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Citation

Fosch Villaronga, E., & Giraudo, M. (2022). Innovation letter: experimenting with competing techno-legal standards for robotics. *Journal Of Law, Market & Innovation*, 1(3), 9-14. doi:10.13135/2785-7867/7164

Version: Publisher's Version

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Downloaded from: <https://hdl.handle.net/1887/3763957>

Note: To cite this publication please use the final published version (if applicable).

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INNOVATION LETTER

EXPERIMENTING WITH COMPETING TECHNO-LEGAL STANDARDS FOR ROBOTICS

Abstract

There are legitimacy and discriminatory issues relating to overreliance on private standards to regulate new technologies. On the legitimacy plane, we see that standards shift the centralization of regulation from public democratic processes to private ones that are not subject to the rule of law guarantees reviving the discussion on balancing the legitimacy and effectiveness of techno-legal solutions, which only further aggravates this complex panorama. On the discriminatory plane, incentive issues exacerbate discriminatory outcomes over often marginalized communities. Indeed, standardization bodies do not have incentives to involve and focus on minorities and marginal groups because 'unanimity' of the voting means among those sitting at the table, and there are no accountability mechanisms to turn this around. In this letter, we put up some ideas on how to devise an institutional framework such that standardization bodies invest in anticipating and preventing harm to people's fundamental rights.

JEL CLASSIFICATION: K0, O14

Big data has fuelled optimism and excitement about the widespread adoption of automated systems, especially in industrial, farming, retail, logistics, and, lately, care robots. Such a deluge of new technological artifacts reaching the most intimate recesses of people's lives is already shaking up the legal foundations of our societies. Unfortunately, as the pace of technology dramatically accelerates, our understanding of its implications and regulation does not keep pace¹. On the contrary, current

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¹ Gary E Marchant, 'The growing gap between emerging technologies and the law' in Gary E Marchant, Braden R Allenby and Joseph R Herkert (eds), *The growing gap between emerging technologies and legal ethical oversight: the*

standards, laws, and proposed regulations have so far failed to frame robotic technology adequately, although they are silently inserted in every possible domain².

Public authorities rely on private actors' capacity to develop adequate standards to mitigate the ethical and legal problems, hazards, and concerns posed by robotics³. The overtrust in the ability of these private institutions to deliver balanced and legitimate solutions in such domains is exacerbating, rather than simplifying, the regulatory landscape. Letting private parties develop de facto legal rules through technological standards in domains covered by fundamental rights opens the door to instability related to the possible rejection of these practices by the court system⁴. These soft-law instruments are excellent for reaching international agreements in relevant areas, and if harmonized, they are proof of compliance with hard-law instruments. However, it is not equally sure they work to prevent harm to real people in real-use contexts.

There are legitimacy and discriminatory issues relating to overreliance on private standards to regulate new technologies. On the legitimacy plane, we see that standards shift the centralization of regulation from public democratic processes to private ones that are not subject to checks and balances for the official sources of the law⁵, reviving the discussion on balancing the legitimacy and effectiveness of what we may call techno-legal solutions⁶. Regarding the discriminatory side, we see knowledge and incentive issues leading to dangerous and unacceptable discriminatory outcomes. The first problem relates to the fact that no one can anticipate how autonomous systems will significantly affect real people's rights and interests when they deviate from the standard abstract subject. This knowledge problem applies to professionals working for standardization bodies who unavoidably suffer from availability bias, the fallacy of composition, and reductionist approaches. They over-concentrate on information and general knowledge to their avail, with little capacity to adapt to the reality of products

spacing problem (Springer Science & Business Media 2011); David Collingridge, *The Social Control of Technology* (St. Martin's Press 1980).

² Eduard Fosch-Villaronga, *Robots, Healthcare and the Law: Regulating Automation in Personal Care* (Routledge 2019); Ronald Leenes, Erica Palmerini, Bert-Jaap Koops, Andrea Bertolini, Pericle Salvini and Federica Lucivero, 'Regulatory challenges of robotics: some guidelines for addressing legal and ethical issues' [2017] *Law Innovation and Technology* 11.

³ Alan Winfield, 'Ethical standards in robotics and AI' [2019] 2 *Nat Electron* 46; Eduard Fosch-Villaronga and Angelo Jr Golia, 'The Intricate Relationships between Private Standards and Public Policymaking in the Case of Personal Care Robots. Who Cares More?' in Paolo Barattini, Federico Vicentini, Gurminder Singh Virk and Tamas Haidegger (eds), *Human-Robot Interaction: Safety, Standardization, and Benchmarking* (CRC Press 2019); Eduard Fosch-Villaronga and Angelo Jr Golia, 'Robots, Standards and the Law. Rivalries between private standards and public policymaking for robot governance' [2019] *Computer Law & Security Review* 129.

⁴ Eduard Fosch-Villaronga, Hadassah Drukarch and Marco Giraudo, 'A legal sustainability approach to align the order of rules and actions in the context of digital innovation', forthcoming in Henrik Saetra (ed) *Technology and Sustainable development. The promise and pitfalls of techno solutionism* (Springer 2023).

