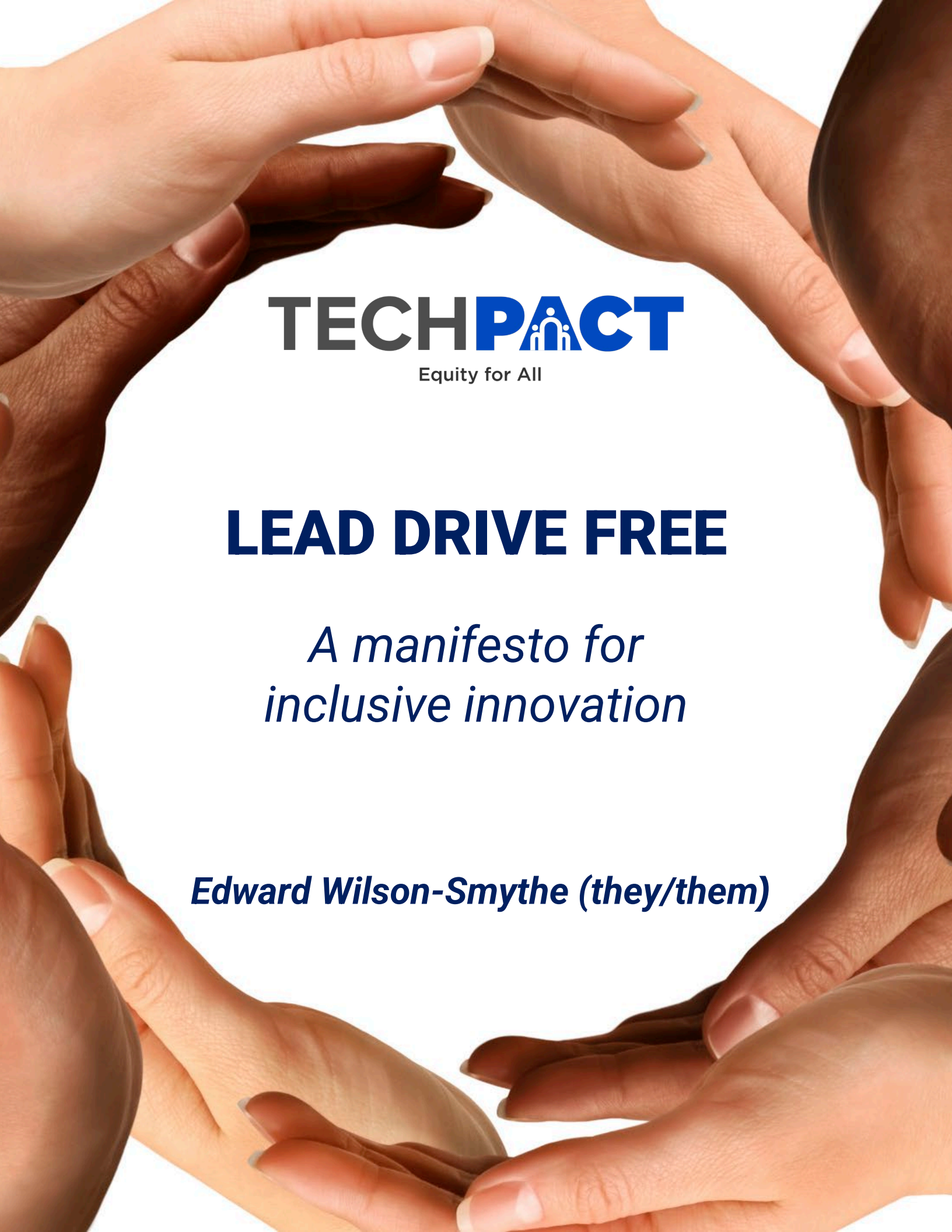


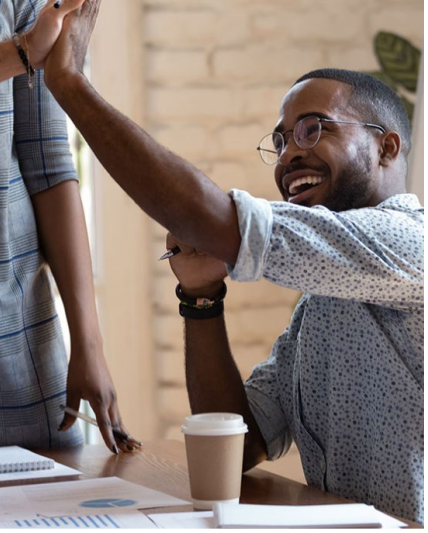
TECHPACT

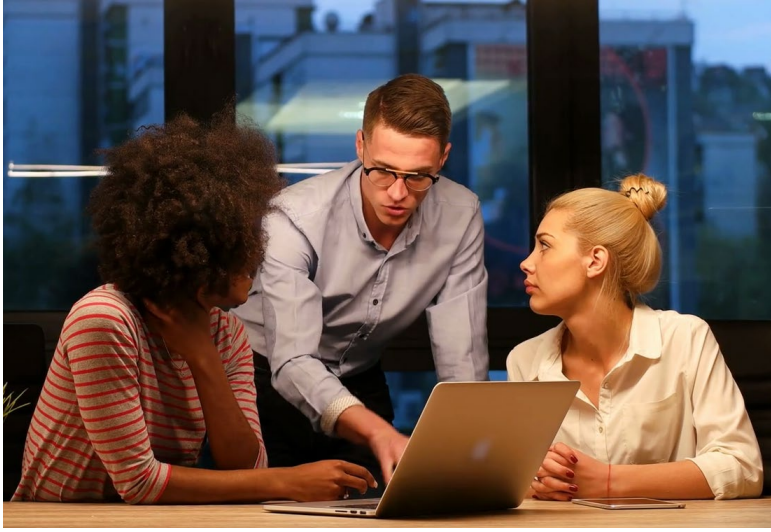
Equity for All

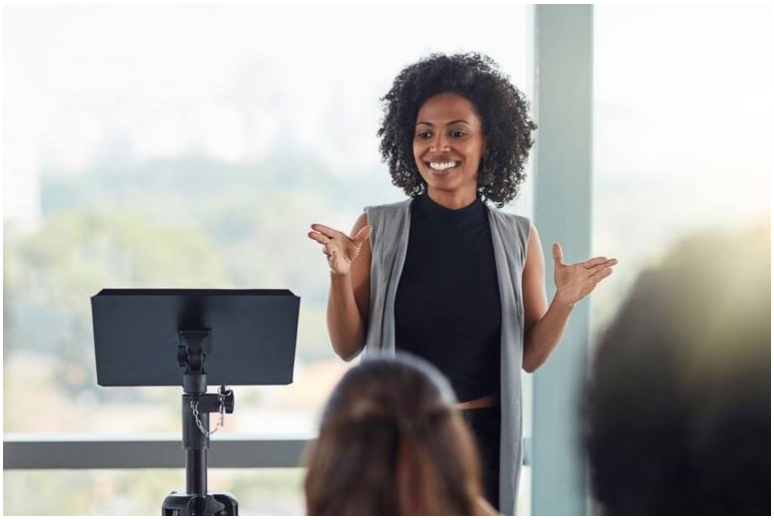
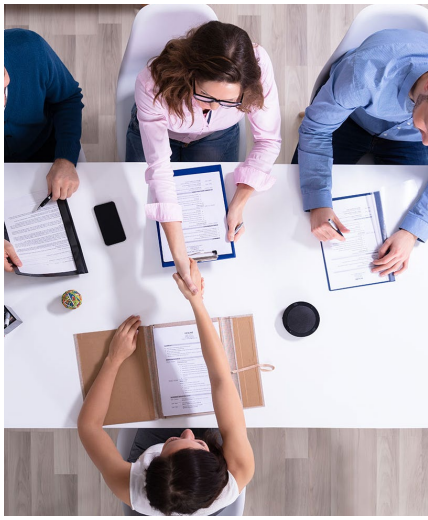
LEAD DRIVE FREE

