

# INNOVATION-FRIENDLY REGULATION: THE SUNSET OF REGULATION, THE SUNRISE OF INNOVATION

Sofia Ranchordás\*

**ABSTRACT:** In the last years, the approach of governments towards innovation has changed dramatically. The myth of innovation being an activity carried out by lonely inventors in their garages or in the laboratories of large private companies, in the context of which there was little or no place for governmental intervention, is passé. The advancement of innovation and economic growth has been included in the list of priorities of most governments. However, in times of crisis, governments expect to play more than a supporting role and go beyond the traditional economic incentives and innovation policy documents. It is time to call regulators to the center stage and tell them to start playing the innovation tune. Regulation and governance can play either an impeding or a facilitative role, depending on the instruments used. Regulation may give or take away incentives to innovate; it may accelerate or delay the introduction of innovations into the market; it may adapt itself to the speed of the innovation process or lag behind. This article focuses on two aspects of this regulatory approach to innovation: the pacing problem and the lack of information about the regulation of the innovation process.

Very often regulation simply lags behind or tries to slow down the “pace” of innovation, whereas innovation moves at the speed of sound: it can “happen” anywhere and anytime; regulators are limited by slow procedures and the need to confer some stability to regulations. In addition, regulators are being confronted with complex innovations in the different fields of emerging technologies and apparently straightforward innovations that challenge existing regulatory paradigms (e.g., Aereo, Airbnb, Uber) about which regulators know very little. Do these innovations bring along risks, and how should they be regulated? In this article, I argue that the “pacing” and “informational” problems could be solved by enacting two highly overlooked regulatory instruments: sunset clauses and experimental legislation. Both of these instruments confer adaptability to the regulatory framework, set the stopwatch on obsolete legislation, and create room for regulatory flexibility and learning. Sunset setting limits the temporal scope of regulation, while experimental legislation can limit both the temporal and geographic scopes or object of regulation. Experimenting with laws can be particularly useful to test new regulations on a small-scale basis, gather more facts about the market’s response to an innovative product, and improve regulation as more information becomes available. Both temporary legislative instruments can be part of a more innovation-friendly approach to regulation, combining on the one hand an openness to innovation, and on the other, a responsible regulatory framework.

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\*Sofia Ranchordás, L.L.M., PhD, Assistant Professor, Tilburg Law School, The Netherlands. I would like to thank the Arizona State University for the invitation to participate in the Annual Conference on Governance of Emerging Technologies in Scottsdale, as well as a number of its participants that provided me with very useful comments and “food for thought.” I would like to express my gratitude to Rob van Gestel, Patricia Popelier and Pierre Larouche, with whom I discussed preliminary versions of this paper. I am also indebted to the anonymous reviewers for their excellent remarks.

Innovation: a path to long-term economic growth,<sup>1</sup> a word of hope for economic recovery in times of crisis, and a vital opportunity for economies in developing as well as developed countries to maintain high levels of competitiveness.<sup>2</sup> Innovation: a word we pronounce too often, most of the time devoid of significance. Beyond the magic of this word lies an array of statutes and governmental regulations, institutions, granting schemes, and incentives that make many innovations possible.<sup>3</sup> Examples of innovation-promoting activities include the Leahy-Smith America Invents Act,<sup>4</sup> the Innovation Act of 2013,<sup>5</sup> the 1960s space program, the Standards Development Organization Advancement Act of 2004,<sup>6</sup> the federal Small Business Innovation Research Program that has been successfully tailored to encourage entrepreneurship in different sectors,<sup>7</sup> and the several industry-academia collaborative research programs all over the world.<sup>8</sup>

Legislation delaying innovation is caused by the slow-going nature of regulation and the fast pace of emerging technologies, allied with significant informational disconnections between law and innovation.<sup>9</sup> Regulation seems to be unable to keep up with the fast pace of innovation. While this might be inevitable given the fast development of new products, rules do not remain just a few steps behind innovation. Very often, they are found miles away pushing and pulling strings that impede innovation from moving forward. The level of complexity and speed of innovation experienced over recent years in different

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1. Richard S. Whitt, *Adaptive Policymaking: Evolving and Applying Emergent Solutions for U.S. Communications Policy*, 61 FED. COM. L.J. 483, 494 (2009) (citing Paul Romer from Stuart Minor Benjamin & Arti K. Rai, *Fixing Innovation Policy: A Structural Perspective*, 77 GEO. WASH. L. REV. 101 (2008)).

2. Jean-Eric Aubert, *Promoting Innovation in Developing Countries: A Conceptual Framework* 5, 12–13 (World Bank Policy Research, Working Paper No. 3554, 2005), available at <http://elibrary.worldbank.org/doi/pdf/10.1596/1813-9450-3554>.

3. Suzanne Scotchmer with Stephen M. Maurer, *Institutions: A Brief Excursion through History*, in SUZANNE SCOTCHMER, INNOVATION AND INCENTIVES 1, 1 (The MIT Press ed., 2004).

4. Leahy-Smith America Invents Act, Pub. L. No. 112-29, 125 Stat. 284 (2011) (amending 35 U.S.C.).

5. Innovation Act, H.R. 3309, 113th Congress (2013) (amending 35 U.S.C. and the Leahy-Smith America Invents Act to make improvements and technical corrections).

6. Pub. L. No. 108-237, 118 Stat. 661, 15 U.S.C. §§ 4301–05 (2004).

7. See ALBERT N. LINK & JOHN T. SCOTT, BENDING THE ARCH OF INNOVATION: PUBLIC SUPPORT OF R&D IN SMALL, ENTREPRENEURIAL FIRMS (2013) (analyzing the impact of the Small Business Research Program and demonstrating the positive impact of this program on the commercialization of innovations by small enterprises).

8. For the innovative collaborative R&D programs of the Japan Science and Technology Agency with the S-Innovation Programs, see, e.g., *Industry-Academia Collaborative R&D Programs: S-Innovation (Strategic Promotion of Innovative Research and Development)*, JAPAN SCI. & TECH. AGENCY, <http://www.jst.go.jp/tt/EN/platform/s-innova.html>.

9. For a general analysis of the problematic relationship between law and innovation, see Roger Brownsword & Han Somsen, *Law, Innovation and Technology: Before We Fast Forward—A Forum for Debate*, 1 LAW, INNOVATION & TECH. 1 (2009). On the pacing problem, see THE GROWING GAP BETWEEN EMERGING TECHNOLOGIES AND LEGAL-ETHICAL OVERSIGHT: THE PACING PROBLEM (Gary E. Marchant et al. eds., 2011) [hereinafter THE GROWING GAP]. On the disconnection between law and innovation, see, e.g., HERAUSFORDERUNG INNOVATION: EINE INTERDISZIPLINÄRE DEBATTE [INNOVATION CHALLENGE: AN INTERDISCIPLINARY DEBATE] (Reto M. Hilty et al. eds., 2012) (Ger.).

emerging technologies has resulted in significant and unexpected consequences on our societies. The acceleration of technological development generates a stream of fundamental debates that often must be carried out at break-neck pace; for instance, debates on the meaning and protection of privacy on the Internet, on surveillance, or on the health risks regarding genetically modified organisms (GMOs). As Gary Marchant points out, there appears to be two solutions for this “pacing problem”: “(i) to slow down or stop the pace of scientific progress; or (ii) to improve the capacity of the legal system to adapt to rapidly evolving technologies (even if this means departing from traditional forms of legal education into broader forms of governance).”<sup>10</sup>

The pacing problem of law and technology reflects a more general controversy regarding the relationship between time and law and the role that law should play in the life-cycle of technology and science.<sup>11</sup> Law and regulation are often seen as the sources of certainty that do not exist elsewhere and thus appear to be more permanent or lasting than the daily reality, which travels at the speed of technology. However, “existing regulatory systems and ethical frameworks are inadequate to provide effective, meaningful and timely oversight of the current and future generations of emerging technologies” and although this might not sound new to most of us,<sup>12</sup> we observe a “growing asynchronicity in the pacing of law and ethics with science and technology.”<sup>13</sup> In addition, regulators are overwhelmed both by the pace and the complexity of emerging technologies: not only do these technologies evolve fast, but they also move furiously in the direction of new social, ethical, and privacy risks.<sup>14</sup> Beyond the world of emerging technologies, regulators are often confronted with innovations that challenge existing regulatory paradigms (e.g., Aereo, Airbnb, and Uber) about which regulators know very little and which might be a source of opportunities for consumers to have access to more products, but might also be a source of multiple risks.

Regulators are often faced not only with information asymmetries in the sense of the gap between their knowledge and that of innovators, but also with a lack of information about the potential effects of innovative products and services. Innovation is both a source of chances and risks, and is characterized by numerous uncertainties that accompany innovators from the moment they have an innovative idea until its final commercialization.<sup>15</sup> Innovators are not able to foresee whether the idea can be converted into an innovative product or

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10. Gary E. Marchant, *The Growing Gap between Emerging Technologies and the Law*, in *THE GROWING GAP*, *supra* note 9, at 19–20 (Gary E. Marchant et al. eds., 2011).

11. *See generally* *THE GROWING GAP*, *supra* note 9.

