

Strengthening ethical guardrails for emerging technology businesses

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Abstract

Purpose – The purpose of this paper is to make the case that ethical guardrails in emerging technology businesses are inadequate and to develop solutions to strengthen these guardrails.

Design/methodology/approach – Based on literature and first principles reasoning, the paper develops theoretical arguments about the fundamental purpose of ethical guardrails and how they evolve and then uses this along with the characteristics that distinguish emerging technology businesses to identify inadequacies in the ethical guardrails for emerging technology businesses and develop solutions to strengthen the guardrails.

Findings – The paper shows that the ethical guardrails for emerging technology businesses are inadequate and that the reasons for this are systematic. The paper also develops actionable recommendations to strengthen these guardrails.

Originality/value – The paper develops the novel argument that reasons for the inadequate ethical guardrails in emerging technology businesses are systematic and stem from the inadequacy of laws and regulations, inadequacy of boards and the focus of business executives.

Keywords Ethical guardrails, Emerging technology businesses, Boards, Negative externalities

Paper type Research paper

Introduction

Emerging technology businesses use emerging (i.e. new) technologies to introduce products and enter markets. Emerging technology businesses are typically startups rather than large, mature, established businesses. The innovations introduced by these businesses using their emerging technologies present unprecedented opportunities for all stakeholders including customers, investors and society at large. However, the new technologies of these businesses, either directly or indirectly, also raise the risk of significant harm because of inadequate ethical guardrails. Consider the potential gains and direct risks from the following emerging technologies across a broad swath of the economy.

Artificial Intelligence (AI), especially generative AI technologies, such as ChatGPT, has taken the business world by storm with predictions that these technologies will add between \$2.6tn and \$4.4tn annually, change the way companies perform their operations and



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enhance the efficiency of our daily activities (Chui *et al.*, 2023). Because of inadequate guardrails, however, a number of scientists, including those responsible for the development of these systems have warned of serious risks from the AI systems, including systemic bias, misinformation, malicious use, cyberattacks and weaponization in the immediate future and the possibility of even extinction in the more distant future (Borges, 2023; Renaud *et al.*, 2023; Romo, 2023).

Biotechnologies, such as stem cell therapy, gene therapy, personalized medicine and implanted medical devices promise new and more effective treatments. Innovations in tissue engineering and pluripotent stem cells, for example, can treat diseases for which there are presently no cures (Petrosyan *et al.*, 2022). Inadequate protection for human subjects in clinical trials of new biotechnologies, however, can and has caused significant harm, as evident from the death of an 18 year old gene therapy trial participant (Sharma *et al.*, 2022; Silverman, 2004). Fintech, or financial technologies, such as mobile payment systems, low-cost online trading, peer-to-peer lending, smart insurance, crypto currencies and block chains have brought tremendous benefits (Berg *et al.*, 2022; Renduchintala *et al.*, 2022; Tambe and Jain, 2023). By lowering costs, for example, Fintech firms have expanded investment services, including options trading, to millions of first-time investors. Not all of these investors understand the risks, however, causing real harm as illustrated by the 20 year old college student who committed suicide after racking up a loss of \$730,000 on options trading on a Fintech firm's platform (Rooney, 2020).

Emerging energy technologies reduce our dependence on fossil fuels, contributing to the sustainability of the planet (Salkuti, 2022). The accumulation of toxic waste from broken or decommissioned solar panels, however, is a significant and growing environmental hazard as recycling is presently not a profitable enterprise and there is no dedicated funding source for governments to subsidize recycling (El-Khawad *et al.*, 2022; Shellenberger, 2018). Emerging food and agro technologies have contributed to greater yield in food production (Falk *et al.*, 2002). This greater yield, however, has been accompanied by a reduction in micronutrient content in major cereals, as the agro tech firms seem to focus on increasing yield at the expense of other ethically valuable breeding goals, such as nutritional content and lower environmental impact (Hansson, 2019). Social media firms enable greater connectivity and accessibility of information through internet platforms. These same platforms, however, can be abused to amplify divisiveness in society and even threaten democracy (Terren and Borge-Bravo, 2021). Firms leveraging the Internet of Things (IoT), bring benefits including remote monitoring of homes, smart buildings and cities and autonomous transportation (Ranger, 2020). Since IoT bridges the physical and digital worlds, they are vulnerable to hacking by malicious actors and the resulting harm can be very serious (Ranger, 2020).

