficult to figure out the different levels of trust one must put in each of its activities. All tech firms require good faith on the part of customers that their data will not be used without their permission, but so far that faith has not been restored due to multiple data breaches and false promises previously described. However, knowing the purpose these data gathering machines have decided for the realms of personal data that are rendered unto them will help in rebuilding some needed conviction that each firm can be trusted, given regulatory oversight. Unfortunately, whether or not users can ever trust Facebook (or any tech behemoth) again will always be hard to know and understand. There is fear that even de-identified data in the hands of these immense firms can fairly easily be re-identified given the technology each has in place. And if there ever was any doubt about their capabilities, all one has to look at the ads in their social media accounts to know they are continuing in targeting ads to users (Arndt, 2018a, 2018b).

Gandolf (2018) delineates issues in social media for healthcare marketing purposes. Seven hundred million users in 2018 relied upon social networking sites to obtain health ideas from the Internet. This personal data is recognized as a tremendous business benefit for hospitals and other health systems, along with pharmaceutical firms and device manufacturers. Gandolf speaks to Facebook accounts being free, mobilizing groups that vested health firms can look at on its platform to connect and target certain constituencies. Business pages can be established to attract “fans.” Facebook can then serve as a mechanism for a firm to listen to “the voice of the consumer” and then send out specialized branding messages to boost visitor traffic to the firm’s site where easy ad tools in Facebook’s platform can seize new opportunities.

Privacy and Trust

The long developing public’s love for technology, however, may be beginning to erode given the abundance of discoveries flooding the popular media. The Economist maintains the heart of public disenchantment has much to do with centralization of Internet providers and search engines become too centralized (Siegele, 2018, p. 3), dominated by a few giants who remain suspect of privacy and placing profits ahead of consumers. Other corporate IT shenanigans that the popular media regularly highlight add to the suspicion that firms are not so “consumer-oriented.” The consumer-connected world of today is now being seen with several unwelcomed downsides. As platforms such as Facebook monopolize our time, we can be victims of bad algorithms that keep us from hearing genuine voices of those we disagree with and more of individuals and foreign agents and governments’ intent on subverting our political way of life through social media manipulation. And then having one country holding a significant amount of our personal data puts us all at greater risk of having that information stolen and used against us (Siegele, 2018, p. 4).
Every year *Bloomberg Businessweek* presents a list of issues of “What We Got Right (and Wrong) in 2019:” In stating what they *got right*, the first issue was about *privacy*: by not protecting users’ privacy and leaving enforcement of privacy laws to the individual 50 states, we have set up a system that can be easily circumvented and make us prone to more privacy breaches (Killingsworth, 2019).

Broad concerns over IT firms trampling privacy can be found among the population; media accounts are plentiful and alarming over incidents of harm in extracting personal data without a person’s permission or knowledge. Millions of users’ data (and often patients’ data) have been hacked due to sloppy security and held for ransom; sold by IT giants for uses beyond people’s knowledge. Data is a valuable commodity, and databases are easily triangulated to create what the industry calls “personal avatars” and “synthetic communities” that are used in predictive modeling for all sorts of purposes, none of which are transparent or made known to the individuals making up the database.

Given diverse intrusions into health care, furthering the corporate takeover seems evident with these far richer, more resourceful, and much more politically powerful IT firms. Naturally given the IT industries apparent lack of concern for our privacy and their use of our data to sell us stuff, we can expect more data breaches, more ads, and rapid pronouncements about how much they value our privacy and protect our data. Consumer engagement is their means to results, which flies in the face of now privacy issues becoming acute.

Many events led up to the worldwide soaring public concern over privacy. Trolling data without the user’s consent, or even knowledge, selling personal data for marketing purposes, or political use, all came to light last decade. Tracking and surveillance programs, along with facial recognition software already widely embedded, and not just by Chinese authorities, permeates businesses and schools (Thompson & Warzel, 2019). The spreading technology is considered invasive and often inaccurate (Editors, Scientific American, 2020). Beyond facial recognition—30+ businesses are doing it (Facial recognition is already here, 2019)—state surveillance is steadily growing across the world using DNA databases (Moreau, 2019). Fowler questions how are we to survive the surveillance apocalypse, even as the COVID-19 pandemic has been burgeoning new uses for technologies for mass surveillance (McGee, 2020). In January before the coronavirus scourge, in a *New York Times* Opinion special section, “One Nation Tracked” (2019), Thompson and Warzel spoke to dozens of companies, largely unregulated, nor scrutinized, amassing data on 12 million phone movements (Thompson & Warzel, 2019). When virus tracing begins, what leap in our citizenry’s surveillance will then take place? And the question Thompson and Warzel (2019) raise concerning the erosion of democracy: what happens to dissent when there is no anonymity anymore? Is not just China’s technological prowess to worry about?