⁵ Michael Guihot, Anne F Matthew and Nicolas Suzor, 'Nudging robots: Innovative solutions to regulate artificial intelligence' [2019] *Vand J Ent & Tech L* 385.

⁶ Fosch-Villaronga and Golia, 'Robots, Standards and the Law. Rivalries between private standards and public policymaking for robot governance' (n 3).

with increased levels of autonomy and complex interaction with humans, whereby the distinction between practitioners, developers, and designers is challenging and blurry⁷.

For instance, ISO 13482:2014 on safety requirements for personal care robots over-focuses on physical safety, which is much easier to grasp regarding possible harmful events. However, physical safety is not the only personal dimension legally protected at the fundamental rights level. The standards neglect other essential aspects like security, privacy, psychological aspects, and diversity, which play a crucial role in robot safety⁸. As a result, the autonomous systems adopting these standards fail to provide adequate protection in the real world when real people are concerned⁹.

Also, the standards overfocus on dominant groups of potential users, thus overlooking the rights, needs, and sensibilities of minority groups¹⁰. For instance, the already mentioned ISO 13482:2014 is problematic because the first edition of the standards stated that 'future editions of this International Standard might include more specific requirements on particular types of personal care robots, as more complete numeric data for different categories of people (e.g., children, elderly, pregnant women).' However, the subsequent edition did not include these and other minorities. However, these reduction approaches can be helpful in the short run because they allow for a workable solution. They are rhetorical figments that profoundly impact real users' safety and personal psychological well-being. The divergence between abstract models of users and real people is not only relevant on a normative level because when real people are harmed, courts will award damages and issue injunctions such as rise costs and dragging profitability of automated systems too reliant on standards alone¹¹.

Also, incentive issues are exacerbating discriminatory outcomes. To date, standardization bodies do not have the incentives to focus on minorities and marginal groups because there are no accountability mechanisms to ensure their interests and beliefs are considered. Professionals working at standardization bodies are unelected officials. Therefore, they do not have to report to the electorate during general elections,

⁷ Philippe N Boucher, Naja Bentzen, Tania Lațici, Tambiana A Madiaga, Leopold Schmertzling and Marcin Szczepański, *Disruption by Technology. Impacts on politics, economics and society* (European Parliamentary Research Service 2020); Eduard Fosch-Villaronga, Adam Poulsen, Roger A Søråa and Bart Custers, 'A little bird told me your gender: Gender inferences in social media' [2021] *Information Processing and Management* 1.

⁸ Alberto Martinetti, Peter K Chemweno, Kostas Nizamis and Eduard Fosch-Villaronga, 'Redefining safety in light of human-robot interaction: a critical review of current standards and regulations' [2021] *Front Chem Eng*; Eduard Fosch-Villaronga, Simone Van der Hof, Christoph Lutz and Aurelia Tamò Larrieux, 'Toy Story or Children Story? Putting children and their rights at the forefront of the Artificial Intelligence revolution' [2021] *AI & Society* 1.

⁹ Karl Gruber, 'Is the future of medical diagnosis in computer algorithms?' [2019] *The Lancet Digital Health* 1.

¹⁰ Roger A. Søråa and Eduard Fosch-Villaronga, 'Exoskeletons for all: The interplay between exoskeletons, inclusion, gender and intersectionality' [2020] *Paladyn Journal of Behavioral Robotics* 217; Eduard Fosch-Villaronga, Anto Cartolovni and Robin L Pierce, 'Promoting inclusiveness in exoskeleton robotics: Addressing challenges for pediatric access' [2020] *Paladyn Journal of Behavioral Robotics* 1.

¹¹ Eduard Fosch-Villaronga and Michiel Heldeweg '“Regulation, I presume?” said the robot—Towards an iterative regulatory process for robot governance' [2018] *Computer Law & Security Review* 1258.

whereby minority groups may raise their voices. They are “judgment proof” because they supply de facto legal solutions without any effective and rapid accountability tool.

Legitimacy, knowledge, and incentive problems make the current institutional framework unfit to create standards working for most people and groups involved. Should these cognitive and incentive asymmetries continue, the availability of inadequate reductionist techno-legal standards may favor the widespread adoption of ill-conceived practices while at the same time not protecting users from harm¹².

There is robust consensus as to the fact that something has to be done, but there is no shared idea on the agenda¹³. Rather than tackling such a dysfunctional system, the strategy of *kicking the can down the road* may emerge in a reality check in courts for the industry. They may find themselves trapped in technological ecosystems built upon standards that are eventually proved unfit to deliver on their protective goals¹⁴.

So, one may think of possible ways to address these issues. As to the legitimacy issue, this is political and constitutional and shall be addressed seriously and soon by legislative intervention both at the Member State and EU levels. Suppose there is political consensus that standards play a de facto legislative function in such a sensitive domain as fundamental rights. In that case, political bodies at the highest level shall devise viable solutions to include these rules within the constitutional structure of pluralistic democracies.¹⁵ As to the incentive issue, instead, there are some foundational questions we may start to address as to how we can improve the quality and the fairness of standards under the current constitutional framework.