In addition to the potential for direct harm from the technologies, as described in the examples above, emerging technologies of these businesses can also cause indirect harm. For example, ride-sharing companies, such as Uber, use the emerging technology of electronic platforms which leverage a new labor market of drivers and match them with potential ride seekers. These drivers were a category that did not exist earlier and, hence, were not covered by the protections of existing labor regulations. Large numbers of ride-sharing drivers have been harmed as a result (Hawkins, 2019). The inability of boards of emerging technology businesses to provide effective oversight of executives because they are not adequately equipped to understand the new technologies provides another avenue for indirect harm from emerging technologies. Because of inadequate board oversight, executives of emerging technology businesses, such as Theranos have been able to engage

in fraudulent activity that can and has caused significant harm to customers and investors (Bilton, 2016).

Thus, while emerging technology businesses hold the promise of great many benefits across almost every segment of the economy, they also involve a number of risks which can and have caused real harm. It is, therefore, important to address the risks even as we seek the benefits of emerging technology businesses. The risks and the associated harm from emerging technology businesses are at least in part due to inadequate ethical guardrails present for such businesses, which deserve closer attention and strengthening.

Theory: ethical guardrails for business

Reasoning from first principles refers to boiling things down to the most fundamental truths or the first basis from which a thing is known, and then reasoning up from there (Higgins, 2023; Irwin, 1989; Leiva, 2022; Pfeffer and Fong, 2005; Tomas *et al.*, 2022). By reasoning from first principles, and based on literature, this section develops theoretical arguments to understand the fundamental purpose of ethical guardrails and a model of how the guardrails develop.

Market economies, as their fundamental trait, rely on businesses to deliver products and services that will raise the standard of living and quality of life for people in society. Businesses accomplish this by innovating new products, services and production methods. The present crop of emerging technologies mentioned in the introduction section promises to do just this – deliver better products, services and production methods to raise the standard of living and quality of life. It is also, however, fundamentally true that business activity needs ethical guardrails, without which business activity could lead to negative externalities (Heath, 2004). That is, business activity may result in undesirable outcomes for society even though such activity may benefit individuals and individual businesses in the short term (Heath, 2004). Thus, for example, without regulations on pollution, business activity could not only deliver better products and better profits for businesses in the short term but also lead to the long-term deterioration of air and water quality. In addition, because of the separation of ownership and control of businesses, without effective oversight from the board of directors, managers acting in their own self-interest can harm the survival and performance of businesses which would otherwise work to raise the standard of living and quality of life in society (Fama and Jensen, 1983). The fundamental purpose of ethical guardrails is, therefore, to ensure that business activity provides the benefits that society seeks without or while minimizing, undesirable or harmful outcomes.

At its core, it is the people in a society who enact these ethical guardrails by evolving formal rules that govern business behavior via laws and regulations, which are enforced through courts and regulatory oversight and informal norms that business behavior is expected to abide by, which are enforced through social rather than legal or regulatory sanctions (Heath, 2004; North, 1990). Ethical guardrails evolve through a process and reflect the strength of social consensus around acceptable and unacceptable business behavior at the time. In a market economy, business behavior is typically unconstrained by ethical guardrails to begin with. As more and more evidence surfaces about negative consequences of certain business behavior, consensus begins to build about the unacceptability of the behavior. Initially, consensus tends to be weak, and not engaging in such behavior is held as an informal norm which, given the weak consensus, may not invite social sanction adequate to dissuade the behavior. As more evidence emerges, and the negative consequences of the behavior are better and more widely understood in society, the social consensus strengthens. The unacceptability of the business behavior may yet be an informal norm at this point but one where social sanctions may be significant enough to dissuade widespread engagement

in the behavior. As social consensus strengthens further with respect to the unacceptability of the behavior, society may move to codify the unacceptability of the behavior in formal laws and regulations, which then are enforced through courts and regulatory oversight. [Figure 1](#) provides an illustration of this process.

Progression along the path from weak informal norms to codification into laws and regulations is neither one way nor inevitable. As more evidence emerges, it is possible that a behavior that was thought to have negative consequences may be found relatively harmless, and hence the process may not proceed to codification into formal laws or regulations. It is also the case that society may come to find that previously adopted laws and regulations are no longer necessary, for example, because relevant technologies or production methods that caused harm may have since changed, and therefore, repeal the said laws and regulations.