12. Gary E. Marchant, *Addressing the Pacing Problem*, in *THE GROWING GAP*, *supra* note 9, at 199. This disconnection between the adequacy of regulation and innovation in emerging technologies was already described some decades ago. *See, e.g.*, Gregory A. Jaffe, *Inadequacies in the Federal Regulation of Biotechnology*, 11 *HARV. ENVTL. L. REV.* 491 (1987).

13. Gary E. Marchant, *Addressing the Pacing Problem*, in *THE GROWING GAP*, *supra* note 9, at 199.

14. *Id.* at 199–200.

15. HASAN BAKHSHI ET AL., *STATE OF UNCERTAINTY: INNOVATION POLICY THROUGH EXPERIMENTATION* 4 (2011), available at [http://www.nesta.org.uk/sites/default/files/state\\_of\\_uncertainty.pdf](http://www.nesta.org.uk/sites/default/files/state_of_uncertainty.pdf).

service, whether it will be authorized in the market, how much time the competent regulator will take to allow its commercialization and under what conditions,<sup>16</sup> and, last but not least, whether the innovation will be successful, the investment will be recouped, and a profit will be made. This lack of information is a problem both for regulators and innovators. In addition, regulators are far from having discovered the magic potion that assembles the optimal mix of instruments to encourage innovation.<sup>17</sup> On the one hand, regulators want to encourage innovation; on the other, they wish to limit undesirable side effects and control potential risks of these innovative products and processes.

This “informational problem” is enhanced by the fact that regulators have limited access to the forms of information or knowledge which are relevant for the development of innovation, notably inventive knowledge (what facilitates the intellectual or material creation), emergent knowledge (the information generated by the innovation), and interpretative knowledge (what makes us perceive something as innovative, or the added value of a novelty to the state-of-art).<sup>18</sup>

Why are regulators not on pace when it comes to innovative technologies and what should be done to solve this problem? The disconnection between timeliness of the introduction of products into the market and the enactment or review of the applicable rules can delay important innovations. Thus, it is important to adopt a regulatory framework that offers a proper pacing of regulations, that is, a pacing of regulations that is in line with the innovation process,<sup>19</sup> allowing room for learning and revision of regulation as more information becomes available, but still reflects a responsible approach to innovation.<sup>20</sup> In this article, I argue that the pacing and informational problems that characterize the regulation of innovation could be tempered by adopting a more “innovation-friendly” attitude towards science and technology. In this

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16. On the commercialization of innovation, see PERSPECTIVES ON COMMERCIALIZING INNOVATION (F. Scott Kieff & Troy A. Paredes eds., 2012).

17. Brett Frischmann, *Innovation and Institutions: Rethinking the Economics of U.S. Science and Technology Policy*, 24 VT. L. REV. 347, 347, 387 (2000). See generally BRETT M. FRISCHMANN, *INFRASTRUCTURE: THE SOCIAL VALUE OF SHARED RESOURCES* (2012).

18. Alfons Bora, *Knowledge and the Regulation of Innovation*, 7 POIESIS & PRAXIS 73, 73 (2010).

19. Jennifer Kuzma, *Properly Paced? Examining the Past and Present Governance of GMOs in the United States*, in INNOVATIVE GOVERNANCE MODELS FOR EMERGING TECHNOLOGIES 176 (Gary E. Marchant et al. eds., 2013).

20. For a brief literature review on responsible innovation, see Jack Stilgoe et al., *Developing a Framework for Responsible Innovation*, 42 RES. POL'Y 1568 (2013). See generally ANDREW MAYNARD & TIM HARPER, *WORLD ECON. FORUM, BUILDING A SUSTAINABLE FUTURE—RETHINKING THE ROLE OF TECHNOLOGY INNOVATION IN AN INCREASINGLY INTERDEPENDENT, COMPLEX & RESOURCE-CONSTRAINED WORLD, EXECUTIVE SUMMARY* (2011), available at <https://www.scribd.com/doc/47096457/Building-a-Sustainable-Future>. See also RESPONSIBLE INNOVATION: MANAGING THE RESPONSIBLE EMERGENCE OF SCIENCE AND INNOVATION IN SOCIETY 33 (Richard Owen et al. eds., 2013); RESPONSIBLE INNOVATION 1: INNOVATIVE SOLUTIONS FOR GLOBAL ISSUES (Jeroen van den Hoven et al. eds., 2014) (addressing methodological issues involved in responsible innovation and applications to multidisciplinary research).

context, I plead for the use of two regulatory instruments that limit the scope of regulatory enactments: sunset clauses and experimental regulations.

The term *sunset clause* has been used in the literature to describe a broad range of statutory or regulatory mechanisms that entail the termination of a statute at a previously determined time.<sup>21</sup> Sunset clauses or provisions can be applied to entire statutes or determined provisions.<sup>22</sup> A sunset clause imposes not only the expiration of a law or agency, but it should also submit a legislative act to a final evaluation.<sup>23</sup> In theory, sunset clauses may be renewed but this would imply the verification of exceptional circumstances, which would have to be evidenced by those defending the renewal.<sup>24</sup>

Sunset clauses allow for the adaptation of rules to changing social or technological circumstances and determine the expiry of unnecessary acts; they help to avoid overregulating the sector and placing unnecessary burdens on the industry.<sup>25</sup> In the context of emerging technologies, these clauses impose the death of regulations that do not keep up with the current state of technology. Although they are scarcely used in the daily legislative and regulatory practice, these provisions are far from being unknown legislative instruments in the United States where there was even a sunset boom in the late 1970s until the mid-1980s.<sup>26</sup> Although they have been suggested as valuable instruments in the context of the regulation of telecommunications and emerging technolo-

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21. John E. Finn, *Sunset Clauses and Democratic Deliberation: Assessing the Significance of Sunset Provisions in Antiterrorism Legislation*, 48 COLUM. J. TRANSNAT'L L. 442, 445 (2010).

22. Frank H. Easterbrook et al., *Showcase Panel IV: A Federal Sunset Law*, *The Federalist Society 2011 National Lawyers Convention*, 16 TEX. REV. L. & POL. 339, 341 (2012). See Lewis Anthony Davis, *Review Procedures and Public Accountability in Sunset Legislation: An Analysis and Proposal for Reform*, 33 ADMIN. L. REV. 393, 393 (1981). On the controversial use of sunset clauses in the field of counter-terrorism, see Finn, *supra* note 21, at 442. For a thorough study of both sunset clauses and experimental legislation from a comparative perspective, see SOFIA RANCHORDÁS, *CONSTITUTIONAL SUNSETS AND EXPERIMENTAL LEGISLATION: A COMPARATIVE PERSPECTIVE* (2014); Finn, *supra* note 21.

23. Sunset clauses have not always resulted in an adequate ex post evaluation of legislation. See Richard C. Kearney, *Sunset: A Survey and Analysis of the State Experience*, 50 PUB. ADMIN. REV. 49, 49, 56 (1990). For a less recent perspective on the enactment of sunset clauses, see Sandra M. Vidas, *The Sun also Sets: A Model for Sunset Implementation*, 26 AM. U.L. REV. 1169 (1976).

24. Davis, *supra* note 22, at 393; Ph. Eijlander & R.A.J. van Gestel, *Horizonwetgeving: effectief middel in de strijd tegen toenemende regeldruk? Een onderzoek naar de functie van werkingsbeperkingen in wetgeving ter vermindering van regeldruk* [Sunset Clauses: An Effective Tool to Combat Growing Regulatory Pressure? A Study of the Role of Legislative Limitations to Reduce Regulatory Pressure into the Function of Operating Restrictions in Legislation Reducing Regulatory Burden] 16–17 (2006) (unpublished manuscript) (Neth.), available at <http://www.portill.nl/articles/Eijlander/Horizonwetgeving.pdf>.

25. See BASTIAN JANTZ & SYLVIA VEIT, BERTELSMANN STIFTUNG, *SUNSET LEGISLATION AND BETTER REGULATION: EMPIRICAL EVIDENCE FROM FOUR COUNTRIES* 16 (2010), available at [http://www.fundacionbertelsmann.org/cps/rde/xbcr/SID-ECC49709-ED8CBB90/bst\\_engl/xcms\\_bst\\_dms\\_35739\\_2.pdf](http://www.fundacionbertelsmann.org/cps/rde/xbcr/SID-ECC49709-ED8CBB90/bst_engl/xcms_bst_dms_35739_2.pdf).

26. See, e.g., Mark B. Blicke, *The National Sunset Movement*, 9 SETON HALL LEGIS. J. 209 (1985) (discussing the longstanding use of sunset laws within the United States); Michael D. Crain, *Time for the Sun to Rise on Federal Sunset Legislation*, 8 PUB. L. 10, 10, 12 (2000).

gies,<sup>27</sup> until recently they had not been systematically analyzed and endowed with a framework that guarantees their successful implementation in innovative fields.<sup>28</sup>

Experimental regulations are also a form of temporary legislation,<sup>29</sup> which comprises new regulations within a circumscribed scope that, derogating from existing law or exempting a number of existing legal requirements, are designed to try out novel legal approaches or to regulate new products or services to gather more information about them.<sup>30</sup> Experimental regulations are often first implemented on a small-scale basis to a region or group.<sup>31</sup> The results of the implementation of the law are submitted to a periodic or final evaluation where they are compared to the results obtained in other regions where another law was implemented. An example of this approach is the December 2013 approval by the Federal Aviation Administration of six different research and test sites for Unmanned Aircraft Systems.<sup>32</sup> Once evaluated, an experimental legislative instrument denoting positive outcomes can be adapted in conformity with the results observed and transformed into a permanent act.

