STRATEGIES FOR BOARDS OF DIRECTORS TO MEET THE CHALLENGES ASSOCIATED WITH AI, GENTRIFICATION, AND EMERGING TECHNOLOGICAL ADVANCES

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Abstract

The major research question or issue in this paper is to develop strategies for companies and Boards of Directors to seize opportunities from emerging technological advances, instead of being threatened by artificial intelligence (AI), gentrification, and other new technologies. For example, in 2019 Microsoft made a $500 million positive response to Seattle's gentrification while Amazon made a negative gentrification response by withdrawing its New York City headquarters offer. Seven steps for digital transformation were advocated herein, using the strategy of "Adapt or Die". Another strategy was to create person/machine partnerships, and six steps were recommended for job retraining in this environment where today will be the slowest day for technology change in this lifetime. An additional strategy was to benchmark the 50 Smartest Companies in the world in order to try to adopt their best business practices. The emergence of AI and robotics replacing jobs can be viewed as a positive trend if companies and Boards of Directors take advantage of these technological breakthroughs to help businesses, employees, and communities become more efficient and effective, especially with a broader stakeholder and sustainability perspective, as opposed to the narrow shareholder perspective. The major sections of this paper are gentrification, positive and negative responses to gentrification, the evolving technology environment for jobs, "adapt or die" strategy with implications for companies and Boards of Directors, related stakeholder and sustainability focus, strategies to avoid "Fear of Missing Out", and summary.

Keywords: Artificial Intelligence (AI), Board of Directors, Corporate Governance, Gentrification, Sustainability

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1. INTRODUCTION

ENIAC, the Electronic Numerical Integrator and Computer, was turned on in 1946 following three years of research. Financed by the U.S. military to calculate artillery firing tables, it was quickly reprogrammed post-World War II to aid in the design of the hydrogen bomb, weather prediction, cosmic-

ray studies, thermal ignition, random-number studies, and wind-tunnel design. Its early ability to do in 30 seconds the same work which would take a human 20 hours may have been the start of artificial intelligence (AI) replacing human jobs. Today a fully robotized factory reduces human jobs by 90%, increases production by 250%, and reduces defects by 80% while doubling profits (Richter, 2017).

Stephen Hawking observed: "The rise of powerful AI will be either the best or the worst thing ever to happen to humanity. We do not know which. It will bring great disruption to our economy and in the future, AI could develop a will of its own that is in conflict with ours" (Devaney, 2016). Mark Cuban, billionaire entrepreneur, said: "Increased automation will cause people to lose their jobs and we need to prepare for it. These companies building new plants will lead to fewer people being employed. People aren't going to have jobs." Bill Gates said: "Robots that take over the work of humans should be taxed. If a human worker does $50,000 of work in a factory, that income is taxed. If a robot comes in to do the same thing, you'd think we'd tax the robot at a similar level." Elon Musk, CEO of Tesla, observed: "The most near-term impact from a technology standpoint is autonomous cars. It's going to be a great convenience but driving as a job may be the single largest employer. So, we need to figure out new roles for these people because it will be very disruptive and very quick" (Bunker, 2017).

Companies and their Boards of Directors which have moved beyond the traditional shareholder, profit maximization focus to a stakeholder, sustainability focus should feel obligated to help their employees whose jobs are being replaced by AI and robots. Such an expanded focus does not treat the elimination of jobs as society's problems where technology is just an externality unless it helps to maximize a company's profits. This expanded focus has been shown to be more beneficial as High Sustainability companies have out-performed Low Sustainability companies in both financial operating performance and stock market performance over almost a twenty-year period from 1992-2010. The researchers used 27 sustainability policies to differentiate High and Low Sustainability companies (Eccles, Ioannis, & Serafeim, 2014).

2011 was the first year that a majority of S&P 500 companies publicly disclosed their sustainability performance per the Governance & Accountability Institute (G&A Institute, 2012). These companies also had higher financial returns than their non-reporting competitors (Stevens, 2012). Since the connection between sustainability performance and financial performance has been clearly shown by academic research, sustainability is becoming more established in mainstream financial analysis and reporting (Pilot, 2017).

The major sections of this paper are gentrification, positive responses to gentrification, negative responses to gentrification, the evolving technology environment for jobs, adapt or die strategy with implications for companies and Boards of Directors, related stakeholder and sustainability focus, strategies to avoid "Fear of Missing Out", and summary.

2. GENTRIFICATION

Gentrification is a process of renovating deteriorated urban neighborhoods by means of the influx of more affluent residents. Gentrification can improve the material quality of a neighborhood while also potentially forcing relocation of current, established residents and businesses, causing them to move from a gentrified area, seeking lower cost housing and stores (Freeman, 2006; Kahn, 2007; Zuk, Bierbaum, Chapple, Gorska, & Loukaitou-Sideris, 2018; Gentrification, 2019). Gentrification can lead to community displacement for lower-income families in gentrifying neighborhoods as property values and rental costs rise. The gentrification process is typically the result of increasing attraction to an area by people with higher incomes spilling over from neighboring cities, towns, or neighborhoods (Freeman, 2005).

