# A Legal Sustainability Approach to Align the Order of Rules and Actions in the Context of Digital Innovation

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## CONTENTS

## 10.1 INTRODUCTION

The increased productivity and efficiency in the industrial and retail sectors, thanks to robotics and Artificial Intelligence (AI), have caused an emerging interest in realizing a comparable transformation in other sectors, including healthcare, farming, and pharmaceutical (Simshaw et al., 2015). While technology has fueled significant innovations geared toward making life and work more accessible, not all such advancements benefit society. Some of this progress has led us to experience social, economic, and environmental challenges (Brundtland, 1987; Johnston, 2018; Zuboff, 2019; Crawford, 2021, see also Chapter 3). For instance, screen-based technology leads humans to be less creative

(Zomorodi, 2017), tired (Genner & Süss, 2017), and more distracted, thus increasing traffic accidents (NHTSA, 2021). On another note, the increasing use of technology in patient care makes one wonder whether and to what extent all parts of society can be automated (Fosch-Villaronga, 2019; Sharkey & Sharkey, 2020). Breakthroughs at the expense of nature also have disastrous consequences for planet Earth's survival (Khakurel, 2018).

Since new technologies are novel, push the boundaries of the current understanding of how the world works and may have a broad range of consequences on people; the development of new technologies comes with the need for increased regulatory attention. Nevertheless, there is an increasing gap between the policy cycle's speed and technological and social change (Downes, 2009; Sucha & Sienkiewicz, 2020). If market participants are to coordinate their investments and economic plans in light of the emerging legal rules being affirmed by the judicial bodies, there might be a problem of unexpected conflict between them. Spontaneous coordination of activities within the market may clash with the normative order of legal rules established and applied by the court system and rule makers. This gap is becoming broader and more prominent in the field of robotics and AI, as existing policies were unprepared to deal with machine learning and autonomous agents adequately and, consequently, often lag and do not adequately frame or address the implications of such technologies (Liu et al., 2020; Custers & Fosch-Villaronga, 2022).[1]

The enlarging divergence between policy adaptation and public authorities' responses can result from information and knowledge gaps between developers and policymakers. However, sometimes it also results from stalling strategies deployed by technological firms to seize dominant market shares to become "too big to be banned" (Mazur & Serafin, 2022, see Pollman & Barry, 2017). For instance, scholars have highlighted for years the legal, ethical, and societal consequences arising from services provided by Google or Facebook, which go from privacy violations to democracy alteration (Choolhun, 2009; Isaak & Hanna, 2018; Milmo, 2022), or sharing economy platforms such as Uber or Airbnb that challenge workers' rights (Posen, 2015; Lutz & Newlands, 2018). As our dependence on these firms has reached unprecedented heights, these companies seem to have become too big to adequately regulate by public authorities (Beard, 2022). In such an uncertain and strategic scenario, a recurrent question is then how society, and more precisely how the law, responds to these events (Sætra & Fosch-Villaronga, 2021a), or, in other words, what direction of adaptation should be between the "order of actions" and the "order of rules" (see, e.g., Dold & Lewis, 2022; Rizzo, 1999).[2]

Although technological change is believed to be at the core of all major historical disruptions, revolutions, wars, and general development (Bailey & Barley, 2020), it may nevertheless offer a means to mitigate precisely those problems it has caused (Millar et al., 2018). At the same time, it is also true that institutional change and legal reforms have been conducive to and have proved essential preconditions for technological investments and economic growth (Hodgson, 2015). We must ensure a synergistic relationship between these two constitutive economic and social progress dimensions.

Given such a co-evolving and constitutive relation between legal, institutional, and technological innovations, it is all the more urgent to modernize the policy cycle on many levels and to ensure as smooth co-evolution as possible between the "order of actions"

and the "order of rules". It is in this state of affairs that data-driven policy interventions appeared, evidence-based mechanisms promising to offer a more comprehensive understanding of the issues at stake concerning a particular technology or field (such as chemicals or pharmaceuticals), frame it accordingly, and provide more detailed guidance to developers (Höchtl et al., 2016; Athey, 2017; Calleja et al., 2022). Departing from the notion that information is power, we hold that data may offer a valuable means to policymakers to ensure adequate and sustainable policies for societal and technological developments (Sandersen & Kvalvik, 2014).