In this article, I suggest that both instruments—sunsetting and experimental regulation—would diminish the pacing and informational gaps between law and innovation because they respond to the dynamic character of the innovation process. Sunset clauses determine the expiry of regulations that are expected to become obsolete because of an inability to keep up with improvements in technology. This can be particularly valuable in the context of disruptive innovations, that is, innovations that revolutionize the status quo and require new rules.<sup>33</sup> When new pharmaceuticals or medical treatments replaced existing ones, it is important that regulations expire or are substantially reviewed as regulators become better informed about the risks of new medicine. The recent *Planned Parenthood Ariz., Inc. vs. Humble* case was triggered, among other reasons, by a disconnection between the current medical practice and the implementation of outdated FDA regulations that gave preference to on-label prescription of abortion medicine, although this was regarded as an obsolete medical practice.<sup>34</sup>

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27. See Lyn M. Gaudet & Gary E. Marchant, *Administrative Law Tools for More Adaptive and Responsive Regulation*, in *THE GROWING GAP*, *supra* note 9, at 178.

28. For a thorough analysis of the legal framework of both sunset clauses and experimental legislation, see RANCHORDÁS, *supra* note 22.

29. For more general literature on temporary legislation, see Jacob E. Gersen, *Temporary Legislation*, 74 U. CHI. L. REV. 247 (2007). For a law and economics analysis of temporary legislation, see FRANK FAGAN, *LAW AND THE LIMITS OF GOVERNMENT: TEMPORARY VERSUS PERMANENT LEGISLATION* (2013).

30. Experimental regulations are often not randomized, which affects their validity and meaningfulness. See Michael Abramowicz et al., *Randomizing Law*, 159 U. PA. L. REV. 929, 931 (2011).

31. For an analysis on the relevance of experimental regulations in the financial sector, see Zachary J. Gubler, *Experimental Rules*, 55 B.C.L. REV. 129 (2014).

32. See *Fact Sheet—Unmanned Aircraft Systems (UAS)*, FED. AVIATION ADMIN. (Jan. 6, 2014), [http://www.faa.gov/news/fact\\_sheets/news\\_story.cfm?newsId=14153](http://www.faa.gov/news/fact_sheets/news_story.cfm?newsId=14153).

33. Clayton Christensen et al., *Disruptive Innovation for Social Change*, 84 HARV. BUS. REV. 94, 96 (2006).

34. *Planned Parenthood Ariz., Inc. v. Humble*, 753 F.3d 905, 907 (9th Cir., 2014).

When regulators are uncertain about the effects of a law regarding an innovative product, experimental regulations can be an alternative to a precautionary approach that would either delay or prohibit the authorization of a product on the grounds of its estimated risks. Instead of slowing down technology and science, experimental regulations catch up to the pace of innovation by giving the benefit of the doubt to innovators and testing new rules, which ensures that good innovations do not perish at the door of regulators.<sup>35</sup>

Experimental regulations should not allow for an unsafe or untested product to be promptly authorized. Instead, experimental regulations can be used in scenarios where, for example, clinical trials have revealed that a product is safe but it remains unclear how an innovative service or product should be regulated or where ethical concerns or political disagreement might be standing in the way of the enactment of new regulations. The use of experimental regulations also enables regulators to adapt and update legislation by incorporating new facts that have been gathered, conferring a stronger science-based character to regulation.<sup>36</sup>

Sunset clauses and experimental regulations should be regarded as elements of an innovation-friendly regulatory framework that translates into a different state of mind for regulators where opportunities for innovation are left open, but where cautious regulation is enacted through temporary and experimental rules. This perspective approaches innovation as an isolated phenomenon characterized by a number of complexities, and detached from specific fields and technologies. It also allows for a balance between the advantage of introducing a new product into the market faster, and the need to regulate its risks for public health, environment, or safety. In other words, innovation-friendly regulation does not reflect only the characteristics of specific technologies, but focuses rather on the approach that law should take to accompany the pace of innovation in general, regardless of the industry in question.

The complex relationship between innovation and the timeliness of law is a common element transcending the specificities of any particular technology, innovation, or scientific discovery. The big picture regarding the relationship between law and innovation, notably the fact that innovators and regulators do not seem to live in the same decade, is explored in Part I. I argue that regulators should think like innovators and enact regulations that are both open to change and “ethically and legally responsible.” Part II explains what sunset clauses and experimental legislation are and why they could contribute to solving the above-mentioned “pacing problem.” While I do not make empirical claims in this article, I argue that these two approaches offer straightforward solutions to the pacing and informational problems of innovation by

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35. In a different field, but still connected with the impact of excessive and outdated regulation on innovation, see Gillian K. Hadfield, *Legal Barriers to Innovation: The Growing Economic Cost of Professional Control over Corporate Legal Markets*, 60 STAN. L. REV. 1689 (2008) (arguing that excessive self-regulation of the legal profession annihilates any margin of creativity in legal services and the development of innovation).

36. See Sofia Ranchordás, *The Whys and Woes of Experimental Legislation*, 1 THEORY & PRAC. LEGIS. 415, 423–24 (2013).

attacking its main virus: the tendency of law and regulation to lag behind technology and society.

## I. INNOVATION & LAW: THE “BIG” PICTURE

In the last few years, the approach of governments towards innovation has changed dramatically. It is precisely at times of economic and social crisis that higher levels of innovation are essential for the advancement of competitiveness and economic recovery.<sup>37</sup> At times of budgetary constraints the path to higher levels of innovation has started to be explored from the regulatory perspective, which may be less costly than direct economic incentives and still have an important impact on the emergence of new products and services.<sup>38</sup> This path is not necessarily less hard even though it implies a clear definition of the concept of innovation and understanding the relationship between law and innovation.

### A. Innovation

Innovation may be often associated with garage inventors and their serendipitous inventions, but innovation rarely emerges because of fortuitous discoveries.<sup>39</sup> Instead it is mostly the result of persistent actors that dare to think out of the box, try to develop new solutions for existing problems, resist opposition to new ideas, and break new ground with their inventions.<sup>40</sup> In the legal context, “innovation” is a known concept frequently associated with “something significantly new”; however, the former cannot be qualified as a legal concept.<sup>41</sup> Innovation is a comprehensive concept that can refer to the newest cutting-edge advances in biotechnology, like the use of engineered tobacco plants as biofuel or to social innovations like microfinance.<sup>42</sup> For the purposes of this article, innovation is defined as *the ability to introduce new ideas into the market, translating them into socially desirable commercial or techno-*

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37. DEP’T FOR BUS. ENTER. & REGULATORY REFORM (BERR), REGULATION AND INNOVATION: EVIDENCE AND POLICY IMPLICATIONS, BERR ECONOMICS PAPER NO. 4, at iv (2008).

38. Knut Blind, *The Influence of Regulations on Innovation: A Quantitative Assessment for OECD Countries*, 41 RES. POL’Y 391, 392 (2012).

39. SCOTT BERKUN, THE MYTHS OF INNOVATION 3–4 (2007).

40. Barbara Thomaß, *Akteursbezogene Stimulierung innovativer Angebote im öffentlich-rechtlichen Rundfunk. Die Bedeutung von Redaktionen und Rundfunkräten [Actor-Related Stimulation Innovative Items in Public Broadcasting: The Importance of Editors and Broadcasting Councils]* in INNOVATION, RECHT UND ÖFFENTLICHE KOMMUNIKATION [INNOVATION, LAW AND PUBLIC COMMUNICATION] 150, 153 (Martin Eifert & Wolfgang Hoffmann-Riem eds., 2011) (Ger.).

41. Stefan Müller, *Innovationsrecht—Konturen einer Rechtsmaterie [Innovation: Is It in the Eye of the Beholder?]*, 2 INNOVATIONS- UND TECHNIKRECHT 58, 60 (Ger.).

42. On the concept of “social innovation,” see Christensen et al., *supra* note 33, at 96; James A. Phillips Jr. et al., *Rediscovering Social Innovation*, 6 STAN. SOC. INNOVATION REV. 33, 39 (2008). For an overview of examples on social innovation in the E.U. context, see EUROPEAN COMM’N, THIS IS EUROPEAN SOCIAL INNOVATION (2010), available at [http://ec.europa.eu/enterprise/flipbook/social\\_innovation/](http://ec.europa.eu/enterprise/flipbook/social_innovation/).



logical outcomes by using new processes, products, or services.<sup>43</sup> The concept of innovation thus implies an externalization of new ideas either through their commercialization or policy implementation.