Positive effects of gentrification include reduction in crime, increased property values, and rehabilitation of property. Negative effects include displacement through rent/price increases, loss of affordable housing, and homelessness (Lees, Stater, & Wyly, 2008; Ding, Hwang, & Divringi, 2016). In the U.S., these effects were generated by the economic transition from manufacturing to post-industrial service economies. Measurement of the rate of gentrification during the period from 1990 to 2010 in 50 U.S. cities showed an increase in the rate of gentrification from 9% in the decade of the 1990s to 20% in the first decade of the 21st century with 8% of the urban neighborhoods in 50 large cities being affected. Cities with a rate of gentrification of 40% or more in this decade were Portland, Oregon (58.1%), Washington D.C. (51.9%), Minneapolis (50.6%), Seattle (50.1%), Atlanta (46.2%), Virginia Beach (46.2%), Denver (42.1%), and Austin, Texas (39.7%) (Maciag, 2015).

Although just below 40% gentrification, a major driver of gentrification in San Francisco has been attributed to the Dot-Com boom in the 1990s which created a strong demand for skilled tech workers from local startups and nearby Silicon Valley businesses leading to rising standards of living (Schwarzer, 2001). As a result, a large influx of new workers in the internet and technology sector began contributing to the gentrification of historically poor immigrant neighborhoods, such as the Mission District. Accordingly, San Francisco began a transformation, eventually becoming the most expensive city in the United States. For example, San Francisco's average monthly rent is $5,000 versus $3,100 per month in New York City (Avakian, 2015). San Francisco is now building skyscrapers just like New York City. From 2010 to 2014, the number of households making $100,000 annually grew while households making less than $100,000 annually declined. During this same period, an annual average of 60,000 people both migrated into and out of San Francisco. The people leaving the city were more likely to be non-white, have lower education levels, and have lower incomes than those who moved into the city. For example, schoolteachers and firefighters now live two hours away (Factfinder, 2018). According to a survey from apartment search website RENT Café, the common features among the top 20 most gentrified ZIPs are that "they are central, highly coveted mostly

downtown neighborhoods where development options are limited" (Szekely, 2018). Many of the gentrified areas are near museums, theater districts, universities, and elegant restaurants.

3. POSITIVE RESPONSES TO GENTRIFICATION

The traditional emphasis of corporate decision-making has been on the firm's investors. The original stakeholder argument is that stakeholders other than investors and management play an important role in financial policy and they are the contributing inputs to the success of a business. Hence top management also has a commitment to their well-being (Freeman, 1984; Cornell & Shapiro, 1987; Ali & Abdelfettah, 2016). The term stakeholder has drawn increasing attention in the corporate world over time. For example, on August 19, 2019, a group of CEOs of nearly 200 major U.S. corporations issued a statement after a business roundtable led by Jamie Dimon, chairman and CEO of J.P. Morgan Chase, stating that "while each of our individual companies serves its own corporate purpose, we share a fundamental commitment to all of our stakeholders" (Fitzgerald, 2019). Another significant and evolving corporate management paradigm is sustainability, which requires corporations to pursue goals relating to long-term sustainable development, including ethical, social, environmental, cultural and economic dimensions. Kostyuk, Kostyuk, and Shcherbak (2016) review the relevant literature and provide perspectives on various challenges to create and maintain a sustainable organization. They suggest that "effective corporate governance is the only way for company to reach the proper level of corporate sustainability". The new governance mechanisms should be developed to embed sustainability into the system. Freeman, Hörisch, and Schaltegger (2014) examine the links between stakeholder model and sustainability and develops a conceptual framework to reinforce the integration of the two. They argue that stakeholder theory can be purposefully applied in the context of sustainability management and the two "belong together grow together". "Sustainability has to be one of these important values to comprehensively include durability and environmental concerns in stakeholder theory".

Using this focus on creating sustainability-based long-term value for stakeholders, companies, and Boards of Directors can encourage partnerships with local governments, organizations, and universities to respond to gentrification. For example, the largest contribution ever by a private corporation to public housing was a $500 million pledge in 2019 by Microsoft, the largest contribution in the company's 44-year history, to address homelessness and develop affordable housing in the Seattle region, where housing costs have risen faster lately than in any other part of the U.S. Microsoft is trying to help fix a market failure – a job typically done by government. Since 2010, 85% of the 62,000 market-rate units opened in the Seattle region have been luxury units while only 15% (9,000 units) were for middle-income earners. Microsoft President, Brad Smith, said: "We do not want to permanently force the people, who are going to teach our kids in schools, put out the fires in our houses, and keep us alive in hospitals, to spend four hours every day getting to and from work. That is not, in our view, the best outcome for the community" (Coleman & Rosenberg, 2019).

Microsoft's $500 million pledge will be split three ways:
- $250 million will be market-rate loans for construction of affordable housing across the Seattle region for people making up to 60% of the local median income ($48,000 for a two-person household).
- $225 million will be below-market interest rate loans to help developers facing high land and construction costs to build and preserve "workforce housing" on the Eastside area where Microsoft has 50,000 workers and is planning 8,000 more employees in a massive expansion of its headquarters. The developments will be aimed at households making between $62,000 and $124,000 per year.
- $25 million will be donated to nonprofit and governmental services for the Seattle region's low-income and homeless residents.

Thus, Microsoft plans to make a total $475 million capital investment in affordable, workforce housing loans over the next three years. As these loans are repaid, Microsoft will lend the capital to other developments as well, in theory leveraging the money to create what it estimates could be tens of thousands of housing units, or far more than would be possible if the company simply spent the money directly building apartments itself (Badger, 2019).