Legal sustainability is an interdisciplinary notion we derive from economic literature (Davies, 2013), aiming at singling out different postures toward the substitutability of legal capital with technological capital, bearing on the propensity toward gambling core legal interests and values to favor technological innovation patterns whose society-wide implications are unknown. For instance, the substitution of strong consent requirements and other legal guarantees for individual autonomy in favor of security or "efficiency" promises attached to new technologies. In this sense, and in the pursuit of the UN Sustainable Development Goals (SDG), we aim to contribute to the realization of legal sustainability through the encouragement of more robust and more capable institutions (SDG 16 – peace justice and strong institutions) in an age characterized by rapid developments, diminished accountability, and increased uncertainty.

By framing democratic public order, fundamental rights, and constitutional rules as core *legal* capital – at least in Western Legal Tradition (Gambaro, 2002) – the notion at hand aims at emphasizing *weak* and *strong* policy and legal approaches toward the danger of corroding the foundational constitutional structure of our society, as a result of unintended and unexpected consequences of technological adoption and diffusion. Advocates of weak approaches tend to see technological solutions as *substitutes* for constitutional rules and values. In contrast, proponents of *strong positions* see the corrosion of *legal* capital as conducive to the erosion of the ability of the legal order to reproduce itself and preserve the prevailing constitutional order in the future. In both cases, access to better information is a condition to make sense of how the ongoing social, economic, and political dynamics around technological adoption and diffusion square or imperil the prevailing constitutional order and the rule of law.[3]

This chapter is structured as follows. After this introduction, we lay the grounds for this chapter in section 2 by explaining notions of sustainability in an uncertain legal world. Since the current narrative focuses on how the order of actions (i.e., technology) shapes constraints and world problematics and how the order of rules (i.e., the law) is doomed to lag behind the order of actions, sections 3 and 4 provide examples on how technology disrupts the legal ecosystem and how an uncontrolled legal environment may provide *carte blanche* to techno-solutionism to cause further disruptions. We explain a three-step process to align the order of ideas with that of actions in section 5. Such a process aims at bridging information asymmetries by generating policy-relevant data, sharing knowledge among stakeholders to understand and make sense of such information, and creating opportunities for those ideas to turn into an "action" in the world of actions. This chapter concludes with some final remarks in section 6.

## 10.2 INTERDEPENDENT TRANSITIONS TOWARD HOLISTIC SUSTAINABILITY

We are living in a time of transition, especially the twin transition concerning the technological migration toward a digital environment and the ecological transformation, which are regarded as complementary, co-evolving dynamics toward the sustainability of human development (European Commission, 2021). Technological breakthroughs and dedicated policies are essential to counter various crises, including climate one, toward realizing a sustainable, fairer economic–social system (Fischer & Newell, 2008; De Cian et al., 2012). Equally, technological innovation is increasingly necessary to solve long-standing social and economic problems and inequalities (Johnston, 2018).

Any transformative and innovative activity involves the exploitation of some resources, thus generating unpredictable and undesirable effects on third parties and the environment (Addressed in SDGs 12–15) (Calabresi, 1985). The most notable and well-known example is the environmental externalities of industrial development based on fossil fuels and plastic materials. From the 1950s onward, it had already become evident that the remarkable improvements in terms of productivity, economic growth, and standards of living enabled by massive motorization of society and new cheap materials were based on the consumption of natural capital, which were polluting the environment (see Missemer et al., 2022). However, the extent to which these undesirable and unintended implications of technological innovation would have affected the environmental sustainability of the prevailing business models of the time was unknown (Davies, 2013), with authoritative – yet unheard – voices calling for early course correction (Meadows et al., 1972).

On the one hand, advocates of a *weak sustainability* approach claimed full substitutability of natural capital being destroyed by the externalities of industrial and technological development. They held that technological improvements would have made it possible to replace natural capital with functionally equivalent technological artifacts to maintain ecosystemic equilibrium and avoid climate change and environmental disasters (Neumayer, 2003). On the other hand, advocates of a *strong sustainability* approach claimed that full substitutability was impossible (Dobson, 1998). Thus, they warned about the danger of depleting core natural resources, for their destruction would have hindered the replicability of the ecosystem, thus eliciting climate changes with unknown and potentially destructive implications. Time has shown who was right, and the current climate crisis is a monumental warning toward techno-solutions. Indeed, the more time advances, the more we can see a parallel with the ongoing legal debates around digital transformation based on datafication of human experience (Zuboff, 2019).