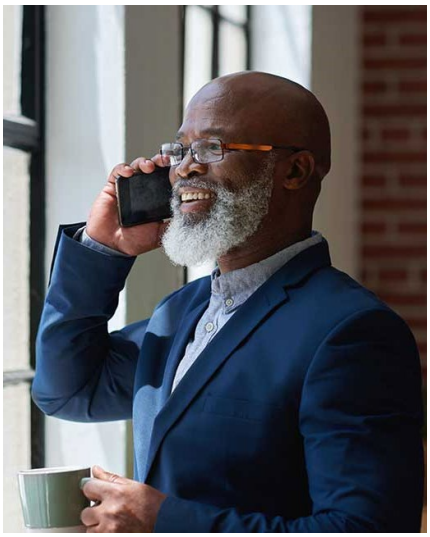
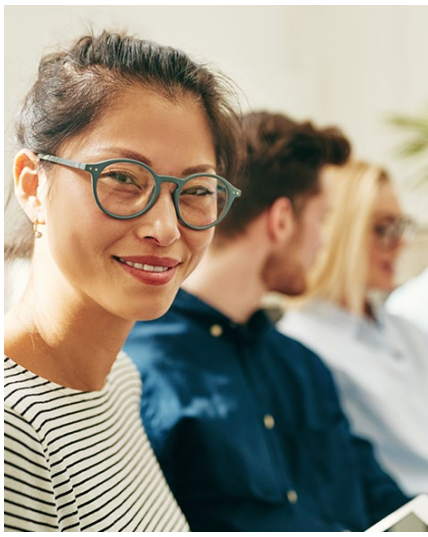
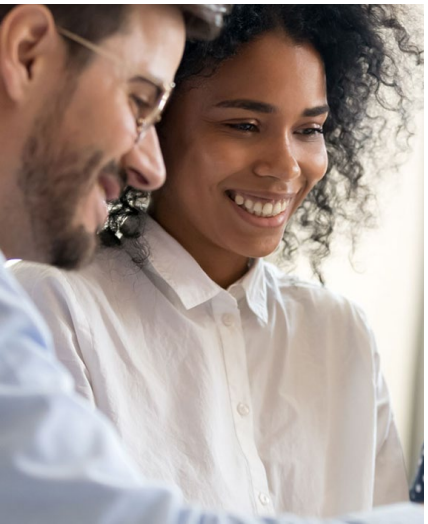
A manifesto for inclusive innovation

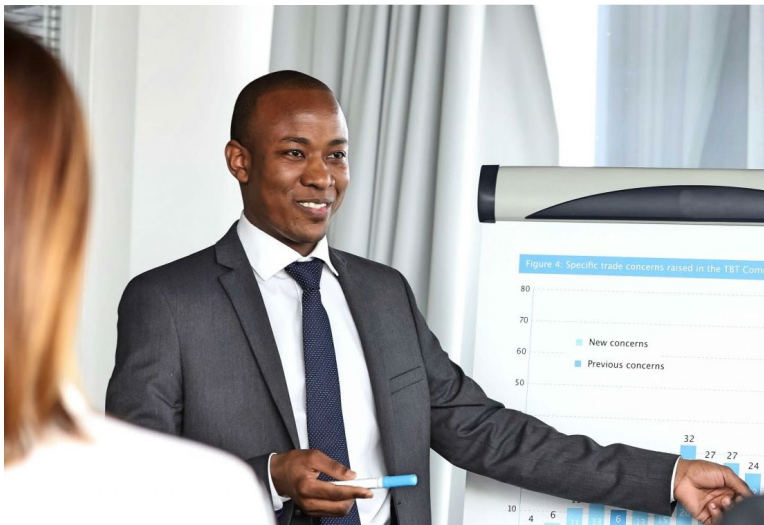
Edward Wilson-Smythe (they/them)



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Executive Summary

Technology innovation was supposed to usher in the next era of human progress, leading to a world without want and inequality. The unfortunate reality is that in the middle of the third decade of the Information Age, we are more unequal than ever, part of a community that is persistently unrepresentative of the societies we live in, increasingly beholden to biased algorithms that disenfranchise and victimize with no accountability, and confronting automation that threatens to remove a large portion of humanity from economic cycles altogether. The good news is that despite these seemingly insurmountable challenges, our ability to influence the course of innovation has never been greater.

This research note addresses three priorities that technology leaders can focus on to address these challenges. By:

- leading to create a truly inclusive and equitable technology community,
- driving out algorithmic bias so that innovation serves all people,
- and freeing people to realize their full potential,

we may finally be able to restore the promise of innovation to its rightful beneficiaries – the people.

The practical guidance in this research note enables us to purposefully guide innovation for the common good; leading to a community that drives equality, security and dignity for people as much as it creates economic value.

The Innovation Paradox

1. Four Centuries of Growth and Inequality

Before we jump into the deep end of the inequality in our technology community, we need to understand the nature of innovation and its impact on both growth and inequality.

The trajectory of technological and economic innovation over the last four hundred years has seen unprecedented growth, delivered most of the world from the specter of starvation, extended the duration and quality of human life, and created opportunities that did not exist before[1]. These successive waves of innovation have also led to unspeakable suffering and exploitation, almost as a necessary corollary to the opportunities created[2].

The Agricultural Age represented the first time in history when sustained growth in food supply, doubling from 1600-1900[3,4], was able to feed the population of Europe and the colonizers of the new world. This age also further enriched the landed gentry as rentiers and perpetuated the class system in Europe[5], relied on enslavement[6] and indentured servitude[7] which disrupted family and community structures in Africa and Asia and caused suffering for indentured and enslaved people and their descendants, and dispossessed and impoverished Indigenous people in the colonized new world[8,9].

The Industrial Age created unprecedented population, productivity and economic growth from the 1870s[10], especially in the post-WWII era of relative peace. This also ushered in a new business model based on wealth creation through child labor, unsafe workplaces, urban slums and environmental degradation[11,12] whose impacts have persisted to this day[13]. This age disrupted the traditional intergenerational family in Europe[14], imposed exploitative trade models[15] to extract wealth from colonies[16], and ultimately abandoned workers to unemployment and poverty in search of new ways to accumulate wealth[17].

The Financial and Trade Age that took hold in 1980 has led to the greatest and widest creation of wealth globally[18] but has also created a definitive schism between money and the structural foundations of the economy[19,20]. This has led to levels of inequality not seen since before the Great Depression[21], driven by:

a) Financial engineering and financialization[22,23];

b) Focus on short-term financial[24] and share valuation results[25];

c) Favorably stacked macroeconomic[26], monetary[27], tax[28] and credit[29] policies; and

d) Growth of tax havens[30].

As a result, we are more unequal that at any time in modern history[31], with workers close to home living increasingly perilous lives[32] and those in far-off lands being subject to modern-day mercantilism[33].

The root cause of this dichotomy between growth and equity is that innovation is not just an amoral driver of technical and economic breakthroughs. Each wave of innovation has been defined and shaped by the control and monetization of a singular new type of productive capital[34] that is unique to the social and economic structures of that wave: land during the Agricultural Age; machine capital during the Industrial Age; intangible intellectual property during the Financial and Trade Age.

2. What's Past is Prologue to the Information Age?

The rise of data, information and analytics over the last three decades as the apex economic resource of the Information Age has merely replaced one type of productive capital with another, without the structural changes required to break the cycle of inequality that has been characteristic of each previous wave of innovation. As a result, the issues endemic to innovation through history have only been amplified and accelerated in the Information Age.