Efficacy of the ethical guardrails in protecting society from undesirable effects of business activity at any given time can vary depending on the adequacy of laws and regulations, the adequacy of informal norms and the enforcement of both formal rules and informal norms. In what follows, I argue that, for systematic reasons [1], the ethical guardrails for emerging technology businesses are inadequate.

Inadequate guardrails in emerging technology businesses

This section draws on the theoretical arguments about the fundamental purpose of ethical guardrails and how they evolve, developed from first principles reasoning in the previous section, and the distinguishing characteristics of emerging technology businesses to identify why ethical guardrails for these businesses are systematically inadequate.

Paucity or inadequate coverage of laws and regulations

As argued in the theory section, the fundamental purpose of ethical guardrails, including laws and regulations, is to allow benefits from business activity to flow without or while minimizing the negative effects to society from these activities. Regulations are by their nature restrictive and innovations, by their nature, require freedom to experiment. Regulations, therefore, can stifle innovations by restricting what can and cannot be done ([Curfman and Redberg, 2020](#); [Lim and Prakash, 2014](#); [Ranchordás, 2015](#)). In addition, regulations impose compliance costs, and these costs can drain funds that otherwise would be invested in research and development and regulations can stifle innovation in this manner as well ([Lim and Prakash, 2014](#)). Since much of the benefits to society from emerging technology businesses stem from the innovations they introduce, regulators weigh the risk of stifling the innovations before they introduce regulations ([Curfman and Redberg, 2020](#); [Nannini et al., 2023](#); [Ranchordás, 2015](#)).

Regulations come about through an evolutionary process that includes gathering and evaluating the necessary information and are not rushed into existence.

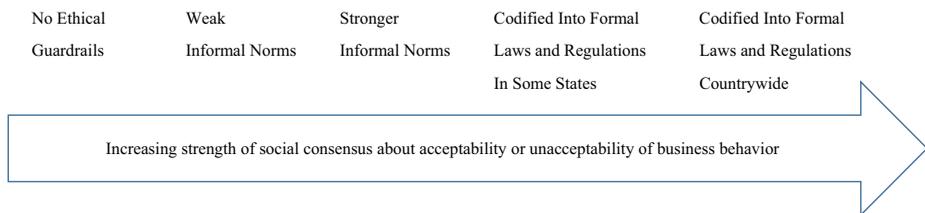


Figure 1.
How ethical guardrails evolve

Source: By author

Regulations are introduced only when there is clear and sufficient evidence that harm from the business practice that is being considered for regulation is sufficiently high to justify the compliance cost and the risk of stifling innovation (Curfman and Redberg, 2020; Ranchordás, 2015). As a result, businesses could engage in practices that may cause harm without regulatory restraint for some time before regulations are introduced to address such behavior. Moreover, innovations by emerging technology businesses evolve rapidly and, therefore, present a moving target for regulators (Brownsword, 2008; Ranchordás, 2015). That is, even as regulators consider regulating their existing business practices these businesses innovate newer ones. Consequently, there is a persistent lag between emerging technology business practices and regulations (Brownsword, 2008; Ranchordás, 2015). For these reasons, regulations for emerging technology businesses remain inadequate. The below list provides examples of the paucity or inadequate coverage of laws and regulations:

- Classification of drivers of ride-sharing firms as contractors or employees is not clearly delineated by extant laws and regulations outside California, leading rideshare drivers to claim harm from unfair employment practices and traditional taxi owners to claim harm from unfair competitive practices (Dickinson, 2018; Hawkins, 2019).
- Collection of genetic information is not sufficiently regulated, including by the Genetic Information Non-discrimination Act, since the genetic information can legally be used in ways that are harmful, including discrimination while obtaining long-term care insurance or life insurance (Seife, 2013; Stein, 2012). Furthermore, while extant laws allow for the sale of anonymized genetic data, nefarious actors can use genetic markers tied to specific physical traits, such as eye or hair color, cross-referenced with publicly available demographic data to unmask the identity of persons behind genetic data (Pitts, 2017).
- Despite evidence that cadmium from broken solar panels can leach into the soil, regulations to classify them as toxic waste are yet to be uniformly adopted, even in some developed countries. Furthermore, due to loopholes in the waste electrical and electronic equipment directives, used solar panels, unlike other forms of e-waste, can enter developing nations with less developed waste disposal systems legally before ending up there as e-waste (IER, 2018; Shellenberger, 2018).
- In the USA, unlike in Europe, intellectual property laws do not provide sufficient exemptions for independent researchers and institutions to compare seeds owned by agro-tech firms with seeds from other companies (Hansson, 2019).
- In January 2020, some of the first regulations aimed at securing consumer data collected by the IoT took effect in the USA and the UK. These regulations do not yet cover some important IoT security issues, including the “bombardment the devices suffer from unsolicited traffic from web crawlers and other bots, which reduces battery life, consumes limited data plans, and creates bill contention (Fernandez, 2020).”
- Unlike traditional media, such as television and newspaper companies, since they do not create their own content, libel, defamation and other laws and regulations do not apply to social media firms. Social media platforms, however, have been abused to amplify divisiveness and cause great social harm and adequate regulations to prevent such harm are not yet in place (Wareham, 2020).

In addition, at times, governments also exclude or suspend regulations to foster the development of emerging technology businesses. These exclusions and suspensions can have unintended consequences which can further weaken the guardrails for these businesses. For example, the US Government, as part of the JOBS Act, removed some restrictions on the ability of startups to raise private capital. Although the law was intended to clear the path for startups toward their IPOs, such changes have instead contributed to more startups remaining private despite enormous valuations and scale. One unintended and harmful fallout is what has been termed the “unicorn governance trap,” where, as private firms, even billion-dollar startups are not subject to the same corporate governance oversight that could have prevented some of the harmful actions of founder managers in startups like Theranos and Uber (Jones, 2017).

Inadequacy of boards

Boards of directors have the responsibility to oversee the actions of the top executives and can, therefore, act to prevent potential harm from strategies and actions of the business. For a number of reasons discussed below, however, the boards of directors do not provide adequate safeguards in emerging technology businesses.

First, the newness of technologies often leaves boards of directors unfamiliar with and not knowledgeable about the potential harm from emerging technologies to adequately question strategies pursued by executives. For example, in the case of one prominent emerging technology company, Theranos, the board included two former US secretaries of state, a former chairman of the US Senate Armed Services Committee and a former secretary of defense for the USA. A board that was “better suited to decide if America should invade Iraq than vet a blood-testing company (Bilton, 2016).” In addition, boards can become ineffective when investors provide funding on terms which give founders voting power to control the boards of directors, as has been the case with an increasing number of prominent firms including Uber (Jones, 2017). Furthermore, the traditional roles of boards have been to ensure compliance with laws and regulations, and not to question or deliberate the negative externalities of the firms’ emerging technologies. Given the paucity of laws and regulations in emerging technology firms, however, such a focus on mere compliance with existing laws and regulations becomes insufficient. See *Boards of Emerging Technology Companies* for some insight into the boards of directors of emerging technology firms in terms of their expertise, stated responsibilities for deliberating potential harm from the technologies of the firm and their independence.

Boards of Emerging Technology Companies: The following insights are from an analysis of the boards of emerging technology companies and mature companies. The set of 38 emerging technology companies which had their IPOs between 2016 and 2018 with a market valuation of over one billion dollars each, the Unicorn 38, represent the sample of emerging technology companies for the analysis (Clabaugh and Peters, 2019). Thirty-three mature companies from the S&P500 – three companies randomly selected from each of the eleven S&P500 sectors, form the sample of mature companies for the analysis. Data for the analyses are from publicly available sources, including news reports, the latest available proxy statements and the firms registration filings.

Director expertise/qualifications. The most frequently mentioned reasons for nominating directors to the board by the Unicorn 38 firms include: public company board experience, industry experience, finance/accounting expertise and knowledge of the company. Expertise in, or experience with, weighing the potential negative externalities of the firm’s technologies was not mentioned by any of the 38 firms.

Board deliberations. While oversight of business risks was mentioned as part of the board's responsibility, none of the 38 Unicorn firms had stated responsibility for their boards or board committees to weigh the broader ethical issues or negative externalities from the firms technology, i.e. potential harm from the firms emerging technology beyond risks typically present in any business. Most (35 out of the 38) firms had just the three board committees required by stock exchanges: audit, compensation and corporate governance committees. None of the firms had board committees on ethics or social-impact of their technologies.

