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The rising tide of artificial intelligence and business automation: Developing an ethical framework

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Stakeholder theory;
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Artificial intelligence;
Business ethics;
Work displacement

Abstract Recent advancements in robotics, artificial intelligence, machine learning, and sensors now enable machines to automate activities that once seemed safe from disruption—including tasks that rely on higher-level thinking, learning, tacit judgment, emotion sensing, and even disease detection. Despite these advancements, the ethical issues of business automation and artificial intelligence—and who will be affected and how—are less understood. In this article, we clarify and assess the cultural and ethical implications of business automation for stakeholders ranging from laborers to nations. We define business automation and introduce a novel framework that integrates stakeholder theory and social contracts theory. By integrating these theoretical models, our framework identifies the ethical implications of business automation, highlights best practices, offers recommendations, and uncovers areas for future research. Our discussion invites firms, policymakers, and researchers to consider the ethical implications of business automation and artificial intelligence when approaching these burgeoning and potentially disruptive business practices.

1. The evolution of labor markets and business automation

Concern over business automation and artificial intelligence (AI) echoes across the globe. Outside of Amazon's headquarters in South Lake Union, over 1,000 employees chanted: "We are people, not robots!" (Wang, 2013). In response to increased

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automation, Hyundai workers in South Korea stopped production of the Kona sport utility vehicle (Jin, 2017). In Rome, riot police violently broke up a protest in which taxi drivers were demonstrating against ridesharing apps.

In this article, we assess the cultural and ethical impact of *business automation*, which we define as a technique, method, or system of operating or controlling business processes by mechanical or electronic means that replaces human labor (Nof, 2009). Business automation presents a unique set of sociocultural and ethical issues that the literature has yet to consider. To assess these issues, we introduce a novel framework that integrates stakeholder theory with social contracts theory and highlight important implications, recommendations, and potential directions for future research.

More and more, machines can match or outperform humans in a range of activities, including learning, tacit judgment, and emotion sensing (Manyika et al., 2017). Because of this, many predict that developments in automation and AI will dramatically affect workers, businesses, nations, economies, and society as a whole (Autor, 2015; Executive Office of the President, 2016); some even refer to these technological advancements as ushering in a fourth revolution[1] (Schwab, 2016). In the Industrial Revolution, technological progress provoked ethical issues that involved labor rights, working conditions, and social inequalities (Habakkuk & Postan, 1966). This fourth revolution, too, raises a number of ethical concerns.

Predictions remain mixed regarding business automation and AI. Many anticipate an economic boon followed by increased productivity and favorable labor supply adjustments (Abeliansky & Prettner, 2017; Arntz et al., 2017; Gurkaynak, Yilmaz, & Haksever, 2016). These align with many of the benefits often associated with business automation in terms of reduced costs and production time and increased production, safety, and quality. Others, however, warn that automation and AI may create economic stagnation (Acemoglu & Restrepo, 2017; Keynes, 1930; Sachs & Kotlikoff, 2013), especially if consumers predominately save their wages (Gasteiger & Prettner, 2017). Still, others advise that while automation and AI may improve the economy, they may also exacerbate societal inequalities by reducing employment and wages—especially for the working and lower middle classes (Acemoglu & Restrepo, 2017; Autor, 2015; Executive Office of the President, 2016; Lankisch, Prettner, & Prskawetz, 2017).

[1] The first three being steam power, electricity, and electronics.

Most researchers agree, though, that automation is likely to spur labor disruptions, altering how individuals work and the types of jobs available to them (Arntz et al., 2017; Autor, 2015). For instance, Frey and Osborne (2017) predicted that automation could replace 47% of today's occupations in as little as 10 years. Researchers disagree, however, in how quickly they predict the workforce will transition from these disruptions. In addition, firms and policymakers lack a structured approach to assess and navigate the ethical quandaries certain to arise as businesses increasingly rely on automation.

In what follows, we discuss the growth of automation and delineate its ethical challenges in relation to stakeholder theory and social contracts theory. Applying stakeholder theory, we identify consequences that automation and AI will likely create for various stakeholders. We then integrate stakeholder theory to explain why researchers need to consider automation and AI from a social contracts theory perspective. We proceed with a review of current economic, political, and social practices designed to address these challenges, and conclude with best practices and suggested guidelines to minimize social contract disruptions. We hope this article will move the business community toward better and more ethically sound uses of automation and strengthen scrutiny of automation as a growing business practice.