For another cooperative example, the region around Knoxville, Tennessee wove an adaptive coalition with the skills of the University of Tennessee in Knoxville, Oak Ridge National Laboratory, and Pellissippi State and Roane State Community Colleges to help develop workforce skills and available infrastructure that can be utilized by technology and other companies. It stimulated a dialogue between employers and higher-learning institutions to ensure they're meeting labor force needs of the future (Friedman, 2017a). To upgrade the skills of American workers and improve their prospects for rewarding careers, the Center for American Progress is advocating a scaling up of apprenticeship programs, especially in combination with community college and other post-secondary education programs. Apprenticeship programs train individuals to achieve the skills of a fully skilled worker through supervised, work-based learning and related academic instruction (Lerman, 2009).

Concerning a different employee skillset perspective, the county around Louisville, Kentucky has 30,000 unfilled job openings in its regional area. A county executive summarized the problem: "The two biggest issues we are dealing with are soft skills and drug test passage. I thought the problem was that people needed more STEM (Science, Technology, Engineering, and Math) skills. But that is not the case. It's not that hard to train someone, even with just a high school or community college degree, to operate an advanced machine tool or a basic computer. Factory managers say they will train them and put them to work tomorrow in good jobs requiring hard skills. The problem they have is finding people with the right soft skills. Employers just want someone who will get up, dress up, show up, shut up, and never give up" (Friedman, 2017a).

Companies and Boards of Directors can help noncoastal towns and rural communities whose people do not want to move to the Big Tech hubs. Although the most advanced software innovation may take place in big cities with research communities, there is a lot of lower-order work concerning the application of software to business processes and the administration and maintenance of software systems that can be done remotely. Instead of shipping an estimated 200,000 of such jobs offshore to countries like India, Malaysia, and Brazil, companies should realize that Americans have an advantage in doing such jobs because of a cultural understanding of what businesses need and more convenient time zones. Companies could provide additional funds to existing community colleges and land-grant universities in noncoastal and rural communities to create tech institutes which could equip students with practical degrees and credentials that lead to such lower-order tech jobs which can sustain middle-class life without Big Tech's large stock options and rock star salaries (Khanna, 2018).

Companies and Boards of Directors also need to encourage employees to become lifelong learners. Tom Friedman, author and commentator, said: "The notion that you can go to college for four years and then spend that knowledge for the next 30 years is over. If you want to be a lifelong employee anywhere today, you have to be a lifelong learner. That means more is now on you. And that means self-motivation to learn and keep learning becomes the most important life skill." Similarly, an education-to-work expert commented: "Stop asking a young person WHAT you want to be when you grow up. It freezes their identity into a job that may not be there. Ask them HOW you want to be when you grow up. Having an agile learning mind-set will be the new skill set of the 21st century" (Friedman, 2017b).

4. NEGATIVE RESPONSES TO GENTRIFICATION

Many communities have a deepening suspicion that the costs of urban prosperity outweigh the benefits. The Big Tech jobs and the high wages aren't worth having if they come with worsening congestion, more crowded development, or soaring housing costs. Such communities include Long Island, New York and Arlington, Virginia where Amazon had announced the location of two new east coast headquarters, New York City where Google (Alphabet) recently expanded its offices, Austin where Apple recently announced the location of a new business center, and Toronto where Google made a deal to reimagine a large chunk of the waterfront area (Streitfeld, 2019).

San Francisco has come to stand for the most specific set of horrors about gentrification. It is the place where extreme poverty, homelessness, and tech wealth may occupy the same block, and the middle class is disappearing. Once you let tech giants in the door, you have a homeless crisis. Once you allow more density, you're surrounded by skyscrapers. Once housing costs begin to rise, the logical conclusion is San Francisco. Manhattan and San Francisco represent different routes to the same end of creating urban playgrounds for the rich where the construction of luxury condos (starting at $1 million in New York City) are seemingly affordable only to oligarchs and venture capitalists, i.e. urban dystopia

fueled by Big Tech companies and technology advances (Badger, 2018).

The most recent negative response to gentrification was Amazon pulling out of the New York City headquarters location on February 14, 2019 to focus on its other east coast headquarters location in Arlington, Virginia (Swisher, 2019). On February 11, 2019, the major of New York City, Bill de Blasio, had counseled a senior Amazon executive about how Amazon could win over some of its critics opposed to gentrification, with specific strategies. Meet with organized labor. Start hiring public housing residents. Invest in infrastructure and other community needs, such as fixing the neglected subway system. Show you care about fairness and creating opportunities for the working people of New York City. Then, just two hours after meeting with residents and community leaders to move the project forward, Amazon abruptly cancelled it all. Amazon seemed unwilling to bend or even talk in earnest with the community about ways to shape their project. They appeared to not want to be in a city where they had to engage critics at all. On the same day of this announcement, it was reported that Amazon would pay no federal income tax on its 2018 net income of $10 billion (de Blasio, 2019).

$3 billion in New York City and state tax breaks for Amazon were negotiated in secret meetings by governor and mayor officials along with the promise of 25,000 new jobs. Consequently, these negotiators were not better prepared for their constituents' major concerns, primarily the cost of living, gentrification, and better public transportation versus just job creation alone (Editorial Board, 2019). Conversely, Virginia offered Amazon only about half ($1.5 billion) of the New York benefits and none were immediately or directly paid to Amazon. Virginia offered $550 million in job-creation grants to be paid only after Amazon delivered its promised 25,000 jobs with additional subsidies paid if up to 37,850 jobs were created Virginia also included $1 billion in additional taxpayer funds which will go to Virginia schools, universities, and local agencies to invest in the local work force. The Virginia governor office, key state legislators, and city and county council officials all worked together publicly to address concerns from their constituency (Liu, 2019). In this example, Amazon invited cities and states to offer a package of cash, tax breaks, and other incentives to get Amazon to choose their locality for the site of one of its two new headquarters. The invitation created a competition among 20 different localities, with each submitting an incentive package bid to Amazon.