The pace and direction of our socioeconomic evolution over the last quarter century has been founded on the singular force of technology innovation. The hyperaccelerated convergence of increased computing power, reduced cost and broader access has seen technology move from the narrow confines of the largest governments and corporations, to become an integral part of all aspects of individual interactions, economic organization and social structures.

This rapid growth in the role of information in our societies and economies has led to greater prosperity overall, but also to significant increases in economic and social inequality[35]. The last four decades have seen real wages of the bottom 90% of Americans by income grow by 0.5% a year, less than a quarter of the rate for the top 1%[36]. Years of this stagnation have led to even sharper disparity in wealth. The top 1% of Americans by wealth hold 15 times more wealth than the bottom 50% (in other words, they are 750 times wealthier)[37]. This pattern is repeated globally, from the wealthy economies of the OECD[38] to major economies[39] such as China, India, Brazil and Mexico. We live in a time where economic inequality has never been greater, and opportunities for progress for the vast majority of people have never been smaller.

The Information Age has perpetuated the patterns of previous waves of innovation because the three characteristics of our relationship with economic resources have remained unchanged: Concentration of ownership of and control over the resource in a select few; Coercion to make others acquiesce to or participate in inequitable systems; and Conformation of marginalized people and societies to unfairness and inequality as the norm.

3. Concentration

In each previous wave of innovation, concentration of economic resources was overt and easy to identify and measure. Land ownership was concentrated in nobility, aristocracy and landed gentry[40], and the ownership of machine capital and intellectual property in large corporations and wealthy individual and institutional investors[41].

In the Information Age, while the apex economic resource – data, information and analytics – is less tangible, ownership and control are similarly concentrated by three factors:

a) Continued overrepresentation of historically privileged sections of society in the technology community, which lags other sectors of the economy in representation from other groups[42]. This is the case even when compared to other STEM disciplines[43], especially at senior levels[44] and for emerging and growing roles[45] that are disproportionately higher paid and in more demand[46];

b) Even before entering post-secondary education and the workplace, there is a higher level of attrition from STEM disciplines among women[47], racial minorities[48], and LGBTQ+[49] students, which continues into STEM programs in post-secondary institutions[50];

c) Perversely, the same groups of people who face high barriers to entry and progress in the technology community are disproportionately impacted during cost cutting and layoffs[51] that are part of almost decennial boom-and-bust cycles, leading to further marginalization.

4. Coercion

Economic growth over the last 400 years was enabled by both direct coercion by the state (e.g., the colonization of Asia and the Americas; the scramble for Africa; the expulsion of Indigenous people from their lands in the new world; and unequal terms of mercantile trade forced on colonized people[52]) and actions of private enterprises indirectly backed by state power[53] (e.g., the British East India, Hudson Bay, Royal African and Dutch East India Companies). More recently, coercive power has been deployed to conduct disaster capitalism[54] through military and economic intervention that promotes industrial economic hegemony over environmental interests[55], Indigenous rights[56] and even sovereign elected governments[57,58].

In the Information Age, the forces that control economic resources achieve the same if not higher levels of coercion without reliance on overt force. Unlike previous waves of innovation, coercion in the Information Age is built into the design of information-powered social[59] and economic[60] systems. This control makes the corporate entities that control information almost sovereign in their own right[61], independent of and even despite the efforts of governments or people[62]. This new model of self-perpetuating coercion is driven by three factors:

a) The ready availability of artificial intelligence ("AI"), with steep increases in the size of AI computer chips; steep increases in the scale of AI systems; and improvements by orders of magnitude in reducing power requirements to run AI chips and increasing the effectiveness of AI systems[63];

b) The proliferation of analytics and AI in the processes and interactions[64] of people, communities, corporations and governments, leading to increasing dependence on algorithms for automated and even subconscious decisions[65] that impact how individuals interact with each other[66], with companies[67] and with governments[68];

c) Biases in the design of algorithms[69] that drive automated decisions with disproportionately negative impacts on the same people who are marginalized or underrepresented in the technology community – poor people[70], people with less than university education[71], women[72], racial minorities[73], and LGBTQ+ people[74].

5. Conformation

Over the last 400 years, people have at times taken up arms against inequitable systems, such as during the French, Russian and Cuban revolutions against domestic elites, or the American, Haitian, Irish, Indian, Vietnamese and Angolan conflicts with colonizing powers. However, the reality for the most part has been one of people who do not benefit from innovation conforming with prevailing socioeconomic structures to serve the needs of the owners and controllers of economic resources[75]. While the fear of coercion by state and quasi-state forces have been major drivers, people have also had limited ability to challenge systemic inequity due to poverty, lack of education, limited pathways for upward mobility and limited ability to organize[76].

The economic events of the last four decades have exacerbated historical drivers of conformation[77]. Technology workers, as much as we may hate to admit it, have more in common with other exploited and marginalized people[78] than with the innovators, investors and executives that are the public face of our industry.

a) While automation has been a key driver of every wave of innovation, it has matured in the Information Age to jeopardize even complex and specialized technology jobs[79]. This development has the potential to reverse the job and income growth associated with the technology community[80], and introduces a new source of uncertainty that encourages conformance.

b) Technology workers struggle with higher debt due to the higher cost of STEM degrees[81] and jobs being concentrated in more expensive cities[82]. The two generations most represented in the industry – Generation X and Millennials – have amassed the greatest aggregate and per capita private debt in history[83], with the average American Millennial having a net worth of only $8,000[84].

c) We continue to be dependent on our employers for critical parts of our lives that are based more on a relationship with governments in other developed countries.

Employer-centric heath care[85] and immigration[86] relationships create significant barriers to mobility and risk-taking among American workers.

These forces conspire to create conditions where technology workers are already part of the next wave of exploited and marginalized people, a trend that is accelerating and has gained critical mass in the post-COVID era of imbalanced recovery and inequitable growth.

6. Resolving the Innovation Paradox

Despite the promise of innovation to drive prosperity and equality in equal measure, the unfortunate reality is that in the middle of the third decade of the Information Age, we are more unequal than ever, part of a community that is persistently unrepresentative of the societies we live in, increasingly beholden to biased algorithms that disenfranchise and victimize with no accountability, and confronting automation that threatens to remove a large portion of humanity from economic cycles altogether.

The good news is that despite these seemingly insurmountable challenges, our ability to influence the course of innovation has never been greater. In the Information Age, with the most-educated workforce in history[87], much higher earnings in technology than in other industries[88] and low barriers to share information[89] and organize[90], we may finally have the conditions to bend the arc of innovation towards social justice.

We as technology leaders must define our priorities based on three imperatives that can help us purposefully guide innovation for the common good, leading to a community that drives equality, security and dignity for people as much as it creates economic value:

1. **Lead** to create an inclusive and equitable technology community;

2. **Drive** out algorithmic bias so that innovation serves all people; and

3. **Free** people to realize their full potential.

Lead to Create an Inclusive and Equitable Technology Community

Creating an inclusive and equitable technology community is usually conflated with achieving higher diversity in terms of greater representation of people. However, this vision cannot be achieved through a simplistic view of diversity as a number and must transform the industry to fully empower all people as equal members, at all stages of their engagement with the industry and its opportunities.

1. Insist on Representation at All Levels

In our TechPACT Research Note – Impact Beyond the Diversity Headlines[91] – we identified four structural barriers to increased representation at all stages of diversity, equity, inclusion and belonging: 1) Biased Hiring Processes Inhibiting Diversity; 2) Unfair Opportunities and Recognition Inhibiting Equity; 3) Exclusionary Norms and Rituals Inhibiting Inclusion; and 4) Psychologically Unsafe Work Inhibiting Belonging.

We also provided a call to action consisting of twelve steps to drive tangible change as companies travel the path from marginalization and exclusion to belonging.