Forooahar (2018) warns of Big Tech’s unhealthy tendencies as monopolistic complex and opaque advertising firms, though both Google and Facebook have felt the outside pressures to change. She notes that even if devoting more resources at content management, they are not very good at it.
This overall situation shows how web-hosting and online payment firms may sometimes get censored by corporate entities, or not: hate posts, human trafficking, dangerous products, and other grievous situations continue, not always often addressed by public regulation. In addition, the corporate-censoring of sites are to the chagrin of free speech advocates, which indicates the issues are mighty complex, and controversial, for public policy to begin to tackle.

Nevertheless, the private marketplace is proudly addressing a few issues, but to whose advantage and whose satisfaction? In a *Financial Times* opinion piece, in “We Are Living in an Age of Unprecedented Risks,” Bush’s Treasury Secretary Henry Paulson stated that because more and more data are controlled by large, private, and disruptive multinational firms, no nation, not even the most repressive regimes, can be expected to rein in much of anything anymore (Paulson, 2018). This former Bush man worries more about how governments and business may collide with the realm of changing dynamics. But who is articulating the concerns of consumers?

The rise of “surveillance capitalism” is frequently written about with clear warnings (Singer, 2019b). The term was coined by Shoshanna Zuboff, a Harvard Business School professor, in her book, *The Age of Surveillance Capitalism* (2019). She saw how problematic digital services challenging humanity could be, ones that are now being used to predict and influence human behavior; “the stakes could not be higher: a global architecture of behavior modification threatens human nature...just as industrial capitalism disfigured the natural world in the twentieth [century]” (Zuboff, 2019).

More so, the term captures private human experiences to manipulate for buying and selling on the marketplace, but most people remain unaware since their transactions remain generally opaque (Singer, 2019a). A “behavior speculation market” has arisen with general consumer ignorance over the privacy over its format. Individual efforts to protect one’s privacy, are generally unknown and it is very difficult discovering how compromised a person has been up to that point.

More importantly, huge amounts of data are already gathered on most Americans: it is just too complicated to undo what’s already done without unsurpassed federal regulatory reforms, but what and how? In the absence of the federal government having no basic consumer privacy laws, to soon have effective privacy protection appears a very long shot. The State of California has passed its Consumer Privacy Act (CCPA), coupled with the General Data Protection Regulation (GDPR) instituted in Europe. Both are highly resisted by IT industry forces so these regulations’ net effectiveness remains an open question. However, beyond protection over one’s personal data is what can be hacked out of existing databases. Another effect of the COVID-19 epidemic is a jump in “active attacks” including ransomware, on hospitals (Cohen, 2020b) since they are facing duress and subject to email scams.

Already beyond the privacy issue (Cohen, 2020b) are the numerous hacking threats to health systems’ patient data and the announcements of paying ransomware to keep operations afloat. Hacking threats have grown in sophistication with Fortune 500 entities reporting break-ins (Marriott, Equifax, and more) each with much greater security than most healthcare systems. Cohen (2019a) writes that
managing security risks is a ballooning, high-value industry necessary with our increasing reliance upon digital platforms, mobile devices, and the Internet of Things. Its market is forecast to climb from $120 billion in 2017 to $300 billion by 2024. It remains imperative that this persistent and pervasive risk in health care be addressed, but little regulatory scrutiny is on the horizon.

A New York Times piece on ransomware led off with the concept that hackers can lock us out of our computers unless we pay a ransom (usually in bitcoin). These types of attacks are becoming more widespread and damaging by day (Popper, 2020).

Most data attacks are likely underreported because victims are quietly paying off without notifying authorities. Nevertheless, 205,280 organized attributed files had been hacked in 2019, a 41% annual increase. News worthy among hacks have included the City of New Orleans, Baltimore, many other municipalities, a growing number of smaller businesses, physician practices, and hospitals. According to the FBI, ransomware attacks are increasing and ongoing (Bennett, 2020). Smaller organizations (like health providers) are considered to be more vulnerable (Boulton, 2020). A single health system could lose as many as 80,000 EHRs to hacking. In April 2020, providers, insurers, and their business associates reported 38 breaches alone, affecting 446,000 patients (Cohen, 2020a). More than 570 data breaches occurred in 2019 (Cohen, 2020b).