According to Richard R. Nelson and Sidney G. Winter, the innovation process is characterized by a number of features such as uncertainty, diversity, and institutional complexity.<sup>44</sup> In other words, the outcomes of the innovation process cannot be predicted; the emergence of new and better ideas can be advanced when agents with different backgrounds are asked to work together or different instruments and incentives are used; and finally, innovation can often be stimulated more effectively if incentives are provided by agencies at multiple levels, particularly at the local level where agents are closer to the social or technological problems that need to be solved. To wit, one of the risks faced by an innovator is that the new product will not be granted a license or will be introduced into the market after a competitor has made the first move or has become acquainted with the new idea. Regulatory uncertainty and delays<sup>45</sup> can have a highly negative impact on the innovation process, namely when the time span to develop profitable technology is more significant.<sup>46</sup> Uncertainty about the applicable rules can reduce the incentive to invest in the very same technologies where regulators would like to see innovation flourish.<sup>47</sup> Excessive regulatory uncertainty is detrimental to innovation, because it can result in industry inaction.<sup>48</sup> If firms do not know when and if their products or services will be regulated, the incentives to invest may decrease. The same occurs when rules are inconsistently reviewed because the probability of return on investment diminishes.<sup>49</sup>

Regulatory delays are costly, and whenever the product introduction benefits decrease progressively, an additional day of regulatory delay can be extremely costly.<sup>50</sup> Besides the costs, an unnecessary regulatory delay in the field

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43. Richard Bendis & Ethan Byler, *Creating a National Innovation Framework: Building a Public-Private Support System to Encourage Innovation*, SCI. PROGRESS 7 (Apr. 2009), [http://www.scienceprogress.org/wp-content/uploads/2009/04/bendis\\_innovation.pdf/](http://www.scienceprogress.org/wp-content/uploads/2009/04/bendis_innovation.pdf/); Richard R. Nelson & Sidney G. Winter, *In Search of Useful Theory of Innovation*, 6 RES. POL'Y 36, 37 (1977).

44. Nelson & Winter, *supra* note 43, at 36, 48.

45. Regulatory delay refers to the period of time between the moment a firm requests the approval of a new product or the regulation of a new service and its administrative approval or enactment of the respective regulation.

46. See Ronald R. Braeutigam, *The Effect of Uncertainty in Regulatory Delay on the Rate of Innovation*, 43 LAW & CONTEMP. PROBS. 98 (1979) (discussing how regulatory uncertainty and delays may lower the incentives for firms to innovate); James T. O'Reilly, *Entrepreneurs and Regulators: Internet Technology, Agency Estoppel, and the Balance of Trust*, 10 CORNELL J.L. & PUB. POL'Y 63, 66 (2000); James E. Prieger, *Regulatory Delay and the Timing of Product Innovation*, 25 INT'L J. INDUS. ORG. 219 (2007) (examining how regulatory delays may negatively impact innovation by regulated firms).

47. Gregory N. Mandel, *Emerging Technology Governance*, in INNOVATIVE GOVERNANCE MODELS FOR EMERGING TECHNOLOGIES, *supra* note 19, at 44, 50.

48. Nicholas A. Ashford & Ralph P. Hall, *The Importance of Regulation-Induced Innovation for Sustainable Development*, 3 SUSTAINABILITY 270, 279 (2011); Nicholas A. Ashford et al., *Using Regulation to Change the Market For Innovation*, 9 HARV. ENVTL. L. REV. 419, 426 (1985).

49. Ashford et al., *supra* note 48, at 419, 426.

50. See Prieger, *supra* note 46, at 219.

of nanotechnology, for example, can deprive patients from access to life-saving or health-enhancing medical devices.<sup>51</sup>

While delayed or excessive regulation might have a negative impact on the innovation process, inadequate and hasty approval of innovation is also problematic. For example, hastily approved medical treatments (in the field of emerging technologies or beyond) may have disastrous consequences for public health, even at the level of clinical trials.

In sum, uncertainty is one of the troublesome aspects of innovation: innovators do not wish to see it translated into regulatory delays—and perhaps might prefer to go for adaptive releases of medical treatments and medicine; regulators can only regulate when a specific amount of certainty and knowledge is obtained about the effects of an innovation. The latter, however, is not obtained at the same pace as the innovative products and processes of innovation. What is the role of law in this game?

## B. Law Shaping Innovation, Innovation Shaping Law

Innovative technologies have produced a relevant impact on other legal disciplines and have been simultaneously shaped by them. For example, the technological and social acceleration that is implied and even required by innovation has had an undeniable impact in our perception of democracy<sup>52</sup> and has not been left unnoticed by law. Democracy has been accelerated at different levels by innovations in multiple fields: we have all seen how the Internet and social networks played a major role in the exercise of fundamental rights during the Arab Spring, or how citizens with disabilities can easily cast their votes without leaving their houses by using electronic voting systems.<sup>53</sup> However, although democracy seems to be moving faster thanks to new technologies, the complex relationship between law and innovation is far from being fully understood. At stake is not only the above-mentioned pacing problem<sup>54</sup> but also the adjustments that law sometimes requests of innovators.

Technologies normally move faster than law, but in some cases there seems to be a detuning between them. To wit, with the existing technologies, one might expect to be able to cast her vote electronically without putting at risk the protection granted by the secret ballot presented in numerous constitutions. However, there is still little consensus about the reliability of electronic voting.<sup>55</sup> Due to the lack of reliability, functionality, and adequate protection

51. JOHN C. MILLER ET AL., *THE HANDBOOK OF NANOTECHNOLOGY: BUSINESS, POLICY, AND INTELLECTUAL PROPERTY LAW* 85 (2005).

52. For a thorough analysis of the impact of new technologies on our democracy, see JOHN O. MCGINNIS, *ACCELERATING DEMOCRACY: TRANSFORMING GOVERNANCE THROUGH TECHNOLOGY* (2013).

53. For the concept of “social acceleration,” that is, how technology has changed the pace and dynamics of society, see WILLIAM E. SCHEUERMAN, *LIBERAL DEMOCRACY AND THE SOCIAL ACCELERATION OF TIME* (2004).

54. See generally *THE GROWING GAP*, *supra* note 9. See also Gary E. Marchant & Wendell Wallach, *Governing the Governance of Emerging Technologies*, in *INNOVATIVE GOVERNANCE MODELS FOR EMERGING TECHNOLOGIES*, *supra* note 19, at 137.

55. For a European example, see *E-voting Experiments End in Norway Amid Security Fears*, BBC News (June 27, 2014, 7:12 AM), <http://www.bbc.com/news/technology-28055678>. For a

of privacy required by any voting system, electronic voting systems have not been widely used throughout the world. In the United States, Germany, and in the Netherlands, numerous attempts have been made to introduce or expand the use of Internet voting.<sup>56</sup> An experiment with a part of citizenry would enable legislators to gather more information about the reliability and problems of electronic voting systems on a regular election day. In 2009, the German Constitutional Court considered that the electronic voting systems—employed notably in the context of the 2005 elections for the German Senate—violated the German Constitution or Basic Law.<sup>57</sup> The Court decided that the voting machines used did not meet the constitutional requirements attendant to the public nature of elections. The voting devices were not user-friendly and required a minimum technological knowledge. This declaration of unconstitutionality cannot be interpreted as a prohibition of electronic voting of legal adversity towards technology. Instead, the German Constitutional Court underlined at the time that the technologies selected for the exercise of the right to vote should simply comply with constitutional guarantees.<sup>58</sup> This example at the intersection between innovative technologies and law shows the two-way relationship between law and innovation: while innovation is democratizing access to the right to vote, law is also trying to direct innovation in ways perceived as needed to meet legal requirements.

### C. The Challenges Faced

Innovation is not a panacea; instead it is a source of risks and opportunities. Regulators often focus on the risks new technologies can bring, delaying the innovation process and forgetting the opportunities that might be lost by regulatory delays.

Innovating implies “challenging the taken for granted and presenting novel social, economic and health risks and opportunities.”<sup>59</sup> Innovation is, therefore, a journey into the unknown which can produce unexpected conse-

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U.S. example, see Steve Friess, *New Jersey E-vote Experiment After Sandy Declared a Disaster*, ALJAZEERA AMERICA (Oct. 26, 2014, 5:00 AM), <http://america.aljazeera.com/articles/2014/10/26/new-jersey-e-voting.html>.

56. In the Netherlands, the following experimental law on electronic voting has been adopted *Wet van 11 december 2003, houdende tijdelijke regels ter zake van experimenten in het kader van het project «Kiezen op Afstand»* [Temporary Rules in Respect to Experiments in the Framework of the Project “E-Voting”], Stb. 2003, 569 (originally expired on Jan. 1, 2008 but later reauthorized and renewed to Jan. 1, 2010). In the United States, the Help America Vote Act of 2002, 42 U.S.C. §§15301–15302 (2012), aimed at the improvement and celerity of the voting process, included the introduction of voting machines. States and municipalities should further legislate on the implementation means of this act, which has been criticized throughout the years because of several security failures and the lack of reliability of the voting machines.

57. See Bundesverfassungsgericht [BVerfG] [Federal Constitutional Court] Mar. 3, 2009, 2 BvC 3/07, ENTSCHEIDUNGEN DES BUNDESVERFASSUNGSGERICHTS [BVerfGE] 123, 39, ¶¶ 120–163 (Ger.), available at [http://www.bundesverfassungsgericht.de/entscheidungen/cs20090303\\_2bvc000307.html](http://www.bundesverfassungsgericht.de/entscheidungen/cs20090303_2bvc000307.html).

58. *Id.* ¶ 109.