1.1. Hire based on Real Merit, not Relationships or Reputation, by:

a) Stopping familiarity hires, looking beyond immediate networks and traditional "top" schools, and replacing profile-based recruitment with a focus on skills and demonstrated performance;

b) Anonymizing resumes to reveal only relevant qualifications and achievements, to address hiring bias based on names, gender, educational pedigree, race, ethnicity and even ZIP codes; and

c) Ensuring interviewers represent a diverse panel representing a broad range of function, level, and representation.

1.2. Create Equity through Objectivity and Empowerment, by:

a) Creating unbiased performance metrics that focus on tangible and measurable metrics and deprioritize or eliminate behavioral and attitudinal attributes associated with specific cultures and identities;

b) Broadening evaluation inputs to peers, direct reports, internal stakeholders and external customers to provide a more rounded and less biased view into individual performance; and

c) Driving equitable opportunities for all employees based on objective criteria for leadership roles or stretch assignments, encouraging people to address self-doubt, and creating a culture that encourages risk taking and experimentation.

1.3. Purposefully Create an Inclusive Workplace, by:

a) Designing workplaces, work guidelines and even social events to at the minimum have no negative impacts, and ideally drive similar levels of engagement and positive impact for all workers;

b) Encouraging storytelling by people who do not fit historical demographic or cultural norms, to normalize other life experiences and signal to marginalized people that they too are part of the organization; and

c) Creating a culture of mutual respect, starting with something as simple as making sincere efforts to pronounce everyone's name properly.

1.4. Make Psychological Safety a Priority, by:

a) Stopping the normalization sociopathy by refusing to hire and promote people with well-known histories of bullying and harassment, and making the protection of workplaces from habitual abusers a priority;

b) Ending the cult of overwork through a mix of consciously dismantling the "work hard play hard" culture, providing flexible work hours and vacation policies, and normalizing the ability to "clock off" early or "clock in" late when possible; and

c) Reinforcing a culture of trust by eliminating disparate treatment of women and racial minorities in receiving credit for successes, having access to the resources required to succeed in visible or critical roles, and being rewarded equitably for additional responsibility and achievements.

2. Make STEM Accessible and Attractive to all Students

While addressing hiring and workplace biases, technology leaders also need to understand that bias impacting representation in STEM disciplines is evident as early as elementary school for women[92] and racial minorities[93], and barriers persist through high school post-secondary programs for students who are women, belong to racial minorities, and/or have LGBTQ+ identities[94].

The root causes of these biases and barriers are both structural and cultural, taking many forms:

a) Race-, gender- and class-driven assessment of student performance, potential and discipline[95];

b) Biased grading that unfairly gives lower grades to Black and Hispanic students[96];

c) Education and career guidance that reinforces stereotypes[97];

d) The practice of streaming in high schools that codifies gender, race and socioeconomic disparities[98];

e) Lack of relevant role models[99];

f) Higher cost of STEM education[100]; and

g) A hostile culture[101] where people feel marginalized by fellow students[102] and even bullied by instructors[103].

While addressing these issues will require broader changes, there are specific steps we as technology leaders can take to make STEM accessible and attractive to all students:

2.1. Be Visible and Relatable Role Models.

Social alienation driven by a lack of belonging and relatable mentors is a key reason women and Black, Hispanic and LGBTQ+ people choose not to pursue STEM education or technology careers[104]. However, merely presenting ourselves as successful leaders who belong to one or more of these groups is not enough. Role models, to be effective, need to be both aspirational and relevant[105].

A major challenge is that people from marginalized or underrepresented groups tend to reduce their association with those identities as they start progressing professionally, financially and socially[106]. We need to make a conscious decision to be more open about our own backgrounds, vulnerable about the challenges we still face, and transparent about practical steps we took and are still taking to overcome them. We also need to develop longer-term mentorship relationships[107] with people as a key part of our strategy to create a large, effective and engaged pool and pipeline of technology talent.

2.2. Give Back to Make Education More Affordable.

The cost of post-secondary education is one of the biggest barriers to equitable outcomes in the United States[108], and STEM programs are significantly more expensive than those in the Humanities or Social Sciences[109]. This higher cost has a direct impact on how accessible formal STEM education is, especially for Black, Hispanic and working-class Americans[110].

There are steps we can take as technology leaders to address the prohibitive cost of STEM education. We need to stop unpaid internships and pay a fair market value for the work, to prevent internships being something only already-privileged students can afford[111]. We can also fund scholarships for STEM students from marginalized and underrepresented backgrounds. These will only lower the cost of education but also increase our profile in post-secondary institutions as a preferred employer[112]. Having access to scholarships and paid internships makes a significant difference in the enrollment and graduation rates of students from underprivileged backgrounds[113], and a small investment from our firms can make a significant difference.

2.3. Create Alternative Employment and Career Pathways.

The traditional approach of insisting on undergraduate or advanced degrees in Computer Science, Engineering or related disciplines creates an immediate barrier for people without this education. The reality is that over half of computer programmers

and over two-thirds of user support professionals do not have a four-year degree[114], and many technology jobs do not need a degree to perform the roles[115].

We can drive meaningful change in representation and equity by being open to hiring people with technical education from colleges, certifications from technical training programs, and even high school graduates with demonstrated competence in technology. The shift from education-based to skills-based hiring is gaining momentum in technology jobs[116], with research showing that intellectual curiosity[117] and commitment[118] are better predictors of both individual and team performance. As a result, over half of technology organizations list problem solving, collaboration, customer service, and communication as the most valued skills[119].

Accenture and IBM are leading on this front[120], with only a quarter to a third of even a specialized role such as software quality assurance requiring a university degree.

2.4. Get Involved to Make Systemic Change.

The challenges faced by students can be addressed only through coordination across governments, institutions and civic society organizations. As business and technology leaders, we need to channel our social and economic privilege into greater engagement with and advocacy for foundational changes in these institutions.

Becoming members of advisory boards of post-secondary programs or part of elected public school boards gives us a voice in addressing discriminatory funding for public schools[121] and shaping policymaking and curricula, especially in a time when institutions are under greater scrutiny from all sides for failures in educational achievement[122] and issues related to equity[123,124,125]. Finally, as significant and sought-after recruiters from STEM programs in post-secondary institutions[126], we can insist on demonstrated commitment to equity, a culture of inclusiveness, support for marginalized or underrepresented people, and tangible improvements in representation and equity.

3. Proactively Address Bias During Cost Cutting and Layoffs

The latest wave of technology layoffs, which has already impacted at least 400,000 technology workers globally[127] as of the end of August, 2023, is perhaps the first one to be studied from an equity perspective[128]. The impacts are distressing but not surprising. The same groups who are last in line to pursue STEM education or be hired into technology jobs are first in line on the way out[129], even as companies claim the processes are fair and neutral[130] and profess their commitment to diversity. This irony jeopardizes a generation of progress towards representation and equity[131].

Behind this “full lifecycle” marginalization are layers of overt and subconscious bias. Privileged and overrepresented groups benefit from:

a) Decisions being made on subjective behavioral and attitudinal attributes[132];

b) Being perceived as more valuable in adversity than women[133] or racial minorities[134]; and

c) Having stronger social networks at work, especially with leaders[135].

While white male managers are reluctant to negatively impact others from similar backgrounds[136], female, Black, Hispanic and Asian managers are punished if seen as trying to help "their own kind"[137]. Absurdly, we continue to see men as the primary breadwinner[138] and women's work being less valuable[139] and more disposable[140].

We need to address this level of deeply embedded bias directly through:

3.1. Questioning and Revisiting Decisions that Drive Disparate Impacts.

The first step is often the simplest. The legal test for discrimination is one of disparate impact and not malicious intent or discriminatory process. First codified in Griggs v Duke Power Company in 1971[141] and then in Title VII of the Civil Rights Act since 1991[142], disparate impact explicitly covers adverse employment actions such as failing to hire, choosing to fire, or discriminating at work.