Board control/independence: In a little over 60% of the Unicorn 38, the CEO was also the chairman of the board. The corresponding number for the set of 33 S&P 500 firms was 42%. Fully half of the set of Unicorn 38 companies had dual class shares, with the founders holding a class of shares that gave them voting power which exceeded the shares they held – typically ten votes to a share. In contrast, only 10% of all publicly traded companies in the USA have a dual class shareholding (CII, 2020).

Focus of business executives

The focus of business executives is primarily, if not exclusively, on exploring and exploiting the business potential of emerging technologies, such as reducing costs, expanding benefits and thereby increasing profitability and profit growth. This focus may not necessarily be a problem in general since such a focus serves to fulfill businesses' role in society: greater profitability and profit growth enable businesses to develop and deliver goods and services that increase the standard of living in society. Protection of the common good is up to the collective market supporting institutions in a market economy, which society implements through formal regulations, informal norms and their enforcement (North, 1990). As described above, however, in the case of emerging technology businesses, due to their paucity and inadequacy, laws and regulations do not yet provide adequate protection from potential harm to the collective good. Informal norms are also not sufficiently strong to dissuade executive behavior that can cause harm. For example, the CEO of Theranos had engaged in a series of deceptive initiatives, including exaggerating the capabilities of her firm's technology, for many months even as she was celebrated by society as a hero for launching a potentially revolutionary biotech product (Bilton, 2016). By the time the deception came to light, it was too late to save the company from bankruptcy and investors from losing hundreds of millions of dollars (Sheetz, 2018). Informal norms in society at present are strong with respect to encouraging emerging technology businesses and executives but are not sufficiently strong to dissuade harmful behavior (Betta, 2019; Griffith, 2016).

To compound this added risk, emerging technology business executives often believe and emphasize how their technology will change the world for the better and consequently ferociously focus on the speed of development and deployment, brushing aside doubts and potential harm from their emerging technologies (Bilton, 2016; Garde, 2016; Kuznia, 2020).

What can be done to strengthen the ethical guardrails?

This section develops solutions to strengthen the ethical guardrails for emerging technology businesses by reasoning from first principles where solutions are developed to fit the fundamental characteristics that distinguish these businesses (Higgins, 2023; Irwin, 1989).

On product and input market regulations

Recall from the previous section that the inadequacy of regulations stems from three sources. First is the need to wait for clear and sufficient evidence of harm that is high

enough to justify the compliance costs and the risk of stifling innovations. Second is the lag caused by the rapid evolution of innovation in emerging technology businesses, which present a moving target for regulators. Third is the regulatory exclusions and suspensions given to emerging technology businesses that result in unintended harmful consequences. The following solutions can address the inadequacies to some extent.

While the need to wait for clear and sufficient evidence of harm cannot be bypassed, regulatory agencies can ensure that there is no additional delay on their part through continuous monitoring so that necessary regulations are introduced in time as soon as they are warranted – that is, as soon as the necessary information is available (Meskó and Topol, 2023). They can also issue preliminary best practices and seek voluntary compliance while they collect the necessary information (Mandel, 2009). Learning from the experiences of regulators from other jurisdictions can also expedite regulations (Coglianese, 2002). For example, the State of California introduced a new law on how drivers of rideshare and similar companies are to be classified for labor regulation purposes (Luna, 2020). This law classified rideshare drivers as neither traditional employees with associated benefits nor traditional contractors with no benefits. This law was an attempt to balance the benefits from the rideshare emerging technology businesses with protections for its drivers from exploitation. Scholars can study how well the law achieves this balance, and regulators in other States can use this law as a model with appropriate modifications. In instances where regulatory exclusions and suspensions have led to adverse consequences, regulatory agencies can help by reconsidering the exclusions and suspensions. To facilitate this, regulators should have an ongoing program to periodically monitor and evaluate regulatory exceptions granted to emerging technology businesses to identify any adverse consequences.

Regulations and regulatory action, as discussed earlier, reflect the strength of social consensus. Bringing about the above changes, which would entail investment in time and other resources by the regulators, will require building consensus around the need for the same. Building the consensus will, in turn, require increasing awareness of the need for change through scholarly works, such as this and popular business press articles, and by bringing pressure on regulatory authorities through relevant advocacy organizations (Biglan, 2009).