We may ask ourselves a twofold question. First, how do we create knowledge and information about possible adverse implications of personal care robots - and autonomous systems in general - so they can be used to frame standards? Second, how do we incentivise standard organizations to invest in preventing harm to minority groups regarding their specific beliefs and physical and physiological traits?¹⁶ In other words, how can we imagine an institutional framework with standardization bodies to invest in anticipating and preventing harm to people's fundamental rights?

One good start could clarify whom we want to pay for wrong or incomplete anticipations of robots' adverse effects harming the protected legal interests of people.

¹² Carlos Calleja, Haddassah Drukarch and Eduard Fosch-Villaronga, ‘Harnessing robot experimentation to optimize the regulatory framing of emerging robot technologies’ [2022] *Data & Policy* 1.

¹³ Thomas Wischmeyer and Timo Rademacher (eds), *Regulating Artificial Intelligence* (Routledge 2020).

¹⁴ Marco Giraudo, ‘Legal Bubbles’ in Alain Marciano and Giovanni Ramello (eds), *Encyclopedia of Law and Economics* (2nd edition, Springer 2022).

¹⁵ Fosch-Villaronga and Golia, ‘Robots, Standards and the Law. Rivalries between private standards and public policymaking for robot governance’ (n 3).

¹⁶ Ido Kilovaty, ‘Psychological data breach harms’ [2021] *North Carolina Journal of Law and Technology* 1; Eduard Fosch-Villaronga, “‘I love you,’ said the robot. Boundaries of the use of emotions in human-robot interaction” in Hande Ayanoğlu and Emília Duarte (eds), *Emotional Design in Human-Robot Interaction: Theory, Methods and Application* (Springer 2019).

Under the current regulatory landscape, those paying are the users¹⁷, and possibly producers of personal care robots in the future¹⁸. In this context, standardization bodies are not accountable for wrong anticipations or ill-conceived risk assessments.

To re-equilibrate the incentive structure, we may want to switch to a more decentralized model whereby competing private entities provide for techno-legal standards. If we want to leverage private ingenuity and ability to come up with standards considering a broader spectrum of legal interests also concerning minorities, we may recur to the creation of a market for them.

Private companies need incentives to invest resources to explore implications for different and small minorities which today do not exist. If a group of possible customers exists, then they may be willing to invest in delivering the proper techno-legal standards. Moreover, they have incentives to do it properly because if they fail to consider some hazards or risks adequately, they have to bear the consequences of these shortcomings or wrong assessments. The possibility of providing standards to those selling automated systems to minorities may foster investments in these niches and favor research to prevent these possible harms proactively¹⁹. If the techno-legal software fails to protect users and mitigate harm, this will give rise to either product liability or liability towards the professional-client using these standards.

We may call it a market of techno-legal standards whereby private entities sell de facto legal solutions embedded in technological standards to be used as licensed software. In this case, the incentives to invest in preventing harm to real people would spur competition between different private entities to develop better legal-technological standards to anticipate and prevent possible harm, capable of adapting to experience and case law. Of course, the ultimate arbiters of legal-technological standards will be courts and judges assessing them, or not, in case law when establishing liability. Moreover, we may see some standardization bodies go bankrupt because they failed to anticipate and prevent possible harm and how courts will award damages in these cases.

However, the possibility of failure is essential for the competition to deliver on its efficiency promises. A functional market is such that techno-legal standards that are more costly – both in terms of individual and social costs – are filtered out by competition from better alternatives capable of reducing the negative externalities of autonomous systems and robots. The possibility of failure couples with the prospect of reaping the profits of winning the competition in designing techno-legal standards capable of anticipating courts' decisions.

¹⁷ Fosch-Villaronga and Heldeweg (n 11).

¹⁸ Homa Alemzadeh, Jaishankar Raman, Nancy Leveson, Zbigniew Kalbarczyk and Ravishankar K Iyer, 'Adverse Events in Robotic Surgery: A Retrospective Study of 14 Years of FDA Data' [2016] 11 Plos One 1.

¹⁹ Fosch-Villaronga, Cartolovni and Pierce (n 10).

For this to happen, we need to establish an institutional framework providing incentives such as internalizing both benefits and costs of devising techno-legal standards. Legal-technological standards, as software, might be used under licenses and subject to product liability. In this way, we may elicit investment in knowledge production about possible harms to marginal groups and infrequent landscapes, not only to majority groups but also to create a market for standards that is more balanced, inclusive, and efficient. The presence of incentives to anticipate all the costs may favour the competition between legal and technological standards and their adaptation to newly emerging case law across the relevant jurisdictions.

Of course, there is no institutional framework where no one pays. Free lunches do not exist either under central planning or the market economy. Thus, some entities selling techno-legal standards may fail if their solutions do not work and cause unsustainable damage. If their software does not work, they will have to pay compensation and eventually go bankrupt.

Experimenting with market-based regulatory models may favor smoother coevolution between legal rules and industrial practices to avoid air gaps between the policy cycle's speed and technological and social change