2. Business automation and stakeholder theory

Laborers, firms, society, governments, and consumers are key stakeholders in the automation of business processes. Technological advances in automation and AI will continue to disrupt labor markets affecting these stakeholders. To remain competitive globally, firms will increasingly rely on automation to improve efficiencies. The risk is that businesses may seek automation for short-term financial gain while ignoring greater macro-effects. Stakeholder theory offers a useful tool to illuminate how increased reliance on automation may affect various parties and the relationships companies share with these parties. It asserts that companies that balance and attend to the needs of their stakeholders benefit because stakeholders recognize and reciprocate that goodwill (Freeman, 1984). Freeman (1984, p. 46) defines *stakeholder* as "any group or individual who can affect or is affected by the achievement of the firm's objectives." The theory implies that firms

have a moral and ethical obligation to their stakeholders (Brenner & Cochran, 1991; Freeman, 1994).

In the following discussion, we identify and examine various stakeholders associated with business automation, along with the motivations and consequences corresponding to each.

2.1. Labor markets

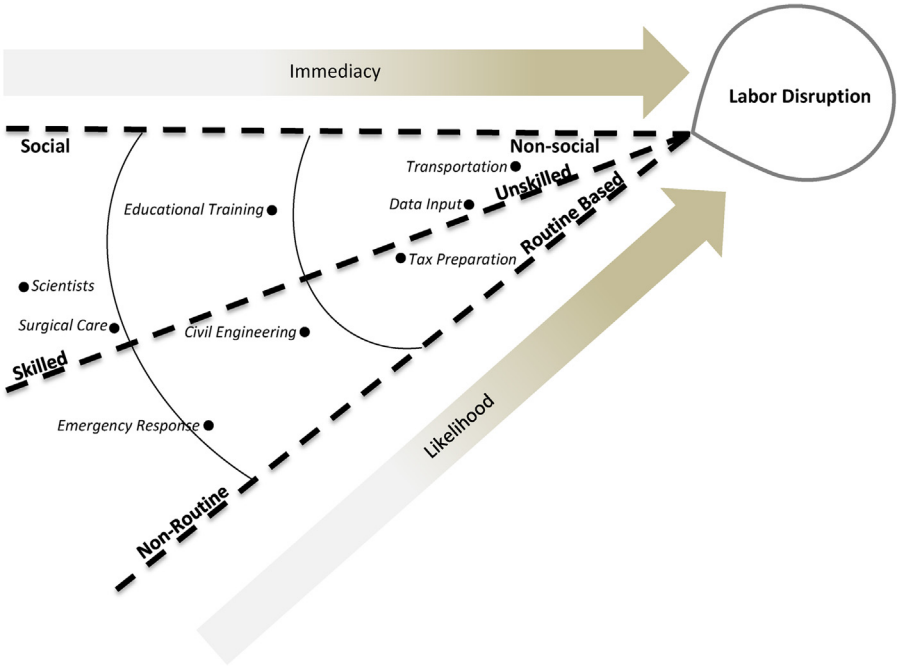
Automation is increasingly replacing not only manual work, but also positions requiring higher-order thinking such as journalists (Smith, 2013), medical lab technicians (Tufekci, 2015), attorneys, paralegals, and others. A growing number of researchers warn that across multiple economic sectors, machines will replace human workers, leaving mass joblessness in their wake (Brynjolfsson & McAfee, 2014; Frey & Osborne, 2017; Sachs & Kotlikoff, 2013). Karabarbounis and Neiman (2014) found evidence that labor may be more plentiful than demand in more automated societies, which could account for stagnating wages in many developed countries. They cite that in the four largest world economies—the U.S., Japan, China, and Germany—the labor share, and specifically the share of corporate gross value-added paid to labor, declined by roughly 2—4 percentage points per decade during the 1975—2010 period. In addition, the displacement of work via automation may remove several people's predominant source of self-worth in modern society (Abrams & Hogg, 1988).

Researchers in favor of automation, however, argue that while automation may temporarily displace workers, historically it has created more jobs than it has displaced. They posit that rather than replacing the workforce, automation will complement it, making workers more productive and creating new, more rewarding occupations. Evans (2017, p. 218) stated: "Jobs will be more meaningful and new markets will develop, making it unlikely that anyone will yearn for the good old days. We are truly seeing only the tip of the iceberg."

From our perspective, three variables will affect the immediacy and likelihood that automation will disrupt particular professions: the extent to which the position is (1) routine, (2) skills-based, and (3) social. In Figure 1, we classify occupations according to these three factors. In particular, we expect that automation will contract lower skilled labor markets that require less social interaction and are predominated by routine, where caring for others is less important (see Figure 1).