The above solutions will help lower the extent to which laws and regulations for emerging technology businesses would be inadequate. Especially because of the lag caused by the rapid evolution of innovations in emerging technology businesses presenting a moving target for regulators, the above solutions will not eliminate the inadequacies.

On boards

The inadequacy of the boards is because of the mistaken assumption that existing regulatory requirements regarding boards, which are effective for other businesses are also effective for emerging technology businesses. This is not the case and changes are needed. Specifically, changes to three aspects of the boards of directors – namely, their oversight responsibilities, their independence, and their qualifications – can help strengthen ethical guardrails for emerging technology businesses. The board of directors' oversight responsibilities are typically with respect to business specific risks and compliance with laws and regulations. As noted earlier, however, laws and regulations to address the risks and harm from emerging technology businesses to society are inadequate. Boards of emerging technology businesses should, therefore, be asked to shoulder the added responsibility of considering the broader risks and impacts of their firms' technologies on society. Such consideration can shape emerging technology firms' behavior in a manner that avoids or minimizes harm to society. In instances where the firm may suffer a competitive

penalty by not pursuing certain courses of action which are profitable but also potentially harmful, surfacing such instances during board deliberations and communicating the same to stakeholders can expedite the development of regulations to level the competitive playing field. Emerging technology firms can thus contribute to shaping the competitive landscape such that firms' interests are in tune with the common good.

In public companies, this recommendation can be implemented by regulators requiring boards to consider the broader impact of the firms' technologies on society and report such deliberations as part of the firms' corporate governance measures in their proxy statements. Such a mandate will increase reporting requirements for these businesses, and as the emerging technologies mature and laws and regulations provide adequate safeguards, the mandate can be removed.

To be effective, boards of emerging technology businesses should be independent. Many emerging technology business boards are chaired by the CEO. CEOs bring the executive's perspective to board deliberations which is indeed important. However, because the board chair has the authority and responsibility to set the board's agenda, including oversight of the CEO, having the CEO as the chair makes the board less able to exercise independent oversight. The exercise of independent oversight is particularly important for emerging technology businesses because of the inadequate coverage of laws and regulations. Consequently, separating the roles of the CEO and board chair in emerging technology firms is an important step in strengthening the guardrails for emerging technology businesses. The present regulations in many countries, consistent with the spirit of minimal regulatory intervention, do not require the roles of the CEO and board chair to be split (Davies and Hopt, 2013; Tonello, 2022). Recognizing the greater importance of boards in emerging technology firms, however, regulators should require this role split for emerging technology businesses.

Dual class shareholding, where founders hold stock with greater voting power than other stockholders, also contributes to board ineffectiveness. The greater voting power enables founders to exercise disproportionate influence on the election of the board of directors, which compromises board independence from the founders who often are also executives of the firm. The typical argument advanced in favor of dual class shareholding is that, by holding greater voting power, founders can implement their vision for the businesses without having to change in response to stockholders who may not share the vision. Current regulations in many countries do not bar dual class shares, allowing the marketplace the freedom to decide if they should or should not buy stock in these firms with weakened governance (CII, 2020; Gurrea-Martínez, 2021). At present, there is social consensus, albeit not sufficiently strong, on the undesirability of dual class shareholding. Relevant advocacy organizations, specifically the Council of Institutional Investors (CII) and other institutional investors have been working to build a stronger consensus on this issue. CII has succeeded in convincing the index providers, such as S&P Dow Jones to exclude firms with dual class shareholding from being added to their indexes (CII, 2020). The prospect of not being considered for inclusion into indexes, however, has not been sufficiently strong to dissuade emerging technology firms from adopting the dual class structures. Considering the greater importance of the board for providing adequate guardrails for emerging technology firms, regulators should bar emerging technology firms from dual class share structures which undermine board independence.

At present, regulations in many countries require boards of directors to have members with the competence to understand accounting and financial statements (Davies and Hopt, 2013; Neill and Shauna Jacobs, 2023). Consistent with this requirement, as seen in *Boards of Emerging Technology Companies*, expertise in finance and accounting was among the most

frequently mentioned reasons for nominating members to the boards of emerging technology firms. Recognizing the importance of the boards in providing adequate guardrails for emerging technology firms, regulators should require that the boards of these firms include individuals with expertise and experience in weighing the boarder impact of the firms' emerging technologies on society. Where they cannot find individuals with the requisite experience, regulators should require that the companies provide training for members of the board in this regard.