59. Alex Faulkner, *Regulatory Policy as Innovation: Constructing Rules of Engagement for a Technological Zone of Tissue Engineering in the European Union*, 38 RES. POL’Y 637, 638 (2009).

quences, such as risks to public health or to the environment.<sup>60</sup> In this context, legislators and agencies are often faced with several challenges, among which, here are just three: first, adopt policy with limited information; second, draft rules with limited understanding of how they will impact technological development; and third, implement and administer them effectively.

While regulators are very often—and rightly so—focused on the health risks for consumers, it is also important to rethink the regulatory process to encompass a balance between all the interests at stake. The regulation of innovation through statutes and regulations has often been criticized and qualified as a true antithesis: innovation is a fast changing and fluid reality that does not go well with either consensus-building or rigid top-down rules.<sup>61</sup> However, even critics of regulation admit that it is necessary because, on the one hand, the lack of an effective legal framework can be a significant obstacle to innovation. On the other, as Epstein notes, “a form of case-by-case-litigation can easily prove to be worse.”<sup>62</sup> In this context, it is important to reflect upon the role of law in the innovation process. If we take the example of biotechnology, we observe that law has been mainly more restrictive than enabling, imposing bans on GMOs, for example. While regulatory requirements are necessary, regulation can play a different role in the innovation process, facilitating it.

Up until now, most policies on innovation have been of a purely economic nature, leaving law, legislation, and regulation aside. Furthermore, the literature has not devoted ample attention to the role of regulation and its respective institutions and instruments in the stimulation of innovation. Rather, there is a significant body of legal literature on the regulation of emerging technologies which tries to understand the specificities of each technology and design rules accordingly,<sup>63</sup> or even how technology is regulating human behavior.<sup>64</sup> This body of literature has attempted attempt to design regulation based on the

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60. Alan Randall, *Innovation, Risk, Precaution, and the Regulation of GM Crops*, in *FRONTIERS OF ECONOMICS AND GLOBALIZATION* 337, 340–41, 345–47 (Hamid Beladi & E. Kwan Choi eds., 2011) (discussing the “precautionary principle” and “ordinary risk management” model).

61. Martin Eifert, *Innovationsfördernde Regulierung [Innovation-Regulation]*, in *INNOVATIONSFÖRDERNDE REGULIERUNG: INNOVATION UND RECHT II [REGULATIONS THAT PROMOTE INNOVATION: INNOVATION AND LAW II]* 11 (Martin Eifert & Wolfgang Hoffmann-Riem eds., 2009) (Ger.).

62. Richard A. Epstein, *Can Technological Innovation Survive Government Regulation?*, 36 *HARV. J.L. & PUB. POL’Y* 87, 87 (2013). See Edward L. Glaeser & Andrei Shleifer, *The Rise of the Regulatory State*, 41 *J. ECON. LITERATURE* 401, 402–03 (2003).

63. See, e.g., Gregory N. Mandel, *Regulating Emerging Technologies*, 1 *LAW, INNOVATION & TECH.* 75, 75 (2009); T.J. McIntyre & Colin Scott, *Internet Filtering: Rhetoric, Legitimacy, Accountability and Responsibility*, in *REGULATING TECHNOLOGIES: LEGAL FUTURES, REGULATORY FRAMES AND TECHNOLOGICAL FIXES* 109, 109–17 (Roger Brownsword & Karen Yeung eds., 2008). Specifically on the role of intellectual property law in emerging technologies, see *INTELLECTUAL PROPERTY AND EMERGING TECHNOLOGIES: THE NEW BIOLOGY* (Matthew Rimmer & Alison McLennan eds., 2012).

64. LAWRENCE LESSIG, *CODE AND OTHER LAWS OF CYBERSPACE* (1999); Bert-Jaap Koops, *Criteria for Normative Technology: The Acceptability of “Code as Law” in Light of Democratic and Constitutional Values*, in *REGULATING TECHNOLOGIES: LEGAL FUTURES, REGULATORY FRAMES AND TECHNOLOGICAL FIXES* 157, 157–74 (Roger Brownsword & Karen Yeung eds., 2008).

specific challenges of each technology, instead of individualizing innovation and its uncertainty, which is the core and most challenging element of regulating new products. Despite its merits, this literature offers a passive and specialized approach to technology and innovation that does not always assist governments in their greater task of understanding and encouraging innovation. The law might be ignoring elements inherent to the innovation process that transcend the specific characteristics of each field.

Up until now, the study of the regulation of innovation—as a phenomenon in itself and detached from the study of specific technologies—has been highly overlooked and limited to the fields of intellectual property rights (IP) and competition law.<sup>65</sup> While both IP and antitrust law are the core disciplines behind the study of innovation, there is more to the regulation of innovation than IP.

This article does not focus on specific fields, rather it argues that because innovation (as characterized above) is an overreaching concept which poses similar challenges to different regulators, the adoption of an innovation-friendly framework that employs sunset clauses and experimental legislation can be valuable to facilitate the regulation (and stimulation) of the innovation process. This article supports and develops the “innovation law” approach developed in the German literature, notably by Wolfgang Hoffmann-Riem and Martin Eifert.<sup>66</sup> As Orly Lobel points out, this legal perspective focused on the stimulation of innovation rather than on the regulation of a specific technology, is “still in its infancy,” and deserves more attention from the literature.<sup>67</sup> It is also an interdisciplinary field that implies the analysis of the different regulations, legal, and policy instruments that should be used to achieve the ultimate goal of more innovation. This perspective presupposes a unitary and coherent approach of law to innovation. Regulations with different goals (e.g., guarantee road safety vs. advance competition and innovation in the market of transportation) should not result in obstacles to innovation or in the prohibition of new services that are located in gray areas. This is the case of collaborative practices such as Uber or Airbnb that have been the target of strict inspections or have been forbidden in different European countries (Belgium, the Netherlands, and Germany). Although these practices are innovative, they have been regarded with skepticism because the agents of sharing economy offer alternatives to commercial services for which licenses and permits are normally re-

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65. See, e.g., BUSINESS INNOVATION AND THE LAW: PERSPECTIVES FROM INTELLECTUAL PROPERTY, LABOUR, COMPETITION AND CORPORATE LAW 6 (Marilyn Pittard et al. eds., 2013).

66. INNOVATIONSFÖRDERNDE REGULIERUNG: INNOVATION UND RECHT II [REGULATIONS THAT PROMOTE INNOVATION: INNOVATION AND LAW II] (Martin Eifert & Wolfgang Hoffmann-Riem eds., 2009) (Ger.); RECHTSWISSENSCHAFTLICHE INNOVATIONSFORSCHUNG [LEGAL AND SCIENTIFIC RESEARCH OF INNOVATION] (W. Hoffmann-Riem & Jens-Peter Schneider eds., 1998) (Ger.). Wolfgang Hoffmann-Riem, *Zur Notwendigkeit Rechtswissenschaftlicher Innovationsforschung*, in PARADOXIEN DER INNOVATION. PERSPEKTIVEN SOZIALWISSENSCHAFTLICHER INNOVATIONSFORSCHUNG [PARADOXES OF INNOVATION: PROSPECTS FOR SOCIAL SCIENCE INNOVATION RESEARCH] 229, 234 (Dieter Sauer & Christa Lang eds., 1999) (Ger.). For a more recent work, see Müller, *supra* note 41, at 58.

67. ORLY LOBEL, TALENT WANTS TO BE FREE: WHY WE SHOULD LEARN TO LOVE LEAKS, RAIDS, AND FREE RIDING 39 (2013).

quired.<sup>68</sup> The lack of information about the potential risks of these sharing economy practices and the speed at which they evolve can stand in the way of an adequate regulatory framework. An “innovation law” approach to the regulation of innovations would mean that innovation is placed at center stage and temporary deviations would be allowed so that innovation “is given a reasonable chance.”

This “innovation law” perspective also refers to the need to deal with innovation in a coherent fashion across the various areas of law. This is in line with the burgeoning literature on a unitary approach to innovation and law. To illustrate, Stuart Minor Benjamin and Arti Rai argue that the most common legal approaches to innovation are insufficient and plead for an innovation regulator to ensure that other regulators do not hinder but rather stimulate innovation according to coherent guidelines.<sup>69</sup> An almighty innovation regulator would oversee different fields and instruments at the service of innovation and ensure that there are no contradictions between the need to protect copyright and the increasing tendency to democratize access to information. These types of dilemmas will continue to emerge in the coming years: how can we solve a potential conflict between traditional perception of rights and the need to democratize access? In addition, is this democratization of access to information a type of innovation that is worthy of protection? This topic was recently discussed in the recent *American Broadcasting Companies Inc. v. Aereo Inc.* case.<sup>70</sup> Aereo provided a service that allowed its subscribers to watch television programs—many of them copyrighted—at the same time as they were being broadcasted on television. Different broadcasters sued Aereo for copyright infringement. The Supreme Court held that Aereo was indeed infringing copyright, and it was not to be distinguished from regular cable providers. Under the Copyright Act, a public performance right is held exclusively by the copyright holder, which was not the situation with Aereo. About whether this decision would have an impact on the stimulation of new technologies, the Court stated: “[W]e do not believe that our limited holding will have that effect.”<sup>71</sup> While innovation should be advanced, property rights (including copyright) are not to be infringed in the name of innovative products. However, this does not mean that truly innovative products or services, that is, new and welfare-enhancing products should not benefit from a more benevolent treatment from courts—even if only on a temporary basis—when they are translated into a significantly improved quality of a service or enhanced access. A coherent balance between conflicting goals might be found in a temporary or experimental regulation of innovations.