For years, many companies have been creating this type of competition by pitting local and state governments against each other to get the best package from the governments and their taxpayers. If governments do not offer cash or tax breaks, companies threaten to go elsewhere. In addition to Amazon's nationwide bidding contest, major companies, like Boeing, Nike, Intel, Ford, General Motors, Foxconn, and Royal Dutch Shell, have all used such strategies. States are responding to such bidding wars by planning "crease-fire" agreements to keep companies from playing off states and local governments from each other. Missouri and Kansas have planned such an agreement. Arizona, Illinois, New York, and several other states have discussed a

multistate compact, known as the End Corporate Welfare Act (Leonhardt, 2019).

These bidding wars are not realistic for many localities. For example, Amazon's initial decision to locate its two new headquarters in the east coast was in large part to benefit from the existing skilled workforce, adequate infrastructure, viable transportation options, potential synergies with other companies to enhance production supply chains, and access to professional services. It was silly for many localities to believe they had realistic chances to attract Amazon. No amount of subsidies could have enticed a major company to a place that wasn't economically vibrant or that was in the middle of nowhere. Thus, it was a waste of taxpayers' money in such localities to incur expenses for producing such bids (de Rugy, 2019).

5. THE EVOLVING TECHNOLOGY ENVIRONMENT FOR JOBS

It is technology, not China or Mexico, which is taking U.S. jobs. 80% of the jobs that have been lost in American manufacturing have been lost due to technology. However, technology benefits have enabled American workers to become more productive. The 12 million American manufacturing jobs in 2016 produce the same amount of goods that 21 million American manufacturing jobs produced in 2000. That trend is not going to change as technology continues to increase the productivity of global manufacturing. For example, Foxconn in China is creating robotic production lines. Also, with evolving technology, the future will see the U.S. losing even more service jobs than manufacturing jobs (Mauldin, 2017b).

A McKinsey & Company Global Institute report predicted that within the next 10 years, nearly 60 percent of jobs could have a third of their tasks automated by artificial intelligence (McKinsey & Company, 2017). A technology job analysis by PricewaterhouseCoopers predicted that by the early 2030s, 38% of U.S. jobs could be at high risk of being performed by automation. Global numbers were lower: 35% in Germany, 30% in the U.K., and 21% in Japan. These numbers were based on anticipated advances in AI and robotic technologies. This study concluded that more U.S. jobs are vulnerable, not because of certain sectors, but because of gaps in education (Newsmax, 2017). Similarly, Jamie Dimon, the CEO of J.P. Morgan Chase, stated that there were three really bad facts limiting U.S. economic growth: 1) 70% of young men are ineligible for military service due to poor education (they can't read or write) or poor health (mostly obesity and diabetes), 2) half the kids in inner city schools don't graduate, and 3) the labor force participation rate among American men has fallen from 96% to 88% over the last generation (Cox, 2017).

Cognitive computing is also a threat to human jobs. It is a subset of AI that uses multiple AI technologies to produce thinking similar to humans. For example, medical journals publish 700,000 new articles each year. Only cognitive computing, like IBM's Watson, can combine the text from these articles with existing medical knowledge and patient history, genome sequencing, and available drug treatments to develop medical solutions for specific patients in minutes as compared to weeks or months of human endeavors. Already in use today, cognitive computing is being used by a banking company to predict overdrafts a week in advance with 94% accuracy and four weeks in advance with 87% accuracy. It is also being used by an insurance company to predict non-renewals and cancellations in advance with 78% accuracy (Koch, 2017). U.S. finance and insurance workers are facing higher possibilities of automated jobs because they work more in the domestic retail market versus global workers, like London employees, who require further education because they work more in international markets.

Oxford University researchers have estimated that 47% of U.S. jobs could be automated within the next two decades (Frey & Osborne, 2017). Industries that are at high risk include hospitality, food service, transportation, storage, and long-range truck driving which will likely become the first form of driving to become fully automated (Newsmax, 2017). For example, Uber is installing AI in 16-wheeler trucks which could eventually replace most or all of 1.7 million U.S. truck drivers. Those jobless truckers will be joined by millions of telemarketers, insurance underwriters, tax preparers, and library technicians – all jobs these Oxford researchers have predicted as having a 99% chance of vanishing in a decade or two (Mauldin, 2017a).

Researchers at the Organization for Economic Cooperation and Development (OECD) study the international data during the period of 1999-2012 and assess the automatability of each task within a given job (Nedelkoska & Quintini, 2018). They find that 14% of jobs across 32 countries are highly automatable, defined as having at least a 70% chance of automation. A further 32% were slightly less vulnerable, with a probability between 50% and 70%. At the current employment rates, that would put 210 m jobs at risk across the 32 countries. Moreover, they discover large variation across countries. In general, workers in rich countries appear less at risk than those in middle-income ones, i.e. jobs in Slovakia are twice as vulnerable as those in Norway.

A business technology consultant, Shelly Palmer, asked: which white-collar jobs will robots take first? He really meant robots as technology, such as machine learning algorithms running on purpose-built computer platforms, which have been trained to perform tasks that currently require humans to perform. He predicted that the following five jobs would be taken first by robots (Palmer, 2017b):

• *Middle management.* If your main job function is number crunching, i.e. taking a number from one box in Excel, putting it in another box in Excel and writing a narrative about how the number got from place to place, the robots are knocking at your door and you will be replaced first.