The changes recommended here indeed increase the mandate that regulations would place on companies. These mandates, however, are necessary to address the inadequacy of ethical guardrails in emerging technology businesses. The types of recommendations made here, with respect to the board's *responsibilities*, *independence* and *qualifications* have precedence, for example, in the Sarbanes–Oxley Act of 2002 (SOX). SOX, for example, clarified board's *responsibilities* including with respect to oversight of financials, conflicts of interest and compliance with laws and regulations. SOX also required board's *independence* to be enhanced, for example, by requiring only independent directors as members of the audit committee and addressed board member *qualifications* by requiring companies to disclose if at least one member of the audit committee is a financial expert.

On the attention of business executives

Problems arising from business executives being focused on the business prospects of their technologies rather than on potential harm from their technologies, as mentioned earlier, are due to inadequate laws and regulations to protect the common good. Implementing the recommendations in this paper to strengthen the laws and regulations, as mentioned earlier, will lower the extent to which they remain inadequate but not eliminate them. The solution recommended in this paper, therefore, is to also strengthen informal norms and their enforcement to get executives to voluntarily attend to and mitigate potential harm from their emerging technologies.

As alluded to earlier, there is a gap between how society regard emerging technology businesses and the reality of these businesses. Social consensus seems to regard founders and executives of emerging technology businesses as heroes and celebrities who drive much needed technological innovation. This idea is reinforced by the founders and executives themselves when they vocally proclaim that they are championing technological innovation to change the world for the better. While this certainly can be true, the reality is also that these executives are human and susceptible to actions and practices that can cause harm (Betta, 2019). Only regarding them as heroes provides too much deference to the executives which can lead to potential harm. For example, the celebrity status of Theranos' CEO made it difficult for many to question the authenticity of the company's technology and easier for the company to ignore calls for independent evaluation of the technology for far too long, resulting in harm to investors, employees and customers (Bilton, 2016). Similar sentiment often underlies investors' willingness to fund founders on terms that make it possible for these executives to thwart effective oversight of their behavior, leading to enormous losses (Griffith, 2016; Jones, 2017).

Likewise, society considers emerging technology businesses as drivers of innovation that elevates the standard of living and quality of life. While this is true, the reality is also that these technologies and strategies can have negative externalities which, while benefiting individuals and individual firms in the short run, can inflict longer term harm to society (Betta, 2019). When the social consensus is that emerging technology businesses are exclusively a source of benefits, it is difficult for executives of emerging technology businesses to voluntarily flag and avoid strategies that can cause harm. This is because, in

the absence of regulations that address strategies that can cause harm, firms that unilaterally abstain from such strategies will face a competitive disadvantage. An executive of an online platform, for example, referred to the decision not to collect and use as much user data as possible to sell advertisements as “leaving money on the table” (Newman, 2020). Even though such a decision to “leave money on the table” would help avoid harm from violations of user privacy and manipulation of users, firms that voluntarily do so will risk conceding a competitive advantage to those that do not “leave money on the table.”

Getting executives to voluntarily pay attention to harm from their emerging technologies and strategies will, therefore, require a change in social consensus such that the executives are seen not only as heroes but also as humans susceptible to behavior that can cause harm and consequently develop informal norms that do not provide undue deference to the executives. Also required will be a change in social consensus where emerging technology businesses are seen not only as a source of benefit but also as a source of potential harm and consequently develop informal norms that expect executives to flag and abstain from strategies that can cause harm. When such consensus is strong, the prospect of social sanctions for not abiding by the informal norms, for example, in the form of consumers swiftly switching away from such firms, can motivate executives to flag and avoid strategies that can cause harm.

The change in social consensus and associated informal norms can be accomplished with the education of various members of society about the realities of emerging technology businesses in general, and about the potential harm from the various emerging technology businesses. Enforcement will require active reporting by the business press on businesses and executives who violate the informal norms, and action by advocacy organizations to help impose social sanctions for violators of the informal norms (Biglan, 2009).

Conclusion

This paper made the case that ethical guardrails for emerging technology businesses are inadequate, and then developed solutions to strengthen these guardrails. Three groups or stakeholders will need to be involved in implementing the solutions developed in this paper. I focus on articulating actionable recommendations for these three stakeholders in this conclusion section.