In this respect, diverging positions are emerging as to the *legal sustainability* of the ongoing digital transition in the face of a compelling and growing body of information and knowledge about prevailing business models' legal implications in terms of fundamental rights and democratic order (see, e.g., De Gregorio, 2022). The more visible these implications become, the more pressing the question becomes how those undesirable and unexpected harms to the foundational "legal capital" of the prevailing technological trends shall be treated (Flórez Rojas, 2016). These can be characterized as "constitutional

externalities" caused by the prevailing data-driven business model, which must be duly accounted for when assessing the efficiency and costs of the current digital transition (see Giraudo, 2022a). Moreover, increasing information makes it apparent that AI development also has an enormous environmental impact, for instance (Zuboff, 2019; Crawford, 2021; Wynsberghe, 2021). As a result, instead of Earth resources as in the previous industrial revolution, we see a broader sustainability question that embraces our legal–institutional "capital" being corroded by surveillance capitalism.

The issue of externalities is neither a surprise nor new (Pigou, 1920; Coase, 1960). What we see today is the need to understand the peril of pushing the prevailing constitutional and legal order out of equilibrium with unpredictable political, economic, and environmental consequences. However vital the twin transition is, it is not self-standing. For it to be lasting, there is also a need to consider a third overlooked transition taking place whose implications are as important as the previously mentioned two: The legal–institutional transition that spans the economy, society, and environment altogether (Sætra, 2022a). We have to ensure that by pursuing the twin transition, we do not do away with preserving the prevailing constitutional order or the rule of law. In fact, given the foundational matters involved, there is little chance that the twin transformation can be stably attained if the legal foundations of these activities are not shared and properly accommodated with the prevailing fundamental rights and constitutional order. However, the rapidly evolving order of actions in the digital environment is shattering the order of legal rules and the constitutional order, the implications of which in terms of the prevailing legal order are substantial and largely still unknown. We provide some illustrative examples of this disconnect in the following section.

## 10.3 TECHNOLOGICAL INNOVATION DISRUPTS REGULATION

In their 2019 report on regulatory effectiveness in the era of digitalization, the OECD noted that governments and regulators, in particular, play a significant role in encouraging digital innovation and incentivizing the development of digital technologies for the benefit of society (OECD, 2019). It is within their ability to foster public and consumer interest in the deployment of these technologies and to limit, where possible, any unintended negative consequences of their introduction and use by providing general rules that reflect societal values and preferences (OECD, 2019). However, this does not come without drawbacks (Sætra & Fosch-Villaronga, 2021a).

This approach is reflected in our current legal system, a *horror vacui* system, which aims to prevent legal lacunae from presenting themselves and ensuring legal certainty at all times (Bryson et al., 2017). Departing from this objective, our legal system has produced laws covering many phenomena and developments, including newly developed technologies such as robot and AI technologies. However, regulatory frameworks often lack the agility to accommodate the increasing pace of technological developments and deeply challenge how governments regulate (Downes, 2009; OECD, 2019). While the benefits abound, new technologies inevitably disrupt how we conceive reality, causing growth and innovation across the board (SDGs 8 and 9) and leading us to question and challenge existing norms and push us toward an increasingly louder call for legal and regulatory change.

An illustrative example of this newly introduced complexity can be found in healthcare robots and AI, which, despite its unprecedented potential, still generally fails to incorporate safety sufficiency comprehensively to ensure satisfactory performance of the resulting technologies in the wild (Gruber, 2019). Healthcare robots and AI challenge the timeliness of laws and regulatory standards that were unprepared for technologies that, for instance, would assist wheelchair users in becoming mobile (Tucker et al., 2015), perform surgeries autonomously (Shademan et al., 2016), or offer assistance and support to children under Autism Spectrum Disease in learning emotions (Scassellati et al., 2012; Fosch-Villaronga, 2019; Sætra et al., 2022).