• *Commodity salespeople (ad sales, supplies, etc.).* Machines can take so much cost out of any sales process (request for proposal, quotation, order, and fulfillment system). It is the fiduciary responsibility of your CEO and the Board to hire robots unless you can perform valuable add-ons.

• *Report writers, journalists, authors, and announcers.* Machines can be taught to read data, pattern-match images or video, or analyze almost any kind of research materials and create a very

readable writing. Also, text-to-speech systems are evolving very quickly and sound very realistic.

• *Accountants and auditors.* Machine learning-based accountants and bookkeepers will be so much better than their human counterparts. This Robo-accounting is in its infancy but it's awesome at dealing with accounts payable, accounts receivable, inventory control, auditing, and other accounting functions that humans used to be needed to do. Big Four auditing is in for a big shake-up, very soon.

• *Doctors.* Robots make amazing doctors, diagnosticians, and surgeons. IBM's Watson is teaming up with a dozen U.S. hospitals to offer advice on the best treatments for a range of cancers, as well as helping to spot early-stage skin cancers. Ultra-precise Robo-surgeons are currently used for everything from knee replacement surgery to vision correction.

Summarizing job prospects for workers earning from less than $20 to $40 per hour versus robots, an Obama presidential report included a very serious prediction: "There is an 83% chance that workers who earn $20 an hour or less could have their jobs replaced by robots in the next five years. Those in the $40 an hour pay range face a 31% chance of having their jobs taken over by the machines" (Palmer, 2017b). The international evidence in Nedelkoska and Quintini (2018) also suggests that "low qualified workers are likely to bear the brunt of the adjustment costs as the automatability of their jobs is higher compared to highly qualified workers".

As predicted by Palmer (2017b), accountants and auditors will be the fourth fastest type of job to be replaced by robots. Deloitte now has its own "baby IBM Watson", called Argus, which uses natural language processing and machine learning to read and analyze any kind of electronic document and summarize items of interest to an auditor, such as modifications to a standard form of a contract or inconsistencies in specific types of transactions. Since Argus completes document reviews in a fraction of the time, auditors can review and assess larger samples or even 100% of a population. Deloitte's auditors have already used Argus to review the following document types: sales, leasing, and derivative contracts, employment agreements, invoices, client meeting minutes, legal letters, and financial statements (Raphael, 2017). Fewer external auditors will be needed, due to the efficiency and effectiveness of AI and robotics applications, such as Argus. Concerning other professionals, IBM's Watson has already reduced the need for new law school graduates by doing legal research much quicker with 90% accuracy, compared to human lawyers who are slower with only 70% accuracy.

An interesting related issue was addressed by a 2016 survey considering the timing issue: When Will AI Exceed Human Performance? 352 AI researchers responded. The Oxford and Yale University research team hoped that these responses would explain when specific AI developments will happen and what the social impacts of advanced AI might be. This AI study used a measure for machine intelligence called high-level-machine intelligence (HLMI) which was initially investigated by a British mathematician, Alan Turing, more than 70 years ago. This 2016 questionnaire asked when machines will reach the goal of HLMI: when unaided machines can accomplish every task better and more cheaply than human workers. The aggregate forecast from these 352 experts in machine learning gave a 50% chance of HLMI occurring within the next 45 years and a 10% chance of it occurring within nine years. There were also predictions of median estimates and milestones for AI achieving human performance in various functions and tasks, such as the following predictions (Castelluccio, 2017b):

• math research – 43 years: routinely and autonomously prove mathematical theorems that are publishable in top mathematics journals;

• 5 km race in city (bipedal robot vs. human) – 11.8 years: beat the fastest human runners in a 5 km race through city streets;

• programing code for simple algorithms – 8 years: write concise, efficient, human-readable programming code to implement simple algorithms, like sorting a list;

• translate – 8 years: perform translation about as good as a human who is fluent in both languages but unskilled in translation, for most text types and popular languages;

• telephone banking operator – 8 years: provide phone/banking services as well as human operators, including replacing bank cards and clarifying bank website usage;

• transcribe speech – 7.8 years: transcribe human speech with a variety of accents in a noisy environment as well as a human can;

• fold laundry – 5.6 years: fold laundry as well as and as fast as a human clothing store employee;

• other functions (performed as well as humans): surgeon – 37 years; retail salesperson – 15 years; truck driver – 12 years.

6. ADAPT OR DIE: IMPLICATIONS FOR COMPANIES AND BOARDS OF DIRECTORS

A technology business consultant observed: "Understand that today you and (companies) are experiencing the slowest rate of technological change you will ever experience for the rest of your life. You really don't have time to wait. Digital transformation will not get cheaper to do and it will not get faster to do. It is also true for your company's competitors and startups. It is not the strongest or the most intelligent that survives. It is the one that is most adaptable to change. In other words, adapt or die" (Palmer, 2017c). He recommended seven steps for digital transformation, relevant for companies, Boards of Directors, and individuals:

• *Awareness*: digital transformation requires both self-awareness and organizational awareness. Concerning self-awareness, did you love or hate math and statistics? Are you a technophobe or a technocrat? Are you excited about learning every day or are you dreading it? Concerning organizational awareness, is it possible to digitally transform your group or ultimately your entire organization? There are several obstacles to digital transformation and the biggest are people-centric, such as a superior who doesn't believe in digital or individuals with an entrenched anti-digital belief system or a bias against change.

• *Literacy (not fluency)*: you need to be digitally literate, including data literacy, coding literacy, machine-learning literacy, math literacy, and

questioning/answering (Q/A) literacy. You need not be fluent, say as an expert in coding, but literate to the point that you recognize when a highly-skilled professional is needed.