Recommendations for regulators

Regulators will play a key role in implementing the solutions developed to address the inadequacy of regulations and the inadequacy of boards. Specifically, the regulators should:

- Establish greater monitoring of emerging technology businesses on an ongoing basis to detect the need for regulations, so regulations can be introduced when they are appropriate in a timely fashion.
- Issue preliminary guidelines based on best practices and seek voluntary compliance while collecting information necessary to introduce regulations.
- Monitor and evaluate regulatory exclusions granted for emerging technology businesses to identify and remedy any adverse consequences.
- Look to learn from and adopt regulations in other jurisdictions after necessary modifications.
- Require emerging technology business boards to consider the broader risks to society from their firms’ emerging technologies and report these deliberations in the firms’ proxy statements.

- Require the boards of emerging technology businesses to include members with expertise and experience in weighing the potential risks of their firms' emerging technologies to society.
- Prohibit dual class shareholdings and require the separation of CEO and Board Chair positions for emerging technology businesses.

Recommendations for the popular business press

The popular business press will play a key role in implementing the solution of strengthening informal norms and their enforcement so business executives will also focus on preventing or minimizing potential harm from their emerging technology businesses. Informal norms strengthen when members of society are informed and educated about the potential harm (not just benefits) from emerging technology businesses, and the business press plays a key role here. Enforcement of informal norms relies on identifying violations of such norms and the business press plays a key role here as well, for example, through investigative reporting:

- Report news and stories that portray executives of emerging technology businesses not just as heroes but also as humans susceptible to making decisions about their technologies and businesses that can harm society. Such reporting will contribute to a change in social expectation that business executives should also focus on potential harm to society from their emerging technology businesses.
- Actively report on violations of informal norms by emerging technology businesses and their executives. Such reporting will contribute to strengthening the enforcement of informal norms.

Recommendations for scholars/further research

The recommendations in this paper, especially those for regulators, involve considerable investment in time and resources. Consequently, they are more likely to be implemented when there is sufficient awareness in society. Research into the need for such investments can serve to increase this awareness in society. Areas for such research and other directions for further research are identified below:

- Research which highlights the value of investing in enhanced monitoring of emerging technology businesses to facilitate the timely introduction of regulations. An example of such research would be studies that quantify savings associated with timely introduction of regulations (Hwang *et al.*, 2014).
- Research to study the efficacy of emerging technology business regulations when they are introduced in one jurisdiction (e.g. one State), to inform the appropriateness and potential modifications necessary before adoption in other jurisdictions (e.g. other States, Nationwide).
- As an example, AI models that use neural networks can be quite accurate when predicting credit worthiness in test samples. However, the factors such models use as inputs and the way the models evaluate these factors to make credit decisions are quite opaque and difficult to explain. The ethicality of rejecting someone for credit using such "black box" models is questionable. Some jurisdictions, for example, the EU, have required that only explainable AI should be used for deciding on credit applications (Nannini *et al.*, 2023). Uncertainties regarding what constitutes

adequate explanation have led some to conclude that the regulation may not be effective. Studying whether the regulation is effective will help inform adoption of similar regulations in other jurisdictions (e.g. other countries).

- The recommendations in this paper are based on conceptual and logical analysis and hence empirical research to validate them where data are available or when data become available would be useful.
- For example, the recommendations on boards can be empirically validated by examining if adopting the recommendations results in a significantly lower incidence of societal harm from emerging technology business. Doing so will be feasible with respect to some of the recommendations at this time due to data availability. Specifically, recommendations regarding separation of the CEO and board chair positions and dual class shareholding can be investigated with available data. This is because even in the absence of the regulatory mandates recommended in this paper, there are at least some emerging technology businesses that have these features. However, our other recommendations, such as requiring board members with expertise in weighing potential risks to society from their business' emerging technologies and requiring the board to deliberate and report on broader risks to society from their firms' emerging technologies cannot be investigated at this time due to lack of data. When these mandates are enacted, empirical studies comparing incidents of societal harm before and after adoption of the mandates through a difference-in-difference methodology may be required to empirically validate these recommendations.

Note

1. I.e. reasons that are not specific to any one emerging technology business but are innate to emerging technology businesses in general.

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