Myriad examples can be found which indicate how such technologies have led us to seriously question and challenge existing norms, such as safety and security, autonomy and responsibility, and non-discrimination and equality (as addressed by SDG 10) (Fosch-Villaronga & Drukarch, 2021). For instance, current legal frameworks tend to overfocus on physical safety when addressing safety concerns. However, they fail to account for other essential aspects like security, privacy, discrimination, psychological aspects, and diversity, which nevertheless play a crucial role in ensuring the safety of such devices to the fullest extent possible and for a wide diversity of potential users. Moreover, these robotic and AI technologies are becoming increasingly autonomous and complex in their interaction with humans, blurring the existing roles and responsibilities and ulteriorly affecting society (Carr, 2011; Yang et al., 2017; Boucher et al., 2020; Fosch-Villaronga et al., 2021).

While technology's dramatically accelerating pace increasingly causes these disparities between the norms we had once established when our societies took on an entirely different architecture and the practical meaning and applicability of these norms in our current technology-driven age, however, (adequate) legal responsiveness does not always follow as a consequent step (Collingridge, 1980; Downes, 2009; Marchant, 2011; Newlands et al., 2020). Moreover, while the pace of digitalization and its impacts on society and markets have become an independent topic of research and debate, far less is clear on how the traditional regulatory functions of governments should evolve with these transformative changes, as will further be elaborated on in the following section.

## 10.4 A CALL FOR A STRONG LEGAL SUSTAINABILITY APPROACH TO AVOID LEGAL BUBBLES OR CONSTITUTIONAL CRISIS IN THE CONTEXT OF DIGITAL INNOVATION

The legal ecosystem faces similar issues and dangers when deciding how to deal with externalities eroding constitutional capital at the core of constitutional democratic market economies: Fundamental rights and democratic order (Büchi et al., 2020). In democratic countries, fundamental rights and democratic order preserve the ability of the system to reproduce itself, change ruling élites, or spontaneously adapt to unexpected events. The uncertainty about the actual capacity of economic agents and political actors to deploy technological solutions to substitute the constitutional values eroded by some technologies gives rise to opposite policy stances, thus paralleling those observed regarding the issue of climate or technological change.

Also, opposite positions are facing the newly emerging constitutional externalities: *Weak legal sustainability* advocates versus *strong legal sustainability* ones. The first position has long been dominant in academia and industry by supporting the prioritization of technological innovation over legal compliance in case of conflicts or undesirable constitutional externalities. By contrast, the second position is strengthening over time, thanks to the consolidation of EU case law prioritizing privacy, data protection, and fundamental rights over economic interests attached to the deployment of technological innovations (e.g., Custers & Malgieri, 2022). As the current climate crisis suggests, "over-trust on the ability of the technology sector to correct and mitigate by itself the externalities it generates may sound fragile" (Aroyo et al., 2021), if not naive. However, unlike the case of environmental pollution, the possible crisis looming ahead if *weak sustainability approaches prevail is* of legal, economical nature – if not constitutional.

As we will discuss in this section, the brewing crisis may come about either in the form of a legal bubble or a constitutional crisis affecting the effectiveness and preservation of the rule of law with unforeseeable political implications (Giraudo, 2022a). Systemic disregard for constitutional externalities may create political friction and spell unprecedented conflict. From that perspective, we argue that a strong legal sustainability approach might be needed to avoid unexpected crises of constitutional nature with all the disruptive consequences which may follow.

Due to the *favor libertatis* (i.e., the preference for freedom/liberty) that formally underpins democratic market economies, everyone is free to let others infringe upon one's fundamental rights unless that jeopardizes public security or other public interests in a democracy. Thus, in the face of newly emerging business models based on direct or indirect forms of commodification of technological innovation, the long-term legal sustainability question relates to the notion of individual autonomy and liberty as well as to the expected implications of these transactions (e.g., privacy implications, dignity violations) in terms of public democratic order. Hence, the level of legal transaction costs attending any transaction involving technology is highly influenced by the account of liberty, and democratic public order is going to be dominant, as well as by the expected implications on society at large of the emerging privately concluded transactions. The disregard for the role of liberty and individual autonomy may, in fact, eventually hamper the sustainability and attainment of the SDG in liberal–democratic countries.