• *Strategy*: successful digital transformation starts with a solid, well-thought-out strategy which clearly identifies your business objectives. Whether it is cost-cutting or media optimization or product design or customer service, have a strategy that identifies a 21st century problem and proposes a 21st century solution.

• *Governance*: misalignment of incentives and outcomes is the number one killer of dreams. There is no way that any of your employees are going to give you an extra minute of their time at the expense of delivering outcomes they are incentivized (fiscally governed) to deliver. To affect digital transformation, you must fiscally govern for it.

• *Culture*: you must create a culture of innovation where continuous improvement and adaptation to change are constant. While it is difficult to transform an existing culture, you are going to have to do whatever it takes. Possibly benchmark MIT's annual list of the 50 smartest companies in the world (Rotman, 2017).

• *Test, fail, learn*: failure is not an option; it is a probability. Part of a successful culture of innovation is an iterative process for testing, failing, learning, reworking, and repeating the process. Leadership must outplay management.

• *Build a yellow brick road*: digital transformation requires all kinds of partnerships. It will be based on an extensible platform strategy, and it will empower partners to add value in myriad ways you would have never thought of or never had the time or resources to create. To facilitate part of your digital transformation, build a Yellow Brick Road that leads directly to your door. For example, the Yellow Brick Road for higher education may lead to Harvard or the Yellow Brick Road for technology may lead to Silicon Valley. Again, possibly benchmark MIT's 50 smartest companies in the world.

These seven steps for digital transformation are one strategy for dealing with a popular law of technology: "Technology is neither good nor bad; nor is it neutral" (Castelluccio, 2017b). A technology business consultant has observed that adapting to these technological changes is going to direct how man-machine partnerships are going to evolve. For example, machine learning is going to be used to automate many, if not most, low-level cognitive tasks. An individual's (and company) goal is to use your high-level cognitive ability to anticipate what parts of your work will be fully automated and what parts of your work will be so hard for machines to do that man-machine partnership is the most practical approach. Companies and individuals can work on adapting your skills to become better than your peers at leveraging man-machine partnership. We've always been tool-users; now we will become tool partners (Palmer, 2017c).

A 2019 study by Korn Ferry Institute reveals the world-wide shortage of leadership skills to meet the challenges of tomorrow and ensure the organization's survival into the future. 67% of global investors believe the current leadership stock is not fit for the future. Their research derives and defines the five-key future-oriented leadership qualities –

the ADAPT dimensions, which encompass the ability to anticipate, drive, accelerate, partner and trust.

• *Anticipate*: demonstrate contextual intelligence to make quick judgments and create opportunities; focus on the societal needs that the organization wants to serve; provide a direction to unify collective efforts even among disoriented environments.

• *Drive*: energize people by fostering a sense of purpose; manage the mental and physical energy of themselves and others; nurture a positive environment to keep people hopeful, and optimistic, and intrinsically motivated.

• *Accelerate*: manage the flow of knowledge to produce constant innovation and the desired business outcomes; use agile processes, quick prototyping, and iterative approaches to rapidly implement and commercialize ideas.

• *Partner*: connect and form partnerships across increasingly permeable functional and organizational boundaries; enable the exchange of ideas; combine complementary capabilities to enable high performance.

• *Trust*: form a new relationship between the organization and the individual that centers on mutual growth; integrate diverse perspectives and values; help individuals to uncover their sense of purpose and facilitate them in providing their maximum contribution.

"The ideal future leader embodies all five ADAPT dimensions at a very high level. They combine future-focused strengths (allowing them to derive with purpose and anticipate changing realities); the core "traditional" strengths (enabling them to accelerate their strategy); and collaborative skills (being able to partner with others to build strong symbiotic relationships, and building trust by bringing people together and helping them contribute to what gives them a sense of purpose)" (Korn Ferry Institute, 2019).

7. STAKEHOLDER AND SUSTAINABILITY FOCUS FOR COMPANIES AND BOARDS OF DIRECTORS

Companies and Boards of Directors which have moved from a narrow shareholder focus to a broader stakeholder and sustainability focus should feel an obligation to help their employees whose jobs are being replaced by AI and robots. Such an expanded focus does not treat the elimination of jobs as only society's problems since these companies are focusing beyond just maximizing their profits for shareholders. Erik Brynjolfsson, an MIT economist, commented that automation won't necessary be so bad since it can eventually create new jobs. He observed: "Average wages have been increasing for the past 200 years. The machines were creating wealth". Companies and their Boards of Directors can help by retraining and outplacing as they realize that the automation transition is rocky. In the short run, automation can destroy jobs more rapidly than it creates them. Similarly, Brynjolfsson argued that politicians should be adopting policies that ease the transition: "There's a long list of ways we've tinkered with the economy to try and ensure shared prosperity, such as public education, progressive taxation, and antitrust law" (Mauldin, 2017a).

One optimistic technology expert provided some guidance for companies and Boards of Directors by observing that technology can be for the good of everyone: "Technology would not just be pruning away the jobs that are too mundane for humans to do but it would also create new opportunities to replace the ones that were lost. Crucially, the jobs will be pruned regardless but it is up to us to create the opportunities" (Marr, 2017). A partner at PwC Analytics commented: "The role of humans will be to push AI further; to create more useful programs, to develop more unique ways for machines to think, and to tackle new problems. Such partnerships should lead to a better intellectual and emotional world. Man and machine together is better than either one on their own" (Rao, 2017).