In sum, middle-skilled jobs—like clerical work and manufacturing—are declining due to automation, but low- and high-skill jobs are increasing, suggesting employment polarization (Goos, Manning, & Salomons, 2014; Katz & Margo, 2014; Lankisch et al., 2017). As routine-based positions decline due to automation, middle-skilled workers will likely find themselves moving toward less skilled, service-oriented positions, leading to further wage erosion. Meanwhile, other laborers who work in professional careers that emphasize high

Figure 1. Factors influencing the likelihood and immediacy of automation-based labor disruptions



skills, low routine, and high social aspects will benefit most from business automation. The effect will further depress the earnings of less-educated, routine-based workers while benefiting the high-educated, low routine-based workers. The stagnation of wages in many Western countries offers evidence for this polarization. For example, results from Goos et al. (2014) found job polarization in all 16 of the developed countries they studied.

2.2. Companies

As previously discussed, companies stand to gain much through automation. Yet, these same companies have already begun to experience negative consequences in the form of increased scrutiny from employees, governments, and customers—often an antecedent to regulations that could affect future innovation. Eventually, automation may create an economy where most consumers cannot afford products created by robots on account of lost wages (Wohlsen, 2014).

From our analysis, it is also clear that business automation is likely to impact industries, countries, and economies differently (see Figure 1). Economies composed primarily of manufacturing, food service and accommodations, and retail are most susceptible (Chui, Manyika, & Miremadi, 2016). Also, many companies are unmotivated or ill-equipped to compete in an automation-based economy. Larger companies will likely benefit more from and possess the capital to adopt automated processes.

2.3. Governments and nations

Several governments have displayed interest in automation, and some developed and developing countries have formed task forces to consider and address automation's future. The U.S. and U.K. have held back on automation until they understand the structural problems it creates, yet the U.S. remains the largest adopter of new automation and AI technologies. Companies in China and Korea are rapidly expanding their use of robotics as the government continues to subsidize its development and adoption. Many countries see the next wave of automation as both a strong potential disruption that will affect its citizens and an opportunity for economic growth or—if ignored—possible decline.

Researchers predict that developed versus developing countries will benefit most from increased automation (Manyika et al., 2017; see Appendix). Companies in the U.S. and many Western European countries (e.g., Germany, France) are incorporating more automation while emerging economies in the Middle East and Brazil are falling further behind (Manyika et al., 2017). Growing adoption of technology in developing nations is predicted to increase income and geographic inequality (Berger, Chen, & Frey, 2017). As automation becomes cheaper than labor, companies founded in developed countries will reshore production to their home country, as outsourcing will have fewer economic advantages. Consequently, countries like India and China, whose economies rely largely on providing cheap labor, will experience increased hardships (Hartman, Ogden, Wirthlin, & Hazen, 2017). Zhou and Tyers (2017) predicted that automation will significantly increase unemployment in China unless (1) China's population growth declines, (2) automation increases investments in innovation and education, or (3) companies identify new ways of improving their total factor productivity growth, an economic measure of output per labor and capital inputs. In contrast, the U.K. is expected to experience the least amount of disruption because many in its labor force work in creative fields that are less prone to automation. Overall, this suggests that automation's increased impact will contribute to, rather than reduce, the economic chasm between developed and developing economies.

2.4. Consumers

According to current projections, consumers will continue to benefit economically as automation enhances labor efficiencies. Lower production costs translate to lower prices and increased consumer demand. Overall, automation provides consumers with greater purchasing power (Brynjolfsson & McAfee, 2014).

On the other hand, consumers are social beings who desire to feel connected to their community. Research demonstrates that even weak ties—that is, interactions with people whom we do not know well, like grocery cashiers or baristas—can dramatically affect our sense of belonging (Sandstrom & Dunn, 2014) and emotional well-being (Granovetter, 1973). Automation could decrease the regularity and quality of human interactions, which may contribute to greater feelings of isolation and disconnection, making it more difficult for consumers to satisfy some of these basic human needs (Maslow, 1943).

3. Social contracts theory informs social contracts of automation

Social contracts theory asserts that rational individuals ought to give up some of their natural freedoms to the state in exchange for collective benefits and

that the legitimacy of governance is contingent upon the state's ability to fulfill and maintain these obligations. Consistent with this thesis, Donaldson and Dunfee (1994) developed the context-specific Integrated Social Contracts Theory (ISCT) which provides a normative approach to formulating business ethics. According to ISCT, social individuals and entities form implied agreements driven by a hierarchy of norms (Dunfee, Smith, & Ross, 1999). This hierarchy incorporates detailed, micro-level norms that are consistent with broad, macro-social norms (i.e., hypernorms). Many of these hypernorms have been identified through Hartman, Shaw, and Stevenson's (2003) work in which they analyzed norms set by the United Nations, the Organization for Economic Cooperation and Development, the International Labor Organization, and the Caux Roundtable. In essence, laborers provide companies with labor, with the expectation that companies will provide a living wage, a healthy and fair work environment, and adequate training while considering their employees' general well-being. Firms automating tasks need to consider the welfare of their employees, and how their actions may violate the norms associated with various social contracts. In the second step of our ethical framework (see Figure 2, Step 2), we encourage firms to enumerate these social contracts.