Do we need a new law to concretize an innovation-friendly framework that offers a middle ground between protecting citizens from risk and encour-

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68. For an extensive analysis of sharing economy practices and their regulation, see Sofia Ranchordás, *Does Sharing Mean Caring? Regulating Innovation in the Sharing Economy*, MINN. J.L. SCI. & TECH. (forthcoming Winter 2015), available at [http://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=2492798](http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2492798).

69. Benjamin & Rai, *supra* note 1, at 1.

70. *Am. Broad. Cos. v. Aereo Inc.*, No. 13-461, slip op. at 16 (U.S. June 25 2014).

71. *Id.*

aging innovators to develop new products or improve existing ones? With better regulation, and more recently, the growing importance of the smart regulation approach to innovation, more attention has been paid to the downstream effects of regulation in innovation studies.<sup>72</sup> In this context, it is clear that ineffective and obsolete laws and policies can certainly hinder innovation.<sup>73</sup> Bad laws or policies do not harmonize well with the life-cycle of technologies and society. To overcome this problem, regulators should reflect upon the duration of laws, adapting them to the characteristics of the field in question and ensuring frequent regulatory reviews and regulatory flexibility.

In the context of a friendlier approach to innovation, a more flexible approach to the regulation of innovation has been suggested. Enhanced flexibility means, for example, that instead of stringent rules, the regulator uses standards or open-norms. This can be effective because under less stringent circumstances, more information shall be voluntarily introduced in the market by private actors, and this will ultimately facilitate the regulation process.

Regulating a reality implies understanding its characteristics and responding to its complexities. If innovation is characterized by frequent changes and uncertainty about its process and outcomes, it seems illogical to respond to it with stringent regulations. Instead, flexibility and adaptability should be the key words of regulation when it comes to spurring innovation.<sup>74</sup> In addition, flexible and adaptable regulations can ensure that regulation remains open to new developments and will be updated for a longer period of time. In this context, Gregory Mandel proposes a new governance model for emerging technologies. The desired level of adaptability and flexibility could be achieved by designing an iterative process characterized by a proactive rather than a reactive governance system.<sup>75</sup> From a legal point of view, this would imply building options into final rules and creating a standardized process for modification which would avoid frequent revisions, and accelerate those which must be performed. The main idea behind Mandel's proposal is to ensure that the regulation of emerging technologies can be rapidly adapted to the evolution of the sector and the growing amount of data gathered in the meanwhile.<sup>76</sup> He explains that this flexibility "will allow an industry to experiment with economic or technical feasibility . . . help in the acquisition of additional information, while still ensuring adequate protection."<sup>77</sup> Mandel's tentative and iterative approach to law fits the perspective adopted in this article. The flexible and "innovation-friendly regulatory zone" required by entrepreneurs can be put in practice not only with the use of open norms but by enacting temporary and experimental regulations that remove unnecessary burdens and ensure that laws do not lag behind innovation. Instead of addressing

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72. Faulkner, *supra* note 59, at 645.

73. Wendy L. Gramm & Gerald D. Gay, *Leading a Regulatory Agency: Lessons from the CFTC*, REG., Fall 1994, at 64, 69.

74. Jeremy Howells, *Innovation and Regional Economic Development: A Matter of Perspective?*, 34 RES. POL'Y 1220, 1230 (2005).

75. Mandel, *supra* note 63, at 89, 92.

76. *Id.* at 89.

77. *Id.* at 90.

Mandel's governance perspective, I restrict my analysis to two regulatory instruments that can be used (1) to set the sun on obsolete obstacles to innovation and (2) to experiment with adaptability of regulation as we gather information about the effects of the regulation of new products and services.

## II. TERMINATION RHYMES WITH INNOVATION

### A. Innovation, Uncertainty and Regulatory Instruments

The regulation of innovation is the regulation of uncertainty. It is the regulation of an empty box that we are simultaneously excited and afraid to open. In addition, innovators and regulators do not look at innovation in the same way. Innovators will focus on the opportunities brought along by innovation, regulators on the potential risks. An innovation-friendly regulatory framework implies a meeting of minds between regulators and innovators, flexibility and adaptability, and the adoption of the same pace.

A truly innovation-friendly regulatory framework should be characterized by flexible and open regulatory instruments. *Flexibility* gains a clearer meaning when connected to a second feature: adaptability of regulations. The term *adaptability* refers to the ability of regulations to rapidly react to the changes underlying innovation and the acquisition of more information regarding this phenomenon. Law is inevitably characterized by the "[f]aster depreciation and obsolescence of legal solutions"—the constant emergence of novel technologies and rapid change of social circumstances affect the validity of most legal solutions.<sup>78</sup> This depreciation does not come as a surprise to economists who have long explained the law of diminishing marginal utility. This has been translated to law by Anthony D'Amato.<sup>79</sup> According to D'Amato, "[l]egal certainty decreases over time," and this is because legal systems are prone to not applying older rules and principles, particularly when society has changed its practices, values have evolved, and the rules have become obsolete.<sup>80</sup>

The mentioned perspective is necessarily limited by the need to be cautious, or even adopt a limited precautionary attitude towards innovation, that is, no matter how innovative something is, society should still be protected against major risks.<sup>81</sup> However, the precautionary principle or approach has not been regarded as a "shield" designed to protect legal values and, simultaneously, stimulate innovation.<sup>82</sup> Moreover, innovation in itself might bring about multiple risks which cannot be categorized within the precautionary approach and yet enough uncertainty to complicate the process of its regula-

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78. Gillian Hadfield, *Producing Law for Innovation*, in THE KAUFFMAN TASK FORCE ON LAW, INNOVATION, AND GROWTH, RULES FOR GROWTH: PROMOTING INNOVATION AND GROWTH THROUGH LEGAL REFORM 23, 37 (2011) (emphasis omitted).

79. See Sofia Ranchordás, *Sunset Clauses and Experimental Regulations: Blessing or Curse for Legal Certainty?*, STATUTE L. REV. (forthcoming 2014) (manuscript at 18), available at <http://slr.oxfordjournals.org/content/early/2014/02/11/slr.hmu002.full.pdf+html>.

80. Anthony D'Amato, *Legal Uncertainty*, 71 CALIF. L. REV. 1, 1 (1983).

81. See CASS R. SUNSTEIN, LAWS OF FEAR: BEYOND THE PRECAUTIONARY PRINCIPLE 24 (2005).

82. *Id.* at 29.



tion. It is precisely in this context that experimental legislation and sunset clauses could be used within the precautionary approach, containing risks, but at the same time meeting the demands of modernization, and offering the flexibility and adaptability required by the innovation process.

Both regulatory instruments offer fast and temporary solutions to innovation. Fast regulatory solutions (or at least faster than lasting legislation) are offered because sunset clauses and experimental legislation have the potential to gather consensus more easily than permanent legislation. Experimental legislation and, particularly, sunset clauses create more room for political bargains. Opponents to new regulations on innovative or controversial topics might be more willing to pass them, if these provisions are temporary, and there is a guarantee that the previously existing status quo will return after the sunset or if the experiment fails.<sup>83</sup> The adoption of sunset provisions increases the probability that political opponents and innovators will support or at least accept new laws; this is because of the idea of reversibility<sup>84</sup> and the promise of future evaluation and termination.<sup>85</sup>

Experimental legislation can be used to reach a compromise or convince opponents or skeptics (often the regulators) about the benefits of a new product or service introduced in the market and its regulatory approach. The lack of political consensus is one of the elements that delay the regulatory and legislative process.<sup>86</sup> Obtaining it can guarantee the timely regulation of innovative products and services.

Sunset clauses and experimental legislation offer temporary solutions to innovation. Temporary regulations can ensure that regulation of novel technologies is frequently reviewed to accompany incremental technological improvements as well as disruptive innovations by terminating regulations that no longer reflect reality and stifle innovation. Sunset clauses determine the termination of provisions at the end of a previously determined period and usually impose an evaluation of effects. This instrument can guarantee a renewed oversight of legislation and ensure that laws that no longer reflect the current state of technology and society are terminated.<sup>87</sup> Experimental legislation is based on the idea that lawmaking should be converted into a dynamic learning process. After all, all new laws are experiments because the legislator is never able to fully foresee their effects.<sup>88</sup> Thus, for every new law or regulation, new lessons should be drawn from the process and the law or regulation should be improved upon for the future.<sup>89</sup>

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83. Tom Ginsburg et al., *Libertarian Paternalism, Path Dependence, and Temporary Law*, 81 U. CHI. L. REV. 291, 337 (2014).

84. See Yair Listokin, *Learning Through Policy Variation*, 118 YALE L.J. 480, 485–86 (2008).

85. Forrest Maltzman & Charles R. Shipan, *Change, Continuity, and the Evolution of the Law*, 52 AM. J. POL. SCI. 252, 255 (2008).