The core question is then multifold and refers to different levels that can be individual (micro), intermediate or organizational (meso), and collective, social, and economic (macro) (Sætra & Fosch-Villaronga, 2021a). On the individual plane, and if we think about a technology that processes personal data, the question can boil down to broadly understood data protection issues. Thus, it deals with the issue of the extent to which contractual agreements, working as a legal basis for data processing, can be qualified as spontaneous and consensual rather than the result of coercion and private power relations and lack of alternatives (Sætra, 2022a). On the collective and macro-levels, the question relates to the expected benefits of surveillance capitalism with AI at its core and its compatibility with the constitutional democratic order. From the different balancing of these expectations

follow other stands toward the ability of surveillance capitalism and the downstream technology to correct the constitutional externalities by itself (Zuboff, 2019).

Of course, there is a spectrum of possible ways of balancing fundamental rights, privacy, and freedom of enterprise bearing on various views on the compatibility of the legal foundations of the data-driven economy with the prevailing notion of liberty and autonomy at the core of EU constitutional order that also happen in the meso-level (Spano, 2021). Depending on which facet of liberty one chooses to prioritize and which of the multiple possible expectations about the future implications of the digital transition, the answer to the legal sustainability issue can vary remarkably (Wu, 2010; Sætra, 2022b). We may frame the ongoing debate regarding *weak* and *strong sustainability approaches* competing at the policy, judicial, and academic levels to shape the legal–institutional foundations of the continuous twin transitions.

Building on the experience with environmental pollution, whereby over-trust in the ability of technological innovation to mitigate – even solve – consequences relating to depletion of natural capital, we may call for a more conservative, strong legal sustainability approach to avoid – or reduce the number of – unexpected future extreme phenomena within the legal, economic ecosystem. At the moment of writing, however, there is no way to envision which approach will prevail, or which future each of them embeds will come to light. Only by taking a precautionary approach and through discovery processes inside top judicial courts in the EU, elsewhere, and other legal actors will we discover whether the conflict exposed by constitutional externalities can be accommodated within the prevailing constitutional order or, instead, substantial constitutional incompatibility is going to bring to a stop many of the personal data commodification practices.

What is already visible today is how economic agents and some departments of public agencies, driven by techno-optimism, are migrating and investing enormous resources into newly emerging technological ecosystems. They do so *as if* AI-powered tech solutions could replace lost shares of individual autonomy and democratic debate or persistent legal uncertainty did not exist. Economic agents' investment strategies joining the digital transition seem unfettered by the ongoing legal discovery processes and shifts, up to the point that legal bubbles may eventually come to light (Giraudo, 2022a). To some extent, such a systemic overlook of institutional dynamics results from legal over-optimism that has been dominant for decades within the industry.

In other words, it is hard to reasonably explain economic agents' tacit legal bets on the stability of the legal foundations of the rampant digital economy unless we acknowledge the fact that there are systemic and silent assumptions within the industry that, sooner or later, *weak legal sustainability* approaches will unavoidably prevail. These possibly misplaced expectations of securing stable legal entitlements over personal data lie at the core of innovative business models dominant in technological innovation, generating tension between the order of actions and the order of rules at the heart of various industries. Sooner or later, they shall adapt as we cannot expect a market economy to last without firm legal foundations (Deakin et al., 2017). Thus, they will either "generate an industry-wide collapse, once the loss of courts' protection substantially decreases the value of investments as the keepers of the legal system" (Giraudo, 2022a) or the adaptation will favor the

order of actions, thus exposing a constitutional conflict between courts, Data Protection Authorities (where present), and the legislative bodies coming to the rescue of the digital industry. Time will tell who guessed correctly, however. As common wisdom has it, "it ain't what you don't know that gets you into trouble. It's what you know for sure that just ain't so" (McKay, 2015).

## 10.5 ALIGNING TECHNOLOGICAL INNOVATION AND REGULATION

The High-Level Expert Group on Artificial Intelligence (HLEG AI) highlighted that AI technologies demand "new legal measures and governance mechanisms . . . to be put in place to ensure adequate protection from adverse impact as well as enabling proper enforcement and oversight, without stifling beneficial innovation" (HLEG AI, 2019). Nonetheless, although something ought to be done, there is no understanding yet of what exactly can or should be done or what effective regulation might look like (Wischmeyer & Rademacher, 2020), an uncertainty that, unfortunately, is at the expense of user rights (Fosch-Villaronga & Heldeweg, 2018).