A hack, and the demand for ransomware, can easily cripple a business, even after it searches out any alternative than to just pay the extortion money, which can be very high. Unless the healthcare organization routinely backs up its information on back-up servers, they are stuck paying the ransom to regain access of their data. For providers, health care is the fourth most common target for ransomware. When a hospital is hit, business operations essentially close down, the EHR system is dismantled, and Internet-connected medical devices are compromised. If the EHRs are inoperable, the question is where did the provider store its old patient forms to still continue patient care? Tens of thousands of medical records have been hacked over the last decade. Thus, patients must be diverted to other hospitals immediately for care. Often the server of the company is shut down by some malware; the entire data files can be stolen, so the demands for ransomware are attempted to be met, usually paid in cryptocurrency, such as bitcoin, to avoid any tracing of the crime.

The upsurge in cyberattacks has hit healthcare organizations and insurers hard, mostly when they have failed to upgrade their security software, which tends to be a dynamic required process. Sometimes foreign and otherwise domestic sources can be found to be the culprits, but malware can easily be obtained for hacking (Bennett, 2020). This author states that while anyone can launch one of these attacks, more of them are directed at tech companies than health care which makes one wonder why IT firms don’t have better security and gives one pause to trust them with our security (Cohen, 2020c).

As the Internet privacy landscape hopefully evolves toward greater transparency and some accountability, how will AI impact medical malpractice and its liability. Already EHRs are being seen more easily assisting plaintiff lawyers for filing suits. How to tell patients that AI and cloud-computing are part of their care will impact informed consent; practitioners must address many patient perceptions of
computers and AI and relate to documenting potential medical errors (Knowles, 2019). Additionally, the liability exposure to AI product designers and manufacturers has begun to escalate (Howze, 2018). This is a completely new frontier in medical malpractice liability.

Minimal structures provide roadmaps for Big Data in health care (Adamson, 2015). IoT will be an unprecedented generation of incessant streams of disparate data from diagnostic devices, plus new sensors and wearables, along with attempts at social determinants, all data sent to cloud computing to pass through sophisticated tools to protect it. Not brushing aside the prime concern for security, Medical Economics enthusiastically reported that IT brings the promise of better and cheaper oversight of chronic diseases by both patients and providers (Hurt, 2019, p. 33).

The volume, velocity, and variety in streams coming into Big Data clusters may enable real-time alerting, predictive analytics of “flight paths” of a patient, with genomics coming into play for futuristic assessments. Adamson (2015) expands in detail on where Big Data in health may be headed, though it is very complicated, and generally not easily understood. Enterprise Data Warehouse (EDW) architecture will transition from relational databases to work with unstructured Big Data, including IoT, and watch personal information. And in the end, the large IT firms will be solving the most data analysis problems in health care, so we can hope they will act differently than they have to date.

After the Cambridge Analytica fiasco, there were many calls for users to leave social media outright, and due to the revelations of the inherent manipulation and lack of user consent on personal data, many people did drop out. Twitter, best known as the Trump propaganda arm, as a platform works differently than Facebook. A Twitter user follows an overall network for trends in varying spheres they choose and to communicate with consumers of key influencers on issues of their interest, no friending, just following. Facebook has a more complicated business model, diversified to obtain realms of personal data for microtargeting ads to its users. The number of users on Facebook, plus their staying longer on the site, and growth of users is important, so therefore issues of privacy and censorship may differ.

Surely what Facebook does in the “cloak and dagger realm” of social media is not something the firm wants public. Nevertheless, greater sales revenues depend upon manipulation that measures interests, anticipates desires, and modifies behaviors, all in the purpose of discovering chances for advertisers to sell. Dependency by users is key so that users come back, including promoting key drivers of more engagement: fear of missing out, loathing, anxiety, and outrage. Facebook is extraordinarily rich in the two hundred million monthly users, or about 3/5 of the American population (Gramlich, 2019); these folk do not seem necessarily to feel that Facebook is misusing or abusing their data (Waters, 2018a, 2018b, 2018c, 2018d; LaForgia, Confessore, 2018).