86. *Id.*

87. See THEODORE J. LOWI, *THE END OF LIBERALISM: THE SECOND REPUBLIC OF THE UNITED STATES* 309–10 (2d ed. 1979).

88. PETER NOLL, *GESETZGEBUNGSLEHRE* [LEGISLATIVE EDUCATION] 76 (1973).

89. *Id.*

## B. Sunset Clauses

Sunset clauses are endowed with a temporary character that allows legislators and regulators to coordinate the life cycles of regulations with other timeframes and extinguish rules that have become obsolete because of the verified technological or social evolution. A sunset clause submits a legislative act to a final evaluation, and any renewal based on whether a certain set of circumstances has occurred. Because a sunset clause is designed to expire, there is an inversion of the burden of proof to the actors demanding its renewal. These actors must be able to prove that the continuation of a provision is necessary.

In the last few decades, several federal laws have been enacted in the United States with the mission of facilitating and stimulating technological advancement in the private sector, and, ultimately, fostering innovation.<sup>90</sup> Legislative initiatives with this purpose have consisted of the removal of barriers to technological development in the private sector and providing funding or economic incentives to stimulate innovative activities.<sup>91</sup> A number of these acts were to sunset within an established period of time, but because of the popularity of the programs, most of them were renewed at least once. These attempts were particularly visible in the field of cooperative research and development (R&D) where numerous laws were enacted to advance industry-university cooperation and industry-federal R&D enterprise cooperation. An example of the former was the Economic Recovery Tax Act of 1981,<sup>92</sup> which established the research and experimentation tax credit, granting firms a larger deduction for charitable contributions of equipment used in scientific research at academic institutions and for the donation of new equipment by a manufacturer to the latter. The primordial goal of this act was to encourage firms to invest in research and experimentation, regarded as essential sources of innovation.<sup>93</sup> This act was supposed to sunset in 1985, but because of successive renewals it is still offered today.

Sunset clauses are multifunctional instruments: they can be used to respond to temporary problems by offering equally temporary solutions; reduce regulatory pressure faced by companies by making sure that unnecessary burdens are terminated as soon as they have accomplished their goals;<sup>94</sup> improve

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90. WENDY H. SCHACHT, CONG. RESEARCH SERV., RL33526, COOPERATIVE R&D: FEDERAL EFFORTS TO PROMOTE INDUSTRIAL COMPETITIVENESS, at Summary (2008). Examples of the Congressional initiatives are the National Cooperative Research Act; the National Cooperative Production Act; the Stevenson-Wydler Technology Innovation Act, the America COMPETES Act, and, more recently, the Competitiveness Through Education, Technology and Enterprise Act of 2007. *Id.* at 1, 5–7.

91. *Id.* at 5.

92. Economic Recovery Tax Act of 1981, Pub. L. No. 97-34, 95 Stat. 172, 241–42 (*amended by the Tax Reform Act of 1986*, Pub. L. No. 99-514, 100 Stat. 2085).

93. STAFF OF JOINT COMM. ON TAXATION, 97TH CONG., GEN. EXPLANATION OF THE ECON. RECOVERY TAX ACT OF 1981 119–21 (Comm. Print 1981).

94. See Eijlander & van Gestel, *supra* note 24, at 24–25. See generally JÖRG STEINHAUS, GESETZE MIT VERFALLSDATUM: EIN INSTRUMENT DES BÜROKRATIEABBAUS? [SUNSET CLAUSES: AN INSTRUMENT TO REDUCE BUREAUCRACY?] (2008) (Ger.)

the effectiveness of public administration and quality of legislation;<sup>95</sup> and act as consensus-finding instruments avoiding political impasses. However, these functions are united by the main purpose of ensuring that laws are periodically reviewed and unnecessary regulatory burdens are terminated. Termination is a necessary effect of sunseting, but it is not the main goal of the instrument. Instead, it is a means of guaranteeing a continuous oversight of legislation.<sup>96</sup> Legislators and rule makers are therefore forced to reassess public policy on a periodic basis. They may use their greater knowledge of underlying problems and provide more information on the most efficient means to approach to policy changes.<sup>97</sup>

Sunset clauses can contribute to the establishment of an innovation-friendly environment either directly or indirectly: directly, because sunset clauses can remove obsolete regulatory barriers to technological development. In addition, they can equally be used for the temporary stimulation of investment (e.g., temporary tax credits). They provide for indirect incentives because they reduce the regulatory burdens imposed on entrepreneurs, allowing them to switch efforts from compliance with the sunsetted regulations to investment in R&D. However, it would be interesting to verify whether there is a correlation between the use of sunset clauses and an increase in investment in R&D. Until now, such empirical research has not been performed, but future research on this topic could shed more light on the need for temporary regulations.

Sunset clauses and experimental legislation are not always used for the same purposes. While sunset clauses are meant to be terminated and are usually directed at temporary problems or rapidly evolving problems, experimental legislation aims at continuity and is designed for long-lasting problems and incremental improvements in products and services. Both legislative instruments can be used to gather more information on a relatively unknown problem. However, in the case of the phenomena targeted by sunset clauses, references are made to phenomena that have a more rapidly evolving or disruptive nature. This means that new products will be so different from the previous ones that regulators should start from zero, allowing existing rules to expire and enact new legislation. Nevertheless, in determining duration, regulators should be careful not to introduce sunset clauses that bring more uncertainty than the regulation they are supposed to be fixing. Regulators also need to fit industry cycles, that is, if a certain sector like renewable energies has a life cycle of twenty or thirty years before a company can recover its investment, it will not be reasonable to introduce a five-year sunset clause. This might jeopardize the trust of investors who fear that future regulation will soon take away their temporary tax benefits or increase the compliance requirements.

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95. CARL BÖHRET & WERNER HUGGER, TEST UND PRÜFUNG VON GESETZENTWÜRFEN: ANLEITUNGEN ZUR VORABKONTROLLE UND VERBESSERUNG VON RECHTSVORSCHRIFTEN [TEST AND SCRUTINY OF DRAFT LEGISLATION: INSTRUCTIONS FOR EX ANTE EVALUATION AND IMPROVEMENT OF LAWS] 50 (1980) (Ger.).

96. JANTZ & VEIT, *supra* note 25, at 5.

97. Finn, *supra* note 21, at 442, 449–51.

### C. Experimental Legislation

Experimental regulations also allow lawmakers to regulate novelties under uncertainty and with limited information. “Experimental legislation” is a broad term encompassing not only statutes but also new temporary regulations with a circumscribed scope. These laws and regulations, derogating from or exempting existing legal requirements, are designed to try out novel legal approaches or to regulate new products or services to gather more information about them. Experimental rules are implemented in a part of the country or to a group of citizens (sample group) while the remaining legal subjects (control group) are bound by the previously existing legislation. Experimental regulations are submitted to a periodic or final evaluation, after which the legislator should decide on whether the experiment should be extended to a larger part of the population, generalized and converted into a permanent legislative act, or terminated.

Similar to sunset clauses, experimental legislation performs multiple functions. However, the main idea behind experimental legislation is to “try, (err) and learn.” This legislative instrument fits in the perception of lawmaking as an iterative learning process, where the legislator dares to try new solutions, observes the results, and learns from them (i.e., via an iterative, Deming or Plan-Do-Check-Act process). The legislator assumes here a “humble” position; admitting that there is room to learn and that, under uncertain circumstances including the lack of information about new products or services, not all the effects of new legislation can be predicted on the grounds of ex ante evaluations or consultations. According to Daniel A. Farber, environmental regulation is one of the most suitable fields for experimentalism because “in environmental law . . . every solution seems provisional and subject to reevaluation as new information appears and old solutions are tested against experience.”<sup>98</sup> Environmental law and policy are thus good examples of experimentation and learning: regulators can try to gather more information about the effects on the environment of new activities by trying out new regulations on a small-scale basis, promoting collaboration between different actors affected by the multiple spillover effects of pollution, and engaging in serious monitoring of the experiment.<sup>99</sup>

Besides this learning approach to legislation, experimental legislation can be used to avoid regulatory delays when legislators or regulators are lacking sufficient information regarding new phenomena or novel approaches to existing phenomena. Faced with limited information, experimental legislation allows the legislator to limit the risk of making mistakes by limiting the application of new rules to a part of the population or territory. This avoids a wide implementation of ineffective legislation. In the abstract, these instruments would be a perfect match with innovation because they would transform law-

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98. Daniel A. Farber, *Environmental Protection as a Learning Experience*, 27 LOY. L.A.L. REV. 791, 791 (1993).

99. On (democratic) experimentalism and the case of environmental law and policy, see Michael C. Dorf & Charles F. Sabel, *A Constitution of Democratic Experimentalism*, 98 COLUM. L. REV. 267, 373–74 (1998).

making not only into a learning process but also into a flexible system. Like sunset clauses, experimental legislation can be used as a consensus-finding instrument. This can be particularly useful in the case of new and controversial laws, where their proponents might need to have sufficient evidence that the laws are effective and contain limited risks.

Terminating regulations by employing sunset clauses can be useful to ensure that rules keep up with the changes in technology and society. However, when there is little information about the subject to be regulated or the outcomes of regulation are uncertain, experimenting with new regulations may be a wiser response to the features of innovation. This should be in principle accepted by innovators, because according to the research performed by Jeffrey Dyer, Hal Gregersen, and Clayton Christensen, the capacity to experiment is one of the DNA elements of innovation.<sup>100</sup> Experimentation is considered to be essential for businessmen to put into practice new processes and products conceived: the world is regarded as their laboratory. Therefore, it should not be surprising that the regulation of innovation matches this tendency. The European Commission advanced a similar idea in the context of the Innovation Union flagship.<sup>101</sup> The use of experimentation can favor the establishment of a more innovation-friendly regulatory framework.