In our personnel decisions, there are unintentional, adverse effects that disparately impact people who belong to specific groups, even if our policies are neutral and there is no intent to discriminate. In other words, we may be unintentionally violating the law. Depending on our role and level, when faced with decisions that disproportionately impact marginalized or underrepresented groups, our response can range from outright rejection of recommendations to requesting changes in the decision-making process to simply pointing out the equity impacts and legal concerns. Silence should never be not an option.

3.2. Making Decisions Based on Broader Inputs across the Organization.

The continued reliance on immediate supervisors and managers to determine who are impacted by layoffs[143] makes the process subject to the biases of a small group of people[144] who are disproportionately white cisgender heterosexual males.

A better approach that balances the benefits of managerial empowerment with the need to address small group bias is having a larger group of cross-functional leaders, including other business functions, legal counsel, human resources and diversity & inclusion, involved in analysis and decision making. Managers can remain accountable for executing the decisions, but the decision itself needs to be based on a broader and more diverse set of inputs.

3.3. Giving Marginalized and Underrepresented Groups a Bigger Voice.

As part of creating ownership of and accountability for change, organizations recognize that empowering workers to make and execute key decisions is critical for success[145]. Whether these are leadership roles in driving transformation or employees

identified as change leaders, members of marginalized or underrepresented groups need to have representation in these visible roles.

To prevent these too becoming glass cliff assignments that are disproportionately handed out to female, Black, Hispanic, Asian and LGBTQ+ employees[146], we must provide all people involved in the process:

a) Autonomy to make decisions;

b) Resources to ensure successful execution; and

c) Tangible recognition and reward in terms of promotions, higher compensation and accelerated career paths.

Drive Out Algorithmic Bias

Artificial intelligence (AI) is prevalent in both the public consciousness through innovations such as social media and self-driving vehicles, and corporate decision making through systems and algorithms that impact every industry and business value chain.

As the role of AI in our society and economy expands, we are increasingly aware of significant bias in AI data and algorithms leading to situations such as:

a) Facial recognition software not recognizing and even misidentifying dark-skinned people[147];

b) Image recognition algorithms mislabeling Black men as gorillas[148];

c) Wrongly flagging Black defendants as high risk to reoffend at twice the rate of white defendants[149];

d) Misidentifying Black, Hispanic and Asian people as wanted criminals[150];

c) Excluding transgender, nonbinary and gender-nonconforming people from social networks[151];

f) Wrongly defining majority-minority neighborhoods as crime hotspots[152]; and

g) Recommending excessive law enforcement deployment and force to address minor crimes involving Black or Hispanic people[153].

The root cause of these issues is a combination of: focus on speed to market that often overlooks quality control and testing for negative consequences[154]; lack of representativeness among leaders and developers leading to myopia in terms of issues faced by other people[155]; framing of AI models with leading questions with pre-determined answers based on the biases of leaders and developers[156]; and skewed test data used to train systems based on a small and unrepresentative sample of society[157].

As technology leaders who are both significant creators and consumers of AI, we have a unique ability to address these issues. We must formalize and institutionalize ethical AI frameworks that engender trust among the people and communities we serve[158], through a few principles:

1. Do Not Adopt Algorithms You Do Not Understand

More than three out of four companies say that it is important that results obtained from AI are “fair, safe, and reliable”, and even more place emphasis on understanding how AI works[159]. However, a considerable number, more than two in five, have limited knowledge of how AI will work in their business context[160]. As a result, we unknowingly inherit the biases inherent in systems, and amplify their impact through use in enterprise-scale decisions.

Despite its allure, we must treat analytics and AI as we have every previous generation of innovative technology. We need to stop accepting systems based on the black box concept of trusting the system to work, and instead demand transparency and accountability for data, processes, logic, analyses, recommendations and actions. We must make understanding analytics and AI a priority, from both a technical and business impact perspective, with a focus on - how data are identified, aggregated and orchestrated with other data sets; how these data are analyzed to identify patterns; and how these patterns are translated into insights and recommended actions.

There are three types of human bias that impact how systems are designed with skewed data and biased algorithms: Entirety Bias, the belief that our specific disciplines and frameworks address all the relevant sources required to analyze data and forecast events; Familiarity Bias, the tendency to seek data and insights from sources that reflect values, beliefs and actions similar to us; and Universality Bias, the belief that all actors have utility functions comprised of values, desired outcomes and priorities similar to us[161].

Even without asking for confidential information such as access to code, we can develop frameworks addressing key elements of AI[162] to conduct due diligence on the core elements of AI to identify sources of bias, determine where bias is manifested, and work to eliminate bias[163].

2. Create Algorithms Based on Unbiased Data and Patterns

In our role as creators of AI systems, we can address these biases at the source rather than during adoption. This will require a significant focus on building considerations of equity and adverse impacts directly into the design of solutions, through:

2.1. Purposefully Leveraging Representative and Relevant Data.

The approach of relying on readily available and familiar data leads to biases based on - data from an unrepresentative and small segment of society that is overrepresented[164] in corporate leadership, financial transactions, research studies and media; historical data not being a reliable representative of changing norms and conditions[165]; and biased correlations between data sets leading to biased insights and recommendations[166].

A recent example of data bias with significant public policy and public health implications was the fact that the initial human trials of COVID-19 vaccines had a rate of Black participation which was more than 20% lower than their share of the American population[167], even while the virus infected Black people at disproportionately higher rates[168] and with disproportionately more severe impacts[169].

We need to make defining and creating representative and relevant data a priority when we design and implement systems, and continue to improve existing systems with updated data that are less biased. To achieve this objective, we need to shift our focus from the subset of people and patterns that are represented today, proactively

include people from groups that may be adversely impacted by any system, and incorporate data that reflect the experiences of these broader groups of people[170]. This focus will help us identify gaps in current data and provide us with direction on where to augment these data with more relevant and current sources.

2.2. Testing Affirmatively for Adverse Impacts.

Here is where we can put the thinking back into the often mentioned but seldom practiced design thinking process! Based on the reality that we design and test algorithms on partial and skewed data and train systems based on skewed historical correlations, it is impossible to look at test results and identify the potential for or incidence of adverse impacts[171] on populations that are significantly underrepresented or not represented in the data. Absence of evidence does not mean evidence of absence.

We need to go beyond test results and predefined business use cases, and affirmatively create real-life scenarios that reveal the potential for adverse impacts. The approach to designing these scenarios involves four steps:

a) Understand the specific use case being demonstrated;

b) Identify how underrepresented, marginalized or vulnerable groups may have different experiences compared to the privileged and overrepresented norm;

c) Create scenarios involving these groups of people with data that are specific to their experiences in these situations; and

d) Test if AI algorithms generate results in line with these projected biased conclusions.

IBM has gone one step further by stress testing AI bias by using logically impossible or objectively false propositions[172].

Some examples where we can use real-life biases to evaluate AI systems for bias include:

a) A use case of “law enforcement is dispatched to reports of an altercation between young men” can be tested based on – incidents involving Black or Hispanic people are reported as being more serious than the same incidents involving white people[173]; law enforcement and people calling 9-1-1 routinely overestimate the age of Black children and report them as being adults[174]; and law enforcement wrongly assume that Black or Hispanic people are carrying firearms or other deadly weapons at a much higher rate than white people[175].

b) In health care, a use case of “a smart watch monitors vital signs to predict specific medical emergencies” can be tested based on – Black people have disproportionately higher incidence of underlying health conditions that lower the threshold for onset of medical emergencies[176]; even medical professionals believe that Black people exaggerate pain and have a higher pain threshold[177]; poor people have lower medication adherence due to affordability or scheduling issues,

leading to higher vulnerability[178]; medical professionals downplay even life-threatening symptoms faced by women[179]; and due to limitations of clinical trials, there is lower familiarity with treatment of pregnant women[180], especially Black, Hispanic and Asian women[181], with medical conditions.