Much press has been given to detail the Cambridge Analytica scandal, but it should be noted that it had quite an impact on the bottom line with the series of mishaps Facebook underwent from 2018 on (Frenkel, 2018; Nicolaou & Edgecliffe-Johnson, 2018). Did Facebook learn its lesson about securing users data? Tech stocks face their ups and downs in the market, but it greatly disturbs Wall Street traders and investors when they do not gain (Phillips, 2018). Losing capitalization after all is not
good for any business, but especially the social media titans. After the Cambridge Analytica newsbreak, the numbers on the Facebook platform flatlined for a while (Confessore, 2018). The total number of users determines ad revenues, plus how much time they hang out digitally, how many ads they see, and the price of the ads.

Facebook has applied for patents to use smartphone cameras and microphones as spy tools to study user behavior and assess personality (Zetlin, 2018). Such surveillance is the mainstay of several Internet technology firms, and they are staking out the healthcare system for greater opportunities, as well as across the globe (Staley, 2018). Isaac (2020) details how Big Tech firms are seizing the moment with their huge cash bundles. This could be particularly ominous since AI capabilities are moving forward at such great speed (Metz & Lohr, 2018).

Foroohar (2020) in “Facebook and the Creation of a U.S. Oligarch” in the Financial Times notes that Twitter and Snapchat notably perform fact checking and now curbing the power of Trump, yet Zuckerberg chose to refuse removal of his inaccurate and inflammatory posts. What should be the proper balance between free speech and disinformation remains a heightened debate in any given democratic society. Foroohar (2020) in “Facebook and the Creation of a U.S. Oligarch” in the Financial Times notes that Twitter and Snapchat notably perform fact checking, yet Facebook chose to not remove any of President Trump’s inaccurate and inflammatory posts. Does Zuckerberg with Facebook start to be defined as an oligarchy in America? Or is he merely engaged in a desperate search to remain relevant in American life and social media as people discover new ways to interact that may make Facebook a relic of the past?

Summary

It is far from certain what the entry and implications of Amazon, Apple, IBM, and other IT firms will mean to the existing playing field in the healthcare sector. As we examine the cooperation of Warren Buffett, Amazon, (Jeff Bezos), and Jaime Dimon (Morgan Stanley Chase)—now to be referred to as “BAD”—for their employees, it is further unclear whether such direct contracting moves may portend a nascent beginning for a new wave of corporate class reorganization of the American healthcare system, as seen when Carnegie and Rockefeller Foundations reorganized medical education in the 1920s (Berliner, 1977; Brown, 1975). (See Chap. 1.)

It should be remembered that technology costs a lot in terms of software and hardware purchases, but many organizations find that implementation costs, often unforeseen, so mistakes pile up along the way. Thus, managements remain more intent on not wanting to lose control as processes move forward. Contracted vendor dynamics often reveal this as such. The health sector has a track record of uncertain outcomes from sales pitches to create efficiencies and make it better.

Medical practices may just be realizing how much change in ownership is on the horizon. Their interface with the new organizational powers will reshape physicians’ lives in the dramatic turbulence. The implications for scrutiny over doctor decision-making are extant (Feinglass & Salmon, 1990).
From the above descriptions, one can witness a succession of unique situations that may lead to a broader grasp of the overall corporate direction for the healthcare sector. A popular perspective may react from the exceptional confusion of individual mergers and acquisitions. As new ventures get underway, confusion and shifting patterns in the medical marketplace, perhaps over the decade, may portend a future of continued disarray. Nevertheless, large swatches of the population’s personal data portend potential for social control over the population, as well as crucial privacy issues over one’s health data, both becoming critical issues over this decade.

The reader may notice that the Trump era is filled with mammoth uncertainties for health industry situations, along with a propensity of intolerance and the rise of blatant social injustice, with government paramilitary occupations threatening our democracy. This condition makes functioning of the traditional health system quite different, as we witness several urban systems collapsing due to the coronavirus outbreak. It also is disillusioning while pressuring for change in human and professional values. There is a greater need for formulating alternatives clearly and for a more precise sense of what needs to be done to resist most aspects of this expanding medical marketplace.

The profiteers display a decadent neglect of the true nature of people’s health and health care, with their substitution of making money being prime. Republican ideological support for all things in the medical marketplace and their opposition to more oversight and governmental regulation over health services will allow the incursion of IT firms into health care becoming more problematic than it needs to be.

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