Company actions that violate these social contracts experience distrust from workers, society, and governments (Donaldson & Dunfee, 1994), which is subsequently linked to poorer employee performance, weakened community relations, and lower brand loyalty (Cropanzano, Anthony, Daniels, & Hall, 2016). We recognize, though, that the recommendations put forth by Hartman et al. (2003) represent norms developed and established predominantly by first-world countries and global businesses. Future research should explore broader hypernorms and how perceptions of hypernorms vary. We also recommend that organizations applying social contracts theory to automation first identify universal rights (e.g. humane work hours), quantify the scope and content of those universal

Figure 2. Developing an integrated ethical framework

Step 1: Identify Stakeholders →	Step 2: Enumerate Social Contracts →	Step 3: Assess Stakeholder Impact →	Step 4: Minimize Social Contract Violations/Disruptions
Which external parties, individuals, or organizations are impacted by the practices in question?	**What actions does each stakeholder expect?**	**How is each stakeholder impacted?**	**How can we avoid violating stakeholder expectations?**
Stakeholders are the parties interested in, influenced by, or concerned with the company's actions.	Stakeholders hold idiosyncratic expectations (determined by micronorms) that adhere to societal expectations (i.e., hypernorms) (Donaldson & Dunfee, 1994).	Consider the beneficial and detrimental consequences for each stakeholder.	Encourage company actions that minimize stakeholder harm and preserve social contract expectations.
AI/Automation: automation is potentially consequential to a variety of stakeholders including customers, employees, governments, and competitors.	*AI/Automation*: Stakeholders maintain various behavioral expectations. For example, employees frequently expect companies to provide retraining opportunities alongside automation. Stakeholders frequently hold expectations regarding the following, among others (Donaldson & Dunfee, 1994; Martin, 2012): • Notice – are stakeholders properly notified? • Security – is privileged information kept safe/private? • Voice – is stakeholder input considered/incorporated?	*AI/Automation*: Automation is increasingly affecting stakeholders. Examples include the following: • Human labor is being devalued. • Companies are increasing production efficiencies while decreasing operating costs. • Governments are grappling with growing societal issues related to wealth inequality.	*AI/Automation*: In some instances, stakeholder harm may be unavoidable when adopting automation technologies. For example, some forms of labor displacement and retraining will occur. Stakeholders in positions of power/influence should consider these consequences beforehand and minimize undue disruptions/harm.

rights, and understand how various actors are affected by automation (see Figure 2, Step 3). For example, wealthier workers are likely to be less affected by automation compared to low-skilled laborers because their well-being is less reliant on ongoing wages. Future research should consider the micronorms or nature of particular workers when adhering to hypernorms (Donaldson & Dunfee, 1994).

4. Best practices according to both theories

We propose a number of actions and best practices based upon our ethical analysis. First, we recommend that companies consider automation's effects on various stakeholders (Figure 2, Step 1). Companies should also consider their social contracts with various stakeholders (Figure 2, Step 2; Wright & Xie, in press). Depending on those contracts, companies should find solutions to increase net benefits to various stakeholders and maintain the contracts' terms (Figure 2, Step 3). Finally, we discuss recommendations that firms and governments might implement to lessen the negative effects of automation for various stakeholders (Figure 2, Step 4).

In this section, we provide five recommendations for firms and policymakers regarding business automation. We recommend they (1) acknowledge the transition, (2) minimize disruptions, (3) reduce social inequalities, (4) embrace regulation and oversight, and (5) create sources of meaning outside of work. These recommendations appear in the last step of our framework (see Figure 2). Our recommendations focus on increasing business automation's benefits while reducing the potential ethical concerns it raises.

4.1. Acknowledge the transition

Business automation is forecasted to grow exponentially (Leask, Chaudhary, & Jha, 2017). Stakeholders need to prepare, recognizing that this rapid growth will have important consequences. Stakeholders that ignore automation will be left behind or face increased competitive pressure. We recommend that stakeholders identify ways to embrace automation while minimizing potential disruptions for other stakeholders. Automation, if designed and implemented appropriately, can lead to many advantages for organizations and nations including increased productivity, reduced capital investments, and an overall improvement in stakeholder wellbeing.

4.2. Minimize disruptions

As automation grows, nations and companies need to identify and build initiatives to minimize its negative effects. We recommend that nations and companies (1) invest in their workforce and (2) retrain displaced workers. These actions will help alleviate two of the three factors we identified in Figure 1 that determine the extent to which automation will displace workers, specifically the extent to which the position is routine and relies on higher-level training.