3. Be Mindful of Social Impacts

Analytics and AI have led to exponential improvements in business outcomes across a wide range of value chains that cut across multiple industries. The pressure to improve business performance and drive improved return on assets and investment is even more acute in the current economic downturn, as corporate leaders and institutional investors focus on tangible business results and reallocate investments to companies that demonstrate sustained profits and cash flow[182].

The last step in driving out algorithmic bias requires a bit of moral courage that we often talk about but seldom manifest. We need to reassess our relationship with the societies we operate in and the people we serve, and to redefine the role of corporations as not just economic creations to drive transactional efficiency and optimize returns on investment, but as social and political entities that have as much impact, if not more impact, on people and communities, than sovereign governments[183,184].

As technology becomes foundational to the ways we define and execute our business, we can take steps to address the potential social impacts of analytics and AI in business decisions:

3.1. Address Human Impact While Assessing Transactional Efficiency.

For every AI-driven decision, we need to identify and quantify not just business benefits but also the potential for negative impacts, especially on marginalized and underrepresented groups. For example:

a) In one of the most widely studied impacts, facial recognition software misidentifies dark-skinned people much more frequently than white people based on being trained on data sets that are of predominantly white faces[185]. This replicates the very real human bias where we differentiate minute differences in features of white people, but all Black people “look the same” to us[186]. Misidentification has already led to Black and Hispanic people being arrested and imprisoned due to mistaken identity[187,188], being wrongfully imprisoned[189,190], and even being killed by law enforcement[191,192].

b) Similarly, misgendering a transgender or nonbinary person is common in AI[193], which when applied to medical care can lead to impacts ranging from loss of privacy[194] to medical treatments that do not address underlying physical or psychological conditions[195] leading to trauma, disability and even death[196]. Algorithms use data for training that are based not just on cisnormative standards, but on a binary (pardon the pun) correlation of biological sex with medical

guidelines. This approach fails recognize that for transgender and nonbinary people, some medical interactions require addressing the gender of the person while others need to address the biological sex[197], and still others need to consider that gender identity itself may have underlying biological contributors[198].

Increased understanding of negative social impacts has led to major technology companies such as Microsoft[199] and IBM[200] pausing or restricting the commercialization of facial recognition software, and others such as Deloitte[201] and NTT DATA[202] prioritizing investment in the development and commercialization of ethical AI.

3.2. Realize and Articulate that Ethical AI is Also Good for Business.

While corporate leaders still see ethical AI and other ESG efforts as a trade-off between doing well and doing good[203], there is high awareness of the negative impacts of artificial intelligence among both business decision makers[204] and consumers[205]. Businesses recognize that biased algorithms can lead to significant brand and reputation damage[206]. Over half of private equity firms see ESG as a new lever of value creation[207] and leading firms are publicly making ESG a priority[208], driven by superior financial performance and valuation impact[209,210]. Governments are taking early steps to hold companies accountable for adverse impacts of algorithms[211,212,213], replicating the increasing frequency and impact of privacy-related penalties imposed on companies[214,215].

As a result, a demonstrated commitment to removing algorithmic bias can be a powerful competitive differentiator and preempt emerging regulatory and compliance risks and costs.

This is one of those times where social impact and business impact are aligned and pushing us in the same direction. Driving out algorithmic bias has to be a foundational part of the design and adoption of AI.

Free People to Realize their Full Potential

Optimistic and idealistic projections of the future range from science fiction visions of a unified borderless world with no countries, no conflict, no currency and no want, to projections by opinion leaders that innovation can solve most if not all of our pressing problems by the end of the decade[216].

In contrast to these projections and goals, we are we are facing an uncertain future where:

a) Technology innovation is closely associated with job loss[217];
b) Automation is seen as a bigger threat to employment than low-cost labor and unfair trade practices are[218,219];
c) We confront record-low levels of optimism[220,221] and trust in institutions[222] among Americans; and
d) American workers are increasingly opting out of participation in the mainstream economy[223].

Job loss and lower workforce participation have direct impacts on physical[224] and mental health[225], substance abuse[226] and suicide[227], while higher female unemployment raises the incidence of intimate partner violence[228]. These social impacts translate into tangible economic harms such as lower home prices[229] which impact the single-greatest source of intergenerational wealth creation and higher social costs[230] that persist into future generations[231,232], thus creating a self-reinforcing cycle of marginalization[233].

The nature of innovation itself provides opportunities to break this cycle and free people to achieve their full potential. As leaders, we must bridge the gap between promise and reality, and find ways to realize at least part of the idealistic visions of a digitally enhanced future. We must prioritize reconciling innovation with improvements in the human condition, and work purposefully to restore the relevance of workers in technology-defined ecosystems.

1. Define Digital Jobs that Enhance the Human Element

Automation is projected to impact a quarter of all jobs in the United States substantially and put half of all current human effort at risk[234], increasingly impacting high-skill high-income jobs, including those in the technology community[235]. This is however a reductive view based on a zero-sum approach that assumes changes happen on a static set of baseline conditions, applying the digital equivalent of the production theory of value[236] rather than exploring the complementarity of labor and capital that has been key to sustained productivity gains[237].

The reality is that the same forces that create automation also enable the creation of new jobs through new business models, new ecosystems and new required skills[238,239,240]. By balancing the automation of routine, redundant and inefficient tasks with the creation of

new roles that rely on innovation to drive value, we can repurpose automation to drive demand for high-skilled technology jobs, through two strategies:

1.1. Create New Roles to serve New Digital Business Models.

Automation does not just improve business processes by optimizing workflows and reducing manual efforts, it also creates the potential for business to define and execute new ways of creating value. These new digital business models involve new products and services, new ways of engaging with customers, new ways to monetize customer and ecosystem interactions, and indeed, new roles that would not exist without these business models.

Examples of automation creating the need for new digitally-enabled roles proliferate across business value chains and cut across industries. Consider these selected examples:

a) Remote Inspection: With the advent of private 5G networks enabling live 4K/8K video, integration of sensors for condition monitoring and measurement, and augmented reality and digital twins integrating insights and visualizing physical domains, companies can rely on automate systems to reduce the reliance on physical dispatch. While this impacts typically lower-cost field services roles, it creates the need for highly sophisticated remote inspection and quality assurance roles which require knowledge of emerging technologies and the ability to work in a highly digitized workplace and make autonomous data-driven decisions in real time;

b) Upstream Oil and Gas: By integrating the same technologies used for remote inspections with real time drilling data visualization and predictive analytics platforms, oil & gas companies have improved yields, lowered asset downtime, improved response times and lowered personnel costs. This lowers the need for manual gathering and transmission of operational data, time consuming analysis and manual decision making, and people to manage checks and balances at each step. However, with decisions being made to the edge and requiring real time response to operational data, there is a need for operators who can understand the data, orchestrate various systems, make autonomous decisions and be accountable for the result of their decisions;

c) Sales and Sales Operations: Automating and integrating customer engagement and sales processes is a priority for industrial automation, industrial equipment and technology companies. Mature technologies are being integrated with advanced analytics to drive proactive tailored solution offerings and automating the end-to-end customer lifecycle. While this impacts the role of the traditional sales executive and back-office order management and billing staff, it creates new opportunities for sellers who have deeper technical knowledge to develop customer-specific solutions collaboratively with customers and operations staff who can orchestrate customer journeys across multiple analytics-driven systems and processes.

1.2. Rethink the Role of Humans in a Hyperautomated World.

Automation is already moving from being merely a driver of transactional efficiency to becoming a force for social disruption. With advances in AI, the scope of automation is extending beyond low-value repetitive tasks to those that require judgment and discretion, thus narrowing the range of roles where we need human actors[241]. However, as automation drives even more human discretion and action out of transactions, and replaces these with machine intelligence and actions, it risks disrupting existing social contracts between people, governments and corporations.