Another technology expert observed that AI is only as effective as the people who fine-tune and implement it, increasing the need for a robust skilled technology workforce. An excellent example is the development of IBM's Watson which underscored the importance of a human touch in a machine/person partnership. He said: "AI and robotics will present great opportunities for those who pursue the skills and training needed to keep pace with a technology-driven economy. Much like the industrial age automated many of the routine tasks in manufacturing, AI can be a huge productivity multiplier in the information age – provided we develop the caliber of workforce capable of taking advantage" (Clyde, 2017).

Companies and Boards of Directors can also refer employees to professional organizations which are helping to work with these emerging trends of AI and robotics replacing and/or enhancing jobs. For example, the American Institute of Certified Accountants (AICPA) has recognized these current AI trends of Robo-accounting doing traditional repetitive and mundane tasks which reduces the need for accountants and auditors. The AICPA's Assurance Services Executive Committee has established projects to create guides for five emerging services which will transform the accounting profession in order for accountants and auditors to add value beyond their AI replaceable, traditional tasks (Pawlick, 2017):

– assuring sustainability information;
– performing innovative data analytical procedures;
– advising on cybersecurity readiness;
– providing attestation on cybersecurity;
– reporting on supply chain controls.

More guidance for companies and Boards of Directors in developing workforces comes again from business technology consultant Shelly Palmer. He observed that "Fear of Missing Out" (FOMO) is motivating tech-savvy CEOs to get serious about data analytics and to deploy machine learning across their enterprises as quickly as possible. No CEO wants to learn that her/his goods and services are losing market share because competitive offerings built by both human and robot workers are much cheaper. Soon machine learning systems will become the competitive norm. He recommended that companies and their employees harness the power of machine learning, robotics, automation, AI, cognitive computing, and data science tools by partnering with them. He said: "To survive and prosper as robots take over the business world, you will need to become the best person/machine partner of your peers" and recommended the following six steps which can be used by companies and Boards of Directors in encouraging employees to retrain themselves:

• step one – invent the future: consider your job. Think about all the ways it may be done in the future. Anything is possible. Imagine AI is smarter than you. Write down areas that will be automated first;

• step two – start reading: read everything you can about data, data science, machine learning, AI, and automation. Everything you need to know is available online. Find every company that is working on automating cognitive tasks associated with your business. Look for partners, vendors, consultants, well-read bloggers, anyone who can help you understand what you need to do;

• step three – be "that person": this is the hardest step. Dig deep. Become "that person" in your department who "knows this stuff". Figure out where to use data for better decision-making and what tools to use to automate certain tasks and become expert in them;

• step four – propose a test project: build a short, uncomplicated presentation to articulate what you will try to accomplish and what benchmarks you will use to measure success;

• step five – show your results: build another presentation that describes the problem you identified and solved with data science, data scientific research, machine learning, or the automated systems you built and used;

• step six – revel in your success and repeat: embrace it, own it, love it. It's your pathway to gainful employment for the next decade or so.

In summary, create a competitive advantage by becoming the best possible person/machine partner. If you let the machines do what they do best, combine that with what you do best, and most importantly, demonstrate the value of you and your machine skills, you will not only survive the attack of the machines, you will be stronger for it (Palmer, 2017a).

8. STRATEGIES TO AVOID "FEAR OF MISSING OUT"

Another strategy to avoid this "Fear of Missing Out" (FOMO), concerning emerging technology trends, is for companies, Boards of Directors, and employees to benchmark best practices of the 50 Smartest Companies. This annual report was created in 2010 through 2017 by the editors of MIT Technology Review but was discontinued in 2018. It highlighted both private and public companies that have displayed an especially impressive combination of technological leadership and business acumen. It was not based upon quantitative measures, such as market capitalization, patents, or R&D spending. There was no formal entry process or submission form required. The MIT editors reviewed companies throughout the year and chose the final list each May. They tried to identify what some economists have called "superstar companies" which have gained power at least in part by adeptly anticipating and using digital technologies that foster conditions where a few winners essentially take all (Rotman, 2017).

These smartest companies are deemed to be the most technologically innovative with effective business plans. They are deemed to have the inside track on the technologies, such as artificial intelligence and robotics, which will define the economy in the coming years. They are deemed to have the best chance at building great businesses around them. Companies, Boards of Directors, and employees could study and assess their companies and job prospects in comparison to the key characteristics of these 50 Smartest Companies. For the most recent 2017 list, the U.S. led with 62%, or 31 companies, China and Taiwan had 18%, or 9 companies, Europe had 12%, or 6 companies with the other 8%, or 4 companies from Argentina, Nigeria, Kenya, and India. The industry breakdown was 30% intelligent machines, 22% biomedicine, 20% connectivity, 10% advanced manufacturing, 6% clean energy, 6% finance, and 6% transportation (Castelluccio, 2017a).

The best-known U.S. companies of these 50 Smartest Companies were mainly Big Tech companies with impressive rankings which would still be relevant today: Amazon (#3), Alphabet (#5), Intel (#13), Apple (#16), Merck (#17), Facebook (#23), Microsoft (#27), Tesla (#31), IBM (#39), and General Electric (#41). These ten U.S. "superstar companies" were accordingly acknowledged by Wall Street investors as their rankings had moderate correlations with stock price and market capitalization of 66% and 52%, respectively.