- *Invest in the workforce*. As use of automation increases, firms will employ fewer employees. Those employed will require the skills to work in a technologically driven workplace. To ensure that employees keep pace, firms will need to educate and train their workforce. AT&T, for example, is currently working to reeducate 100,000 of its employees through online universities (Pressman, 2017). For companies like AT&T, reskilling current employees makes economic sense, as these employees understand the industry and company culture, and the decision to reskill removes hiring costs. Governments should offer incentives to encourage companies to invest in workers. Such incentives may also accelerate the speed at which the workplace adapts to the disruption of automation.

- *Retrain displaced workers*. As automation continues to replace lower-skilled labor, public policy officials and organizations should create policies that encourage people to pursue advanced education. A survey by the European Commission found that in countries that offer free health care, education, and job transition programs, people expressed less concern with automation, and even felt enthusiasm for it. In Sweden, 80% of citizens report feeling positive about automation and AI because they trust their government and companies will take care of them (O'Dwyer, 2018).

Similar to policies in Scandinavian countries, governments may give free or intensely subsidized college educations to today's workforce in order to support the transition to a higher reliance on automation (e.g., China has committed to increasing vocational training among its low-skilled employees). Furthermore, given the increased demand brought on by automation for skills related to creativity, social skills, and training in science, technology, engineering, and math (STEM), public policy officials may offer stipends for laborers majoring in

fields that emphasize these skillsets. Secondary education may also wish to place greater emphasis on these skills in their required curriculum.

4.3. Reduce social inequalities

Most researchers believe that advances in business automation will increase inequality among people and countries. Technology will reduce employment opportunities for displaced workers (Autor, 2015), automated weapons and robotic soldiers will further increase inequality among countries and change the way wars are fought, and insufficient internet access will restrict social mobility for those in impoverished regions. Unless policies narrow rather than widen the gap between rich, technologically-advanced countries and poorer, less-advanced nations, it is likely that technology will continue to contribute to rising inequality. In response, we recommend that nations and governments consider (1) wealth redistribution, and (2) implementing policies to reduce social injustice.

- *Wealth redistribution.* If automation causes significant unemployment or wage stagnation, governments may need to consider offering income support. This idea is starting to gain traction in Silicon Valley—with supporters who include Bill Gates and Elon Musk—as well as in Western Europe. With a universal income, government subsidies for laborers and the unemployed would provide low-income citizens with a comfortable standard of living in relation to current government subsidies that provide a meager wage that encourages people to find work. Another suggestion is the Universal Basic Adjustment (Muro & Parilla, 2017). Unlike universal income, benefits focus on helping people find work and include wage insurance, occupational counseling, relocation subsidies, and financial and career help. Governments may also tax robots to help recoup lost income tax dollars from human laborers (Brynjolfsson & McAfee, 2014; Guerreiro et al., 2017). This strategy could level the playing field for workers because it would make automation more expensive, decreasing automation's competitive advantage in comparison to human labor.

- *Policies to reduce social injustice.* A technological arms race is underway in Russia, China, and the U.S. According to Russian President Vladimir Putin: "Whoever becomes the leader in this sphere will become the ruler of the world" (Vincent, 2017). To alleviate global competitiveness and instability, we suggest international organizations (e.g., the United Nations) identify procedural steps and develop regulations. As an example, a group sponsored by the United Nations met informally in 2014 to debate the rise of lethal autonomous weapon systems (LAWS). We suggest that nations expand their collaborative efforts to develop and enact international regulations focused on automation.

4.4. Embrace regulation and oversight

Nations are starting to take steps to regulate business automation as they begin to see the risks and potential backlash that occurs in tandem with the economic growth it spurs. For example, the U.S. Congress passed three acts to help regulate technology: the Self-Drive Act and the AV Start Act, which concern the safety of driverless vehicles, and the Future of AI Act, which created a federal advisory committee focused on AI concerns. However, as little legislation exists to regulate automation, more steps will be required to ensure the effective governance of business automation. To keep pace, organizations have begun collaborating to regulate themselves and ensure that competitors maintain ethical business practices. For example, Facebook, Google, Microsoft, and IBM aim to address ethical issues and improve society's understanding of artificial intelligence through the Partnership on Artificial Intelligence to Benefit People and Society.

Social contracts theorists hold that companies have obligations to ensure laborers' fundamental rights. Using social contracts theory as a guide, we recommend that nations and organizations weigh the productivity and competitiveness that automation will bring against various hypernorms such as fairness, healthy working environments, education, subsistent wage, and wellbeing (Donaldson & Dunfee, 1994; Hartman et al., 2003). In countries like China and Japan—which rely heavily on manufacturing—the need for economic growth and diversification will be more critical than in countries like the U.S., England, and Canada where economies are more diversified and less disrupted by automation. In less-diversified economies, rules and regulations will be more concerned with keeping the economy afloat than with workers' rights. Meanwhile, in diversified nations, laws will be able to adapt incrementally, and legislation can place more importance on workers' rights because these economies can afford to adjust more slowly.