The fallacy of composition is a recurrent problem, that is, those circumstances in which the central planner (private or public) is unable to anticipate the consequences of specific individual choices, and the other way round, it is unable to predict the effects of choices done at the macro-level (Finocchiaro, 2015). Regulators often operate in a regulatory environment where it is difficult to enter such a conversation, let alone intervene adequately. Moreover, academic research is often not ready to provide usable and valuable knowledge either because it takes time to adequately accommodate the ongoing evolution of the order of actions into a sufficiently adapted order of ideas or because its conclusions prove affected by a form of bias in favor of entrepreneurial endeavors due to the prevailing economic and political incentives structure (Nightingale & Coad, 2014; Whittaker, 2021). Regulatory capture strategies have been adapted to the new institutional multi-level and epistemic order, whereby the role of academic narratives and think-thanks cognitive support is an essential part of the attempts of the industry to seize control of the regulatory framework applicable to newly emerging technologies (Wold, 2022). As such, regulators find themselves at a strategic disadvantage due to information asymmetries, a lack of knowledge to properly understand the implications of technologically enabled social relations as well for lack of resources and institutional mechanisms to intervene timely before technology has been developed and widely adopted (Calleja et al., 2022). These are challenges that UN SDGs 16 and 17 precisely aim to address.

Should these asymmetries and strategic disadvantages continue, technology companies "[will] have a lock on how their products work while underfunded and understaffed regulators will continue to struggle not only to understand the technology but to articulate their concerns" (Guihot & Bennett Moses, 2020; Calleja et al., 2022), thereby further destabilizing the already weak constitutional accountability structures in place. Moreover, developers will struggle to implement legal provisions into their designs, resulting in constant disconnects between policy goals and safe technology (Kapeller et al., 2021). Equipping regulators with technical knowledge of design and practices could help them understand the regulatory needs of a specific and novel technology. However, solving such information

asymmetries among developers and regulators raises questions concerning (1) what kind of information is needed to bridge this gap, (2) what knowledge-sharing mechanisms exist for these different stakeholders to make that information intelligible, and (3) what opportunities do those groups have to act upon such knowledge, and foster a change in the order of actions.

### 10.5.1  The Information Needed to Combat Information Asymmetries

Departing from the notion that assessing risks through experimentation is essential to ensure the safety of new technologies and compliance with existing norms, recent research has proved how experimentation facilities can serve as a source for overcoming information asymmetries between developers and regulators (Fosch-Villaronga & Heldeweg, 2018). Anticipating hazards and reflections on appropriate safeguards for new technologies often happens in testing beds, where prototypes' characteristics are improved to meet safety standards. Some initiatives in Japan (via the Tokku zones, see Weng et al., 2015) and Europe (see Calleja et al., 2022) depart from the premise that these settings could also provide knowledge to improve regulations. The idea behind their method is that testing zones primarily used by developers (for instance, the ones created by the H2020 EUROBENCH Project) can be places where policy-relevant data can be generated and that policymakers could ulteriorly use to establish new safety requirements for uncovered challenges or reformulate existing criteria inconsistent with how technology works. The project PROPELLING showed how scholars could harness robot testing zones as a source for evidence-based knowledge interventions concerning diversity and inclusion for lower-limb exoskeletons, that is, because experiments showed that exoskeletons do not account for sex differences and that men and women experience exoskeleton use differently, something that further influences the device safety. As the saying goes, scientia potentia est: Generating policy-relevant, accurate, and representative data can help decrease existing information imbalances among policymakers concerning different communities in line with the SDG 4 objective of improving the quality and accessibility of knowledge. Consequently, legal action can, if necessary, be more efficient.

### 10.5.2  Inclusive Policymaking

Although data generation is essential, its value ultimately depends on which sources these data come from and how it is distributed among other levels and orders. The H2020 COVR project, which stands for "Being safe around collaborative and versatile robots in shared spaces",[4] aimed to present detailed safety assessment instructions to robot developers and make the safety assessment process clearer and more straightforward, which, in turn, may allow robots to be used in a more trustworthy and responsible way. In this sense, this EU-funded project sought to develop a tool to better equip robot developers with knowledge (in line with SDG 4) about various aspects, among which legal and regulatory, that are relevant for them throughout the development of their creations. To this end, they created the COVR Toolkit ("toolkit"), an online software application that, among other things, aimed at aiding developers in identifying legislation and standards relevant to them in framing their robot development process and eventual product outcome. More specifically,

the toolkit compiles safety regulations for collaborative robots or cobots, that is, robots developed to work closely with humans (Surdilovic et al., 2011) in various domains, such as manufacturing, agriculture, and healthcare.