As interactions and decisions become more automated and intrusive, there is already greater social and political demand for transparency and accountability[242,243,244,245]. For automation to succeed and be accepted as an integral part of our evolving societies, there are three key areas where human discretion and action will be needed even more than before:

a) Making decisions that have significant impacts on other people;

b) Assessing and mitigating any adverse impacts of the decisions; and

c) Being held accountable for the impacts and outcomes. We need to prioritize building these roles and responsibilities into the design of automated systems.

2. Prepare Workers for Future Roles

The current economic downturn is unlike others in history, as ongoing layoffs in the technology community are taking place at the same time as near-record low unemployment[246] and continued labor shortages for technology jobs[247].

Conventional wisdom is that technology companies are rightsizing based on aggressive hiring in the last two years, slowdown in the economy and economic uncertainty[248]. A more critical view of the current state of our society and economy sees workers increasingly deciding not the be part of a system they see as fundamentally unfair and flawed[249,250].

While both these factors contribute to current events, the underlying reason is more prosaic but no less damning of an indictment of our role as business and technology leaders. We are either unaware of or complicit in the bigger, longer-term trend of “great replacements”.

In Silicon Valley and other technology centers today:

a) Workers in sales, customer service, HR, recruiting, diversity & inclusion and operations, who are not considered core to product innovation or engineering, represent over 80% of all layoffs[251];

b) Even coders, designers and analysts whose work can be automated are overrepresented in layoffs[252]; and

c) Workers with experience in older technologies or business models are less likely to be in demand[253].

We are pushing out people not considered relevant to future competitiveness and looking for new workers who are seen as more adept in modern technologies that will define and execute new digital business models. If this sounds familiar, it should; we have seen the great replacement play out in places as Allentown, Dayton and Flint [254].

We need to break this pattern before it further fractures our industry and country, by preparing workers for future roles. The lack of a sufficient number of workers to fill available jobs, combined with the reluctance of companies to consider existing workers for these roles, explains why there are 300,000 to 400,000 unfilled technology jobs[255,256] while at the same time over 120,000 jobs have been eliminated in less than a year.

The only way to address this issue, *in the absence of mass immigration* which is impossible or *another round of mass offshoring* which is impractical, is to reskill and upskill existing workers to fill emerging roles.

With 75 to 375 million workers globally needing to switch occupational categories and learn new skills by 2030[257], the best way to approach reskilling is to build a lifecycle view of worker skills in the same way that we develop product lifecycles around projected business needs, as the two are inextricably linked. By developing learning plans, creating educational opportunities and defining career paths that are based on the future direction of technology and business models, we will increase the probability that existing technology workers are able to meet emerging needs.

3. Create A Mobile and Empowered Workforce

Technology workers, except those with highly specialized skills or at senior levels, are increasingly burnt out[258] and actively rethinking their future[259]. This is in stark contrast to the projections of technology innovation leading to greater leisure and freedom for workers.

While addressing these issues requires coordination with government policymakers to drive meaningful changes in post-secondary education, immigration and social programs, there are tangible steps we can take to improve the lives of technology workers.

3.1. Restore Worker Mobility.

The prosperity that accrued to Americans before the Great Industrial Reset of the last 40 years was accompanied by geographical mobility. Internal mobility has been at the core of economic prospects, dignity and true emancipation for the American worker[260]. Unfortunately, this mobility has slowed down significantly, with less than 4% of Americans per year migrating internally across counties or states in the last decade,

half the level in the early-1980s[261]. Lower mobility has a direct impact on economic opportunity and achievement[262].

The major contributors to this slowdown[263] are - the need to have two incomes to support a family; dependence on employer-linked health care; falling property values; high student debt; and for non-Americans, employer-linked immigration programs.

Technology companies can address immediate issues by:

a) Working with local and regional initiatives[264] to attract technology workers from higher-cost areas;

b) Providing joining bonuses that are recoverable over a period of time, providing both improved financial flexibility to move for a job and greater incentive to stay at the job;

c) Extending employment benefits from group health care, where scale and risk pooling leads to lower costs, to group financial services, where similar forces can provide lower-interest personal loans even to people with poorer credit;

d) Providing housing support for new workers until they can find new accommodation and/or sell homes to relocate;

e) Providing access to job opportunities for spouses through social and business networks, so there is less of a drop in income as part of the move; and

f) Collaborating with civic society organizations[265], peer networks[266], and staffing agencies[267,268] that provide critical bridges to employment for foreign workers who are impacted worst by layoffs[269,270].

3.2. Translate Higher Productivity into Higher Flexibility.

With improvements in productivity made possible by automation, there is an opportunity to rethink the roles, job descriptions and engagement models for technology workers. The disruptions caused by COVID-19 have demonstrated that knowledge workers can be just as if not more productive[271,272,273,274] without the constraints of fixed workplaces, fixed hours or direct in-person supervision. Taking this logic one step further, we can create flexible work models that enable workers to pursue other personal and professional interests, by:

a) Formalizing flexible work schedules, which help all workers but disproportionately benefit women, working parents and workers who are caregivers to family members;

b) Exploring 4-day work weeks for roles that do not require direct client interaction, and for those roles that do require client interactions, collaborating with clients to explore ways to meet client needs in this model;

c) Enabling job sharing to provide flexible part-time work options to workers who need to balance work with other commitments including other work (see below); and

d) Finally, accepting and normalizing freelancing and side hustles. The harsh reality is that a sizeable percentage of technology workers already work two jobs[275,276] or freelance in the gig economy[277], and this will not go away just because we pretend it does not exist.

A Manifesto for Inclusive Innovation

In this research note, we have addressed key barriers to inclusive innovation and three priorities that technology leaders can focus on to address these challenges.

By:

- leading to create a truly inclusive and equitable technology community,
- driving out algorithmic bias so that innovation serves all people,
- and freeing people to realize their full potential,

we may finally be able to restore the promise of innovation to its rightful beneficiaries – the people.

The practical guidance in this research note enables us to purposefully guide innovation for the common good; leading to a community that drives equality, security and dignity for people as much as it creates economic value.

It is still not too late to harness technology innovation to usher in the new human renaissance that every previous era of innovation has promised but failed to deliver.

Let us begin.

About the Author

Edward Wilson-Smythe (they/them) is the Head of Research at TechPACT and is a prolific author and speaker on topics related to innovation, disruptive change, emerging ecosystems, and broader socioeconomic and equity impacts of innovation.

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About TechPACT

TechPACT envisions a world where anyone with a passion for technology has the opportunity to succeed. Founded by a group of impassioned technology CxOs, TechPACT is committed to raising diversity, equity, inclusion, and belonging (DEIB) across the technology community.

TechPACT empowers members to foster a culture of belonging by building awareness of diversity and equality opportunities and providing actionable strategies and tools to create inclusion. In their effort to expand the pipeline of diverse talent, TechPACT is inspiring youth to pursue careers in technology and providing resources to support diverse professionals throughout their careers. We support teachers and community outreach programs to enable STEAM programs and partner with organizations who are dedicated to closing the digital divide by contributing funding and/or sharing expertise.

TechPACT creates accountability through community and achieves its mission through the collective efforts of its members. Our members are a community of technology CxOs and leaders committed to making a difference. Members take "The Pledge," a personal promise to accept accountability and take action to increase representation and reduce the digital divide. TechPACT members recognize themselves as force multipliers and understand that each action they take creates an unstoppable network effect that will benefit the lives of millions across the globe.

To learn more about TechPACT's mission and to take the TechPACT pledge, visit www.techpact.org.