We recommend that nations and organizations first identify various hypernorms, which may vary by culture, weigh these in light of the economic benefits of automation (e.g., how diversified and immune the economy is to automation), and then set up committees and regulations that adhere to

those hypernorms in relation to the costs of not automating. Nations that fail to implement regulations based on hypernorms will risk businesses in their country taking advantage of automation at the expense of governments, citizens, and society. Foresight in regulations surrounding business automation is critical for governments and companies.

4.5. Create sources of meaning outside of work

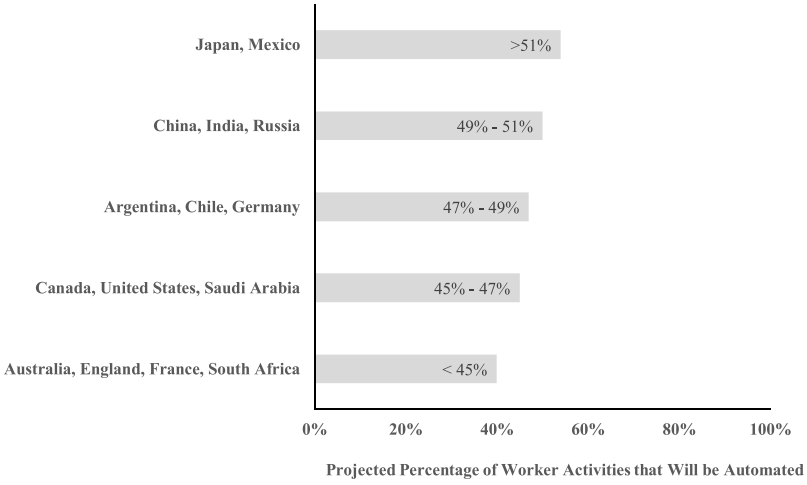
For most employed individuals, the benefits of work extend beyond its economic function. Work provides self-worth (Cohn, 1978), meaning (Morse & Weiss, 1955), community (Katz & Kahn, 1978; Weick, 1995), healthy routines, and other sources of well-being (Rosso, Dekas, & Wrzesniewski, 2010). People have an innate desire to feel like they are contributing to the greater good to feel purpose in their life, and work can be an outlet for many to feel connected to this greater purpose (Rosso et al., 2010). However, if automation dramatically increases joblessness, then organizations and governments may need to help individuals identify ways to find meaning in activities outside of work. Community programs, increased investment in national parks, adult learning programs, and incentives to earn a degree may help individuals find new sources of self-worth and community.

5. Summary

Advances in technological automation increase productivity significantly. However, there is evidence that business automation also comes with costs. Some worry that automation and AI will affect the future of work and the feelings of worth people derive from work. Others are concerned about the impact of automation on smaller organizations that cannot invest in machine capital and governments that earn revenues from taxing citizens, not machines. In this article, drawing from two ethical models—stakeholder theory and social contracts theory—we present a novel ethical framework to understand how the next wave of automation will impact different stakeholders and analyze how social contracts affect relationships among stakeholders. We conclude by providing recommendations to organizations and governments interested in creating policies to support a successful transition to a more technologically advanced society. Our framework is depicted in Figure 2.

This article is the first to apply stakeholder theory to automation and demonstrate how automation will affect various stakeholders. We also consider how various laborers and countries will be affected by automation. We hope this article opens a dialogue about the benefits and ethical concerns of automation and captures the attention of the social and behavioral literature, which has not yet considered the ethical component of recent automation. Finally, this article provides a list of best practices that organizations and governments can follow to protect themselves from the negative consequences of automation. Overall, we believe this framework expands our understanding of how automation will continue to affect laborers, governments, society, and consumers.

Appendix. Projected percentage of worker activities that will be automated by region



Source: Adapted from Manyika et al. (2017)

References

Abeliansky, A., & Prettner, K. (2017). *Automation and demographic change* (CEGE Discussion Paper No. 310). Available at http://wwwuser.gwdg.de/~cege/Diskussionspapiere/DP310.pdf

Abrams, D., & Hogg, M. A. (1988). Comments on the motivational status of self-esteem in social identity and intergroup discrimination. *European Journal of Social Psychology, 18*(4), 317–334.

Acemoglu, D., & Restrepo, P. (2017). *Robots and jobs: Evidence from US labor markets* (NBER Working Paper No. 23285). Available at http://www.nber.org/papers/w23285

Arntz, M., Gregory, T., & Zierahn, U. (2017). Revisiting the risk of automation. *Economics Letters, 159*, 157–160.