Although compliance tools, such as the COVR toolkit, represent a practical step toward bridging legal knowledge gaps among developers, new robot applications may fail to fit into existing (robot) categories. A "feeding robot", for instance, may be composed of a robotic wheelchair, an industrial arm, and a feeding function (Herlant, 2018) and may be difficult to classify in existing laws and regulations that cover wheelchairs and industrial arms, but not such a complex cyber-physical system. Moreover, current standards (e.g., ISO 13482:2014 Personal Care Robots), laws (e.g., Medical Device Regulation, 2017), and proposed regulations (e.g., AI Act, 2021) are often technology-neutral and were enacted when practices were at the early stages of implementation and impacts were still unknown, often resulting in dissonances about their protected scope (Fosch-Villaronga, 2019; Salvini et al., 2021). Providing developers with legal information that may be outdated or unclear may do little to help them integrate these considerations into their R&D processes and may have ulteriorly adverse effects once their technologies are put into practice.

In this state of affairs, and contributing to the SDG 9 objective of investing in scientific research and innovation to facilitate sustainable development, the LIAISON Project was set in motion by researchers at Leiden University. LIAISON stands for "Liaising robot development and policymaking to reduce the complexity in robot legal compliance" and was a Financial Support to Third Parties (FSTP) from the H2020 COVR Project. LIAISON departed from the idea that developers may identify legal inconsistencies among regulations or call new categories of devices that struggle to fit any legal categories established in the legal compliance process. At the same time, patient organizations and other actors may identify other safety requirements (physical and psychological alike) that remain uncovered in existing legislation but are nevertheless essential to cover to protect user safety. LIAISON realized that this currently uncaptured knowledge could be formalized and serves as data to improve regulation. To do so, LIAISON attempted to formalize a communication process between robot developers and public and private regulators from which different actors (and eventually policies) could learn, thereby channeling robot policy development from a bottom-up perspective fueled by partnerships between relevant stakeholders across the technology-policy ecosystem (Fosch-Villaronga & Heldeweg, 2019). This approach would align with SDG 17, which aims to contribute to realizing a more sustainable constitutional interaction with digital innovation.

### 10.5.3 Creating Opportunities to Raise Unheard Voices

The existence of an opportunity to timely and effectively intervene in the regulatory process for noncommercial entities and individuals – for example, associations and think tanks – is essential for implementing a (strong) legally sustainable transition. That is true concerning the two most relevant institutions directly or indirectly influencing policymaking: Law and science (Greif & Mokyr, 2017). If information is available and technical knowledge has been gathered, then there is the need to make sense of all the evidence regarding societal implications and constitutional consequences to translate it into a policy

agenda. This happens in the legislative process, court litigation, and academic research programs, whereby scientific authority is attached to sponsor alternative policy agents. If one-sided views dominate legal and scientific policy assessments, then the strategic disequilibrium society experiences will be exacerbated and bear on regulatory delays and the enlarging pacing problem (Downes, 2009; Sætra & Fosch-Villaronga, 2021b).

Such a situation of strategic disequilibrium between those advocating for legal innovation and those defending the prevailing order of rights shall be leveled off through positive actions funded by public institutions. There is the need to create equal opportunities for corporate and non-corporate entities to timely participate in rulemaking and knowledge production through academic and research institutions in line with the SDG 10 goal, which aims, among other things, to empower and promote the social, economic, and political inclusion of all, ensure equal opportunity and reduce inequalities of outcome (see Chapters 5 and 8). If there is no equal opportunity in both dimensions, society risks perpetuating the distortive loop whereby policymakers use knowledge produced by corporate-sponsored research programs to critically appraise corporate-designed rules laid down with intensive lobbying investments and strategically litigated case law (see, e.g., Mazur & Serafin, 2022).