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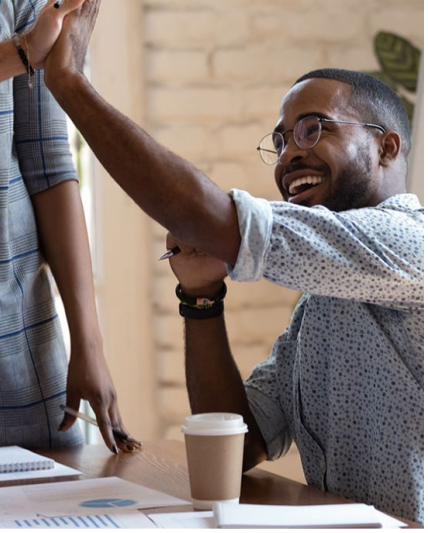

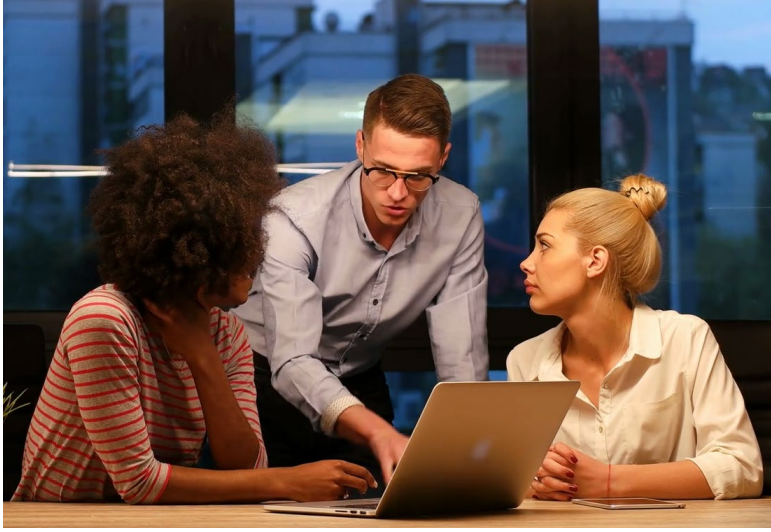

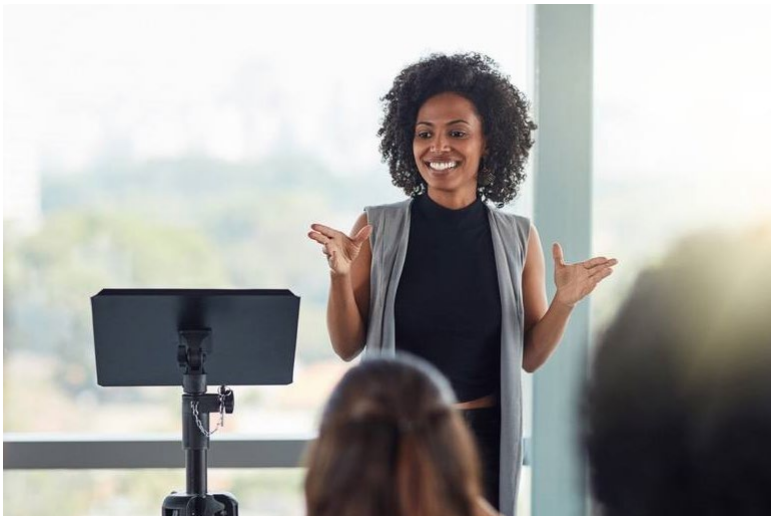
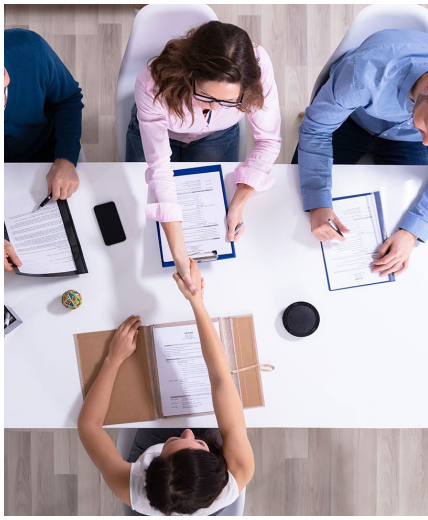

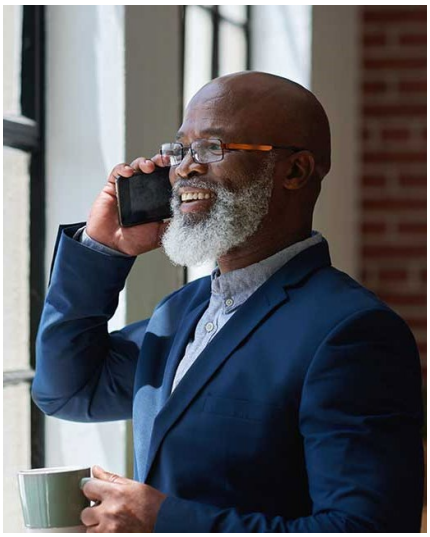
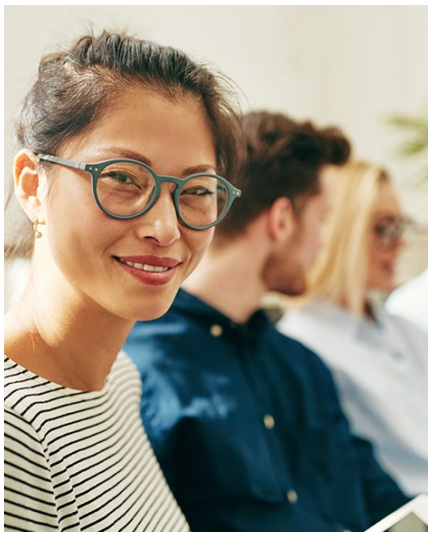
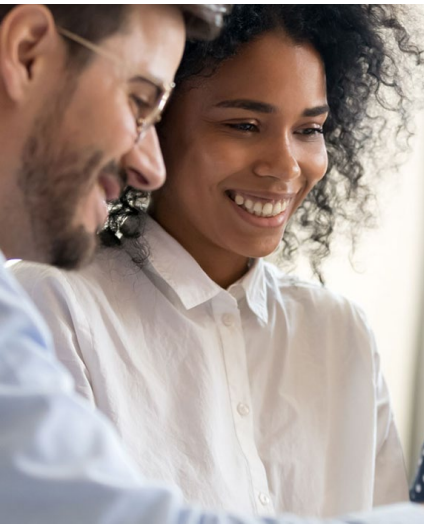

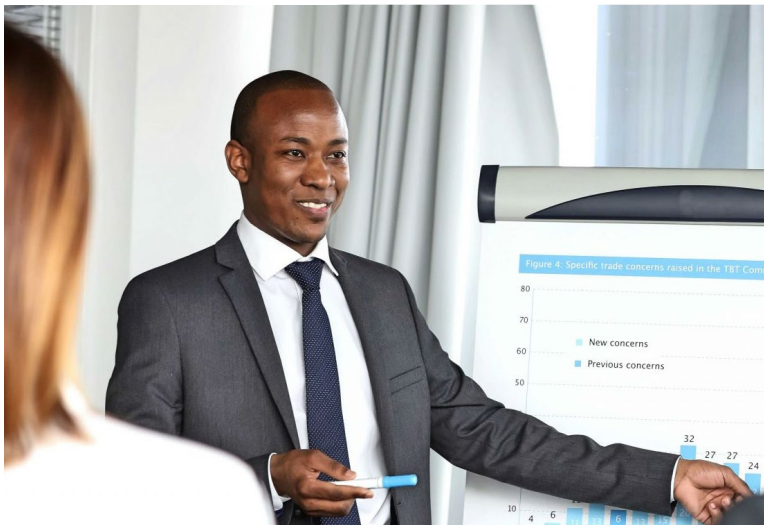
Figure 4: Specific trade concerns raised in the TBT Com
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