In a report on social innovation, policy experimentation was suggested as a valuable tool in the E.U. context.<sup>102</sup> This suggestion is partially justified by the changes observed in social policies and the objections raised to them, notably the criticism of the welfare state model and the progressive government cuts. According to the mentioned report, experimenting has multiple advantages, namely its reduced costs, and the fact that it opens the way for new solutions and alternatives to the existing policies because it introduces and tests deviations to the current system or rules.<sup>103</sup> These findings could be translated to law by enacting experimental regulations that test new regulatory solutions on a small-scale basis, and mandate evaluation after a previously determined period followed by a possible amendment of existing rules.

By experimenting and adapting regulations according to the obtained results, legislators and regulators can effectively respond to the demands and characteristics of innovation. Experimental regulations are compatible with the uncertainty inherent to innovation. These rules are temporary and tested in a

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100. See Jeffrey Dyers et al., *Het "DNA" van innovatievermogen [The "DNA" Innovation Capacity]*, 131 HOLLAND/BELGIUM MGMT. REV. 23, 24 (2010) (Neth.).

101. European Commission, *Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions: Europe 2020 Flagship Initiative Innovation Union*, COM (2010) 546 final (June 10, 2010), at 21, available at [http://ec.europa.eu/research/innovation-union/pdf/innovation-union-communication\\_en.pdf](http://ec.europa.eu/research/innovation-union/pdf/innovation-union-communication_en.pdf).

102. MARJORIE JOUEN, SOCIAL EXPERIMENTATION IN EUROPE: TOWARDS A MORE COMPLETE AND EFFECTIVE RANGE OF THE EU ACTIONS FOR SOCIAL INNOVATION 2 (2008), available at [http://www.notre-europe.eu/media/etud66-mjouen-social-experimentation-en\\_01.pdf?pdf=ok](http://www.notre-europe.eu/media/etud66-mjouen-social-experimentation-en_01.pdf?pdf=ok) ("This study was realised at the request of the DIISES and the High Commissioner for active inclusion against poverty for the Forum on Social experimentation in Europe on 21–22 November 2008, in Grenoble.").

103. *Id.* at 1.

part of the territory before they are extended to the whole country. They are an alternative between an all-or-nothing approach to the regulation of new products or services.

Innovation is a process of discovery that can be stimulated if modeled in experimental and decentralized learning.<sup>104</sup> This idea of solving innovative problems through experimentation was already present—though related here to the importance of federalism—in the mind of Justice Brandeis in *New State Ice Co. v. Liebmann*.<sup>105</sup> Dissenting in this case, Brandeis stated that “it was a happy incident of the federal system that a single courageous state may, if its citizens choose, serve as a laboratory, and try novel and economic experiments without risk to the rest of the country.”<sup>106</sup> The learning-by-doing approach takes into account the complexities of innovation, while simultaneously assessing the response of individual behavior to new legal rules and enabling flexible adaptations of legislation to the lessons learned.<sup>107</sup> This learning approach is said to be particularly suitable for federal systems, where policy innovation can flourish through experimentation at state level: states can learn from each other and, theoretically, the federal legislator can also learn lessons from states.<sup>108</sup> Although experimental legislation was traditionally regarded as a typical instrument and a privilege of federal systems, there are recent claims in the literature that experimentation is equally (or, even more) suited for uni-jurisdictional systems.<sup>109</sup>

#### D. Downsides of Sunset Clauses and Experimental Legislation

Despite the multiple arguments in favor of a broader adoption of sunset clauses and experimental legislation, both instruments seem to be scarcely employed to advance innovation by federal agencies.<sup>110</sup> Are regulators reluctant because these instruments are temporary and therefore uncertain? Neither sunset clauses nor experimental laws appear to confer the legal stability which characterizes conventional permanent laws.<sup>111</sup> However, temporary legislative instruments will only create unnecessary uncertainty when they are not in line with the innovation process, the amount of information obtained, and the po-

104. Hongbin Cai & Daniel Treisman, *Political Decentralization and Policy Experimentation*, 4 Q. J. POL. SCI. 35, 38 (2009). See Listokin, *supra* note 84, at 480 (arguing that, in the quest for the best policies, whenever “learning is possible,” innovative policies with the potential for great outcomes should be chosen). Sunset clauses are mentioned as a valuable instrument in this context. In Europe, see BAKHSI ET AL., *supra* note 15, at 4 (arguing that innovation policy should be set on an “experimental state” where “experimental processes are embedded in publicly supported innovative activity”).

105. *New State Ice Co. v. Liebmann*, 285 U.S. 265, 310–11 (1932) (Brandeis, J., dissenting).

106. *Id.* at 311.

107. BAKHSI ET AL., *supra* note 15, at 15.

108. See generally Christos Kotsogiannis & Robert Schwager, *On the Incentives to Experiment in Federations*, 60 J. URBAN ECON. 484 (2006) (arguing that there is a model that introduces political competition for federal office and explains how such competition plays an important role in shaping the incentives for experimentation at the state level).

109. Susan Rose-Ackerman, *Risk Taking and Reelection: Does Federalism Promote Innovation?*, 9 J. LEGAL STUD. 593, 593–94 (1980).

110. See Gubler, *supra* note 31, at 179.

111. See Ranchordás, *supra* note 79, at 10.

tential risks of the innovative product and service at stake, that is, when the temporary disposition is not adjusted to the technological life cycle (e.g., a two-year sunset clause might bring more uncertainty to a sector that takes a longer period to evolve).<sup>112</sup> Another reason for reluctance towards experimental regulations is that experiments are in principle only implemented in a circumscribed territory or are applicable to a limited number of subjects, which means that not all citizens shall be equal before the law.<sup>113</sup>



The creation of an environment favorable to innovation may imply granting sufficient flexibility to entrepreneurs to experiment with ever-changing opportunities and removing unnecessary regulations concerning the diffusion of innovative products, services, or projects in the market. Innovation-friendly regulation can be achieved if law allows room for more flexibility and adaptability of rules and more openness to innovation, without renouncing its primordial task of regulating society and protecting fundamental values and principles. A law that wishes to regulate innovation responsibly should find a balance between these dimensions. Sunset clauses and experimental legislation appear to clearly respond to the first dimension because of their temporary, flexible, and adaptable characteristics. Both methods treat the uncertainty inherent in innovation with a limited amount of legislative or regulatory uncertainty translated into temporary or experimental rules. This regulatory uncertainty can be tolerated by innovators, who should see it as an opportunity to obtain faster and more coherent regulatory decisions. For regulators, temporary legislative instruments are also instruments that allow more time to assess the effects of innovations, gather new information and improve the existing regulatory framework. Experimental legislation and sunset clauses provide for the above-mentioned balance between the required stability of a legal system and the desired change to guarantee social order. There seems to be no empirical evidence yet demonstrating that sunset legislation will lead to the sunrise of innovation; however, the rigidity of permanent legislation does not seem to be conducive to this aim either.

Now more than ever, governments should not turn their backs on the demands of innovation. The innovation process can be conceived as a fast train where we are all passengers.<sup>114</sup> We do not know the exact route or the

112. For a more comprehensive analysis of this topic, see RANCHORDÁS, *supra* note 22.

113. See Advies van de Raad van State, 23 mei 2000, Bijvoegsel Staatscourant 10 oktober 2000, nr. 196, W03.00.0056/I, Adviesaanvraag inzake het Eindrapport van de Interdepartementale Werkgroep Experimenteerbepalingen: “Het proberen waard” [Advice on the Final Report of the Interdepartmental Working Group on Experimental Dispositions: “Worth a Try”]. The Dutch Council of State expressed on numerous occasions its reluctance towards experimental legislation, arguing that different principles of law such as equal treatment would be endangered.

114. Wolfgang Hoffmann-Riem, *Rechtswissenschaftliche Innovationsforschung als Reaktion auf gesellschaftlichen Innovationsbedarf* [Legal Innovation Research as a Reaction to Social Innovation Needs], in INNOVATION UND RECHTLICHE REGULIERUNG. SCHLÜSSELBEGRIFFE UND ANWENDUNGSBEISPIELE RECHTSWISSENSCHAFTLICHER INNOVATIONSFORSCHUNG [INNOVATION

duration of the journey, but we hope that we shall arrive safe and sound to our destination—although we may often ignore when or how. Law has been perceived in this article as both the potential locomotive and brakeman of this fast train. Law can play both roles depending on the adopted instruments. This article focused on the means to ensure that the train completes its journey safely and that passengers have confidence in arriving safely and on time at their destination. Experimental tickets on this train may provide us better views of the track that lies ahead. Sunset tickets guarantee that we can leave or switch trains if we are displeased. The availability of these two types of tickets can ensure that we do not hesitate (or hesitate less) before boarding the innovation train. This train, just like any other, does not accept late passengers; and missing it is usually more costly than taking the risk of boarding. With sunset, experimental, or full-fare tickets, we are invited to get on the train: all aboard, the innovation train is about to leave.