Autor, D. H. (2015). Why are there still so many jobs? The history and future of workplace automation. *The Journal of Economic Perspectives, 29*(3), 3–30.

Berger, T., Chen, C., & Frey, C. B. (2017, January). *Drivers of disruption? Estimating the Uber effect*. Oxford, UK: Oxford Martin School, University of Oxford.

Brenner, S. N., & Cochran, P. L. (1991). The stakeholder model of the firm: Implications for business and society research. In J. F. Mahon (Ed.), *Proceedings of the second annual meeting of the International Association for Business and Society* (Vol. 2, pp. 449–467). Sundance, UT: IABS.

Brynjolfsson, E., & McAfee, A. (2014). *The second machine age: Work, progress, and prosperity in a time of brilliant technologies*. New York, NY: WW Norton & Company.

Chui, M., Manyika, J., & Miremadi, M. (2016, July). Where machines could replace humans—and where they can't (yet). *McKinsey Quarterly*. Available at https://www.mckinsey.com/businessfunctions/digital-mckinsey/our-insights/where-machines-could-replace-humans-and-where-they-cant-yet

Cohn, R. M. (1978). The effect of employment status change on self-attitudes. *Social Psychology, 41*(2), 81–93.

Cropanzano, R., Anthony, E. L., Daniels, S. R., & Hall, A. V. (2016). Social exchange theory: A critical review with theoretical remedies. *Academy of Management Annals, 11*(1), 1–38.

Donaldson, T., & Dunfee, T. W. (1994). Toward a unified conception of business ethics: Integrative social contracts theory. *Academy of Management Review, 19*(2), 252–284.

Dunfee, T. W., Smith, N. C., & Ross, W. T., Jr. (1999). Social contracts and marketing ethics. *The Journal of Marketing, 63*(3), 14–32.

Evans, G. L. (2017). Disruptive technology and the board: The tip of the iceberg 1. *Economics and Business Review, 3*(1), 205–223.

Executive Office of the President. (2016). *Artificial intelligence, automation, and the economy*. Available at https://obamawhitehouse.archives.gov/sites/whitehouse.gov/files/documents/Artificial-Intelligence-Automation-Economy.PDF

Freeman, R. E. (1984). *Strategic management: A stakeholder approach*. Boston, MA: Pitman/Ballinger (Harper Collins).

Freeman, R. E. (1994). The politics of stakeholder theory: Some future directions. *Business Ethics Quarterly, 4*(4), 409–421.

Frey, C. B., & Osborne, M. A. (2017). The future of employment: How susceptible are jobs to computerisation? *Technological Forecasting and Social Change, 114*, 254–280.

Gasteiger, E., & Prettner, K. (2017). *On the possibility of automation-induced stagnation* (Hohenheim Discussion Papers in Business, Economics, and Social Sciences No. 07-2017). Available at http://opus.unihohenheim.de/volltexte/2017/1338/

Goos, M., Manning, A., & Salomons, A. (2014). Explaining job polarization: Routine-biased technological change and offshoring. *The American Economic Review, 104*(8), 2509–2526.

Granovetter, M. S. (1973). The strength of weak ties. *American Journal of Sociology, 78*(6), 1360–1380.

Guerreiro, J., Rebelo, S., & Teles, P. (2017). *Should robots be taxed?* (NBER Working Paper No. 23806). Available at http://www.nber.org/papers/w23806

Gurkaynak, G., Yilmaz, I., & Haksever, G. (2016). Stifling artificial intelligence: Human perils. *Computer Law and Security Review, 32*(5), 749–758.

Habakkuk, H. J., & Postan, M. (1966). The Industrial Revolution and after: Incomes, population, and technological change. In *The Cambridge economic history of Europe* (Vol. 6). Cambridge, UK: Cambridge University Press.

Hartman, L. P., Shaw, B., & Stevenson, R. (2003). Exploring the ethics and economics of global labor standards: A challenge to integrated social contract theory. *Business Ethics Quarterly, 13*(2), 193–220.

Hartman, P. L., Ogden, J. A., Wirthlin, J. R., & Hazen, B. T. (2017). Nearshoring, reshoring, and insourcing: Moving beyond the total cost of ownership conversation. *Business Horizons, 60*(3), 363–373.

Jin, H. (2017, November 28). Hyundai Kona crossover factory grinds to a halt ahead of U.S. launch. *AutoBlog*. Available at https://www.autoblog.com/2017/11/28/hyundai-kona-crossover-factory-union-la-auto-show/

Karabarbounis, L., & Neiman, B. (2014). *Capital depreciation and labor shares around the world: Measurement and implications* (NBER Working Paper No. 20606). Available at http://www.nber.org/papers/w20606

Katz, D., & Kahn, R. L. (1978). *The social psychology of organizations* (Vol. 2). New York, NY: Wiley.