Companies, Boards of Directors and individuals could benchmark these 50 Smartest Companies in order to try to adopt their following best practices and characteristics:

• adeptly anticipating and using digital technologies that foster conditions where a few winners essentially take all;

• having business models which allow innovation and exploitation of technological advances;

• having an inside track to take advantage of emerging technologies, such as artificial intelligence and robotics, that will define business in the coming years;

• being smart about innovation is not a superstar guarantee but gives potential to create and dominate new markets in an increasingly competitive business environment;

• digital giants have cleverly leveraged the Internet, the network effects, and big data to become hugely profitable while providing indispensable services, like free Web search and easy online shopping and devices that have changed peoples' lives;

• superstar companies are defined as the four largest firms in a given industry and their dominance is particularly strong in markets undergoing rapid technological change. If you are not one of these four smartest companies, you might as well not bother;

• superstar companies are making the best use of the Internet, software, and other technologies to streamline their operations and create new market opportunities;

• the advent of complex technologies, such as artificial intelligence and robotics, will be critical to future business success and are tricky to understand and master. However, such technologies may provide ample innovative opportunities to create markets that do not even exist today;

• thus, these 50 Smartest Companies are predicted to be dominant companies in the future business world.

9. CONCLUSION

The major research question or issue in this paper is to develop strategies for companies and Boards of Directors to seize opportunities from emerging technological advances, instead of being threatened by AI, gentrification, and other new technologies. Examples of both positive and negative gentrification responses by major companies were analyzed. Seven steps for digital transformation were advocated in this paper, using the strategy of "Adapt or Die". Another strategy was to create person/machine partnerships and six steps were recommended for retraining in this environment where today will be the slowest day for technology change in your lifetime. An additional strategy was to benchmark the 50 Smartest Companies in the world in order to try to adopt their best business practices. Corporate executives and Boards of Directors need to be considering technology's impact on society, like gentrification, in an evolving, intrinsic value focus, rather than just the narrow profitability impact on their own companies (Grove & Lockhart, 2019).

In summary, the emergence of AI and robotics replacing jobs can be viewed as a positive trend if companies and Boards of Directors take advantage of these technological breakthroughs to help businesses and employees become more efficient and effective, especially with the broader stakeholder and sustainability perspective, as opposed to the narrow shareholder perspective. First, since AI is freeing up the audit time, Boards of Directors can encourage their own Audit Committees to push their external auditors to expand the focus of their work to become more relevant to stakeholders, especially employees and investors. In addition, external auditors need to be pushed to go beyond their GAAP status quo, vested interest perspective where they cannot be sued for what was not measured and reported of the 85% today in specific intangible assets, 25% are in patents, trademarks, and goodwill while the remaining 60% are in other intangible assets of knowledge work activities for company employees (Heitman, 2017). Thus, current financial accounting or Generally Accepted Accounting Principles (GAAP) only looks at 40% of a company's market value (25% in those specific intangible assets plus 15% intangible assets).

Second, concerning employees, there are three types: engaged, disengaged, and actively disengaged. Gallup estimates that only about one-third of all employees are engaged. For millennials, that estimate is even lower. Thus, at any organization, approximately 67% of employees are either about to walk out the door or worse, stay and create such toxic environments that good employees leave (Brown, 2017). Hopefully, companies and Boards of Directors can use the opportunities created by AI and robots to change such an environment. Concerning such changes, Jack Ma, Alibaba founder, has outlined two ways that automation will benefit

the lives of American workers who can keep their jobs: 1) less time spent working and 2) more time for travel. He commented: "I think the good thing is that technology is going to improve people's lives" (Ward, 2017), especially if gentrification issues are addressed.

Third, the technology experts and researchers emphasize the importance of effective collaboration between humans and machines. Companies must understand how employees can most effectively augment robotics, how AI can enhance what humans do best, and how to redesign business processes to support the partnership. Our work summarizes the strategies and guidelines developed in the field to help companies achieve the synergy and put the power of collaborative intelligence to work.

The main limitation of this study is how fast technology is changing, especially concerning the key topics of evolving technology environment for jobs and the "adapt or die" strategy. There are implications for companies and Boards of Directors concerning stakeholder and sustainability focuses and strategies to avoid "Fear of Missing Out". Recommended future research includes field studies of companies dealing with such technology challenges, especially concerning organizational, corporate governance, and gentrification impacts.

For example, Microsoft's $500 million gentrification efforts in 2019 are being responsive to the 2018 and 2019 annual letters to all public company CEOs from Larry Fink, the CEO of BlackRock which manages over $6 trillion of investments. In the 2018 letter, he declared that companies needed to do more than make profits by making a positive contribution to society. Coming from the world's largest investor, the letter was seen at an inflection point in the ongoing argument over the state of global capitalism as CEOs began explicitly talking about the companies' purpose. In the 2019 letter, he wrote that businesses cannot merely have a purpose, but they must become leaders in a divided world as stakeholders are pushing companies to wade into sensitive social and political issues, especially as they see governments failing to do so effectively, i.e. Microsoft's $500 million pledge for affordable housing. Fink explained that BlackRock seeks to understand how a company's purpose informs its strategy and culture to underpin sustainable financial performance. From such letters, Larry Fink has now been called "the new conscience of Wall Street" (Sorkin, 2019).

Another frontier of future research is the ethics of AI and implications for corporate leaders. In June 2019, Blackstone Cofounder Steve Schwarzman donated 150 million pounds ($188.6 million) to Oxford University to fund a center for humanities which would also house a new institute to study the ethics of AI and computing technologies. "AI is going to be the fourth revolution and it is going to impact jobs, excellence, efficiency", Schwarzman told the BBC. "It is a force for amazing good and also a potential force for not good". It is important to study the impact of AI, which could "challenge the very nature of what it means to be human and transform most aspects of our lives" (Associated Press, 2019).

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