As to the legal dimension, AI-enabled ecosystems enjoy a strategic hedge in their ability to directly shape the regulatory landscape because they have the economic means to reach out to rule makers and win long-lasting lawsuits. There is the need to create institutional venues to match the strategic disequilibrium between those willing to deploy legal innovation instrumental to technological solutions and those willing to protect the prevailing order of rights and interests. On the procedural level, there might be the case to think of dedicated specialized judicial bodies within the judiciary enjoying independence, autonomy, and impartiality to address prompt requests and adjudication on newly emerging issues. One might think of prototypical rules being announced to be applied to a specific case, with no ambition to have general scope during a period of grace. That may combine the need to immediately protect users' rights and prevent society-wide harm while limiting legal decisions' impact on reliance interests at the same time. In fact, due to the prompt legal adjudication from the specialized body, there is less time for relying on interests to form.

As to the knowledge production level, there is the need to counter technological firms' power to fund complacent academic research to shape exclusively positive narratives about technology's future implications and social costs without objectively considering the risks and threats accompanying these developments. Such a knowledge advantage lets them have the ability to rapidly and effectively shape the order of ideas, which will be used to appraise the unfolding technological dynamics critically. To counter that, it might be possible to establish publicly funded research schemes for scientific knowledge production specifically aimed at creating knowledge about the negative implications and incompatible effects with the prevailing order of rules. If public research institutions over-fund pro-innovation research programs, there is a risk of having a distorted incentive structure for researchers to underestimate possible threats coming along with specific trends of technological change (Sætra & Fosch-Villaronga, 2021b). By ensuring a knowledge generation on the implications of technological innovation does not suffer the consequences of (hidden)

bias while simultaneously leaving room for all relevant interests and incentives – both economic and social – to be considered, a step closer to sustainable economic growth and innovation, in line with SDGs 9 and 10, may be achieved.

## 10.6 CONCLUSION

Information imbalance is one of the main drivers behind policy goals and technological innovation dissonances. As science moves faster than moral understanding, people even struggle to articulate their unease with the perils novel technologies introduce (Sandel, 2007), and it is not uncommon to see inventors and users sidelining ethical considerations while focusing on the practical considerations of efficiency and usability (Carr, 2011). Regulation is not immune to those problems. On the contrary, information asymmetries between corporations and regulatory agencies are increasing, impeding the enactment of frameworks closer to reality and more attuned to the real problems that technology poses. In this context, among the 17 UN SDGs, the UN SDGs 16 and 17 are instrumental in promoting a more participatory, inclusive, and accountable institution for technology regulation.

We live in a time of regulatory comeback and technological turmoil after years of retrenchment of public rule makers to the advantage of self-regulation. In this respect, society must be sure not to let the State and the public institutions be trapped within a *knowledge bubble* whereby alternative voices to current deployments and concerns at different levels are not let in for lack of opportunity. If the body of knowledge used to make sense of available information is biased in favor of corporate interests, the effort of the State to mitigate constitutional externalities is doomed to fail. For this reason, this article reasoned from a precautionary perspective about the importance of having a strong legal sustainability approach and generating information from different sources and communities, establishing communication processes to share such information, and creating opportunities to raise unheard voices and learn from diverse communities to avoid legal bubbles or constitutional crisis in the context of digital innovation.

## NOTES

1 In this contribution, we use the terms policy, regulation, and law as synonyms.
2 We refer to the order of actions as the practices carried out by developers and the industry and the order of rules as the set of norms, policies, and laws governing the behavior of the actors involved in the order of actions (including industries but also consumers and users).
3 According to the UN, the rule of law is "a principle of governance in which all persons, institutions and entities, public and private, including the State itself, are accountable to laws that are publicly promulgated, equally enforced and independently adjudicated, and which are consistent with international human rights norms and standards". See www.un.org/ruleo flaw/what-is-the-rule-of-law/. The UN has highlighted that rule of law and development are strongly interlinked, and that strengthened rule of law-based society should be considered as an outcome of the 2030 Agenda and SDGs. Especially in relation to SDG 16, the development of inclusive and accountable justice systems and rule of law reforms will build trust in the legitimacy of governments. In this context, SDG 17 also contributes to this goal by forging partnerships to share ideas and foster innovation.
4 See www.safearoundrobots.com/home.

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