Katz, L. F., & Margo, R. A. (2014). Technical change and the relative demand for skilled labor: The United States in historical perspective. In L. P. Bouston, C. Frydman, & R. A. Margo (Eds.), *Human capital in history* (pp. 15–57). Chicago, IL: University of Chicago Press.

Keynes, J. M. (1930). *A treatise on money*. London, UK: Macmillan.

Lankisch, C., Prettner, K., & Prskawetz, A. (2017). *Robots and the skill premium: An automation-based explanation of wage inequality* (Hohenheim Discussion Papers in Business, Economics, and Social Sciences No. 29-2017). Available at https://www.econstor.eu/bitstream/10419/169370/1/898698979.pdf

Leask, S., Chaudhary, G., & Jha, A. (2017, December). *Success in automation: Decoding the winning formula*. Available at https://www.cognizant.com/whitepapers/success-in-automation-decoding-the-winning-formula-codex3038.pdf

Manyika, J., Chui, M., Miremadi, M., Bughin, J., George, K., Willmott, P., et al. (2017, January). *A future that works: Automation, employment, and productivity*. New York, NY : McKinsey Global Institute.

Maslow, A. H. (1943). A theory of human motivation. *Psychological Review, 50*(4), 370–396.

Morse, N. C., & Weiss, R. S. (1955). The function and meaning of work and the job. *American Sociological Review, 20*(2), 191–198.

Muro, M., & Parilla, J. (2017, January 10). Maladjusted: It's time to reimagine economic 'adjustment' programs. *Brookings*. Available at https://www.brookings.edu/blog/the-avenue/2017/01/10/maladjusted-its-time-to-reimagine-economic-adjustment-programs/

Nof, S. Y. (2009). Automation: What it means to us around the world. In S. Nof (Ed.), *Handbook of automation* (pp. 13—52). Berlin, Germany: Springer-Verlag.

O'Dwyer, G. (2018, March 26). Swedish study talks up benefits of artificial intelligence. *Computer Weekly*. Available at https://www.computerweekly.com/news/252437544/Swedish-study-talks-up-benefits-of-artificial-intelligence

Pressman, A. (2017, March 15). Can AT&T retrain 100,000 people? *Fortune*. Available at http://fortune.com/att-hr-retrain-employees-jobs-best-companies/

Rosso, B. D., Dekas, K. H., & Wrzesniewski, A. (2010). On the meaning of work: A theoretical integration and review. *Research in Organizational Behavior, 30*, 91—127.

Sachs, J. D., & Kotlikoff, L. J. (2013). *Smart machines and long-term misery* (NBER Working Paper No. 18629). Available at http://www.nber.org/papers/w18629

Sandstrom, G. M., & Dunn, E. W. (2014). Social interactions and well-being: The surprising power of weak ties. *Personality and Social Psychology Bulletin, 40*(7), 910—922.

Schwab, K. (2016). *The fourth industrial revolution*. Geneva, Switzerland: The World Economic Forum.

Smith, C. L. (2013). *The dynamics of labor market polarization* (Federal Reserve Board Finance and Economics Discussion Series No. 2013-57). Available at https://www.federalreserve.gov/pubs/feds/2013/201357/201357pap.pdf

Tufekci, Z. (2015). Algorithmic harms beyond Facebook and Google: Emergent challenges of computational agency. *Journal on Telecommunications and High Techology Law, 13*(2), 203—217.

Vincent, J. (2017, September 4). Putin says the nation that leads in AI 'will be the ruler of the world.' *The Verge*. Available at https://www.theverge.com/2017/9/4/16251226/russia-ai-putin-rule-the-world

Wang, D. (2013, December 16). German employees rally outside Amazon headquarters: 'We're People, Not Robots'. *KUOW*. Available at http://kuow.org/post/german-employees-rally-outside-amazon-headquarters-were-people-not-robots

Weick, K. E. (1995). *Sensemaking in organizations* (Vol. 3). Thousand Oaks, CA: Sage.

Wohlsen, M. (2014, August 8). When robots take all the work, what'll be left for us to do? *Wired Business*. Available at https://www.wired.com/2014/08/when-robots-take-all-the-work-whatll-be-left-for-us-to-do/

Wright, S. A., & Xie, G. X. (In press). Perceived privacy violation: Exploring the malleability of privacy expectations. *Journal of Business Ethics*.

Zhou, Y., & Tyers, R. (2017). *Automation and inequality in China* (CAMA Working Paper No. 59/2017). Available at https://cama.crawford.anu.edu.au/sites/default/files/publication/cama_crawford_anu_edu_au/2017-09/59_2017_zhou_tyers.pdf