Predatory Innovation: The Definite Need for Legal Recognition

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"I do not know if this tiger recognized his prey."[1]

I. INTRODUCTION

It is widely recognized that the process of competition generally encourages companies to lower their prices, which benefits consumers.[2] And yet, in certain specific cases, antitrust rules intend to sanction predatory prices because they eliminate the competitive process itself.[3] A similar situation applies to innovation. Innovation is one of the main bases for competition between companies and it is beneficial to consumers who may enjoy new products that are also better suited to their needs.[4] But certain *innovative* behaviors are considered predatory and are punished accordingly,[5] despite the fact that no legal concept specifically addresses this issue.

This absence of a legal category specifically dedicated to anticompetitive practices disguised as innovation leads judges to create numerous type I

1. JEAN RACINE, ESTHER 38 (Theatre Classique 2015). This quote, dated from 1689, reminds us that predatory practices imply a prey, and that preys would be better off if they could identify their predators.

2. *Why is Competition Policy Important for Consumers?*, EUR. COMM'N, http://ec.europa.eu/competition/consumers/why_en.html [https://perma.cc/QBR8-XPUG)] (last updated Apr. 16, 2012).

3. *See* Phillip Areeda & Donald F. Turner, *Predatory Pricing and Related Practices under Section 2 of the Sherman Act*, 88 HARV. L. REV. 697, 697 (1975).

4. *See* J. Gregory Sidak & David J. Teece, *Dynamic Competition in Antitrust Law*, 5(4) J. COMPETITION L. & ECON. 581, 631 (2009).

5. Joseph Gregory Sidak, *Debunking Predatory Innovation*, 83 COLUM. L. REV. 1121, 1121–22 (1981).

and II errors.[6] The jurisprudence has not yet generalized the etiquette of *predatory innovation,* which nevertheless answers some of the problems encountered by antitrust law with high tech markets development.[7] The apparent lack of interest in that notion by courts has led the doctrine to devote few studies to the subject, which has accentuated judges' reluctance to use it, and so on.

This article seeks to substantiate the value of the notion of *predatory innovation*, which covers a wide range of practices, many of which are not reached by actual antitrust rules. The development of a dedicated legal regime is a necessity which must be promptly answered.

In fact, the terms of *predatory innovation*—which the author defines as the alteration of one or more technical elements of a product to limit or eliminate competition—describes all practices that, under the guise of real innovations, are anticompetitive strategies aimed at eliminating competition without benefiting consumers.[8] They may take two different forms—the modification of a technological platform and the technical design of a product—which are aimed at removing the compatibility of third party technologies with those of a dominant firm, or at impairing competing technologies operations.[9] As of today, antitrust law provides no satisfactory answer to these strategies.

It is common to see that many practices in high tech markets are simultaneously occurring on several continents at once—e.g., the new version of software is generally available at the same moment around the world.[10] For that reason, the author chooses to carry out a comparative study between the United States and Europe, first because these two bodies of antitrust law may learn from each other—they have homologous roots—and also because the countries involved have some of the highest GDP in the world.[11]

The main objective of this article, in the first instance, is to portray the practices that can and should be condemned as predatory innovation. This article questions, in substance, what predatory innovation is, and exposes the

6. *See id.* at 1144–45, n.89.

7. *See id.* at 1146–48.

8. *See* Thibault Schrepel, *Predatory Innovation: A Response to Suzanne Van Arsdale & Cody Venske*, JOLT DIGEST (June 10, 2017), http://jolt.law.harvard.edu/digest/digest-note-predatory-innovation; Janusz A. Ordover & Robert D. Willig, *An Economic Definition of Predation: Pricing and Product Innovation*, 91 YALE L.J. 8, 22 (1981).

9. *See* Ordover & Willig, *supra* note 8, at 9.

10. *See, e.g.*, Amit Chowdhry, *iOS 11 Is Now Available: What is Included in the Update?*, FORBES (Sept. 19, 2017, 1:01 PM), https://www.forbes.com/sites/amitchowdhry/2017/09/26/ios-11-0-1-now-available/#257f336b7295.

11. *List of Countries by Projected GDP*, STATISTICS TIMES (Apr. 23, 2017), http://statisticstimes.com/economy/countries-by-projected-gdp.php [https://perma.cc/NU6M-CZNN].

multiplicity of these practices and their frequency, which necessarily brings the need to create a specific legal regime.

Most predatory innovation practices are currently dealt with under the label of *technological tying*.[12] The creation of some legal rules dedicated to predatory innovation would then lead to removing this teetering legal concept and lead to the creation of—instead—a more coherent legal regime—in both continents—that could be understood by business leaders.[13] Indeed, the creation of an autonomous legal regime for predatory innovation will ensure various benefits for those involved: not to suffer the consequences from the legal uncertainty surrounding the notion of technological tying; not to be subjected to differences of interpretation depending on whether the practices are committed in Europe or in the United States; to address many practices that cannot be caught under the legal regime of technological tying; and to provide judges an opportunity to conduct a comprehensive analysis.[14]

II. THE PRACTICES OF PREDATORY INNOVATION

This article intends, in the first instance, to portray practices that can and should be condemned as predatory innovation. This is all the more necessary as these practices tend to develop exponentially.[15] One of high tech markets specificities is the ability for companies to continually improve their products that already are on the market, creating, in fact, a multitude of opportunities to reduce competition.[16] The system of digital updates (sometimes automatic), for instance, allows a dominant firm to impose a predatory strategy to its users, depriving them of any possibility of rejecting the product's new version in the short term.[17] A company can thus create as many preda-

12. *See generally* Charles M. Gastle & Susan Boughs, *Microsoft III and the Metes and Bounds of Software Design and Technological Tying Doctrine*, 6 VA. J.L. & TECH. 1 (2001) (discussing the application of technological tying to software).

13. *See id.*

14. *See id.*

15. *See, e.g.*, Suzanne Van Arsdale & Cody Venzke, *Predatory Innovation in Software Markets*, 29 HARV. J.L. & TECH. 243, 247 (2015).

16. *See* Randal C. Picker, *Rewinding Sony: The Evolving Product, Phoning Home and the Duty of Ongoing Design*, 55 CASE W. RES. L. REV. 749, 751 (2005) ("Design ceases to be a one-time event and instead becomes a continuous process. And that is true not only for the next product sold, but also for the entire installed base. The dead hand of the past and the constraints of backwards compatibility are lifted.").

17. *See* John M. Newman, *Anticompetitive Product Design in The New Economy*, 39 FLA. ST. U. L. REV. 681, 707–08 (2012) (discussing the low risk that consumers will reject redesigns implemented through software updates).

tory strategies as it updates one of its products. These are, in other words, *post-innovation practices* appearing once the product is put on the market.[18]

The newness of these strategies has been the subject of recent developments in the North American legal doctrine,[19] but it remains nonexistent in Europe[20] even though the general literature seems to be willing to consider it more and more, as illustrated by the diagram below:

FIG. 1. GRAPH GENERATED VIA GOOGLE NGRAM VIEWER[21]

18. For more development on this notion of "post-innovation," as opposed to "pre-innovation," see Jonathan B. Baker, *Evaluating Appropriability Defenses for the Exclusionary Conduct of Dominant Firms in Innovative Industries*, 80 ANTITRUST L.J. 431, 438–40 (2016).

19. *See* Hillary Greene, *Muzzling Antitrust: Information Products, Innovation and Free Speech*, 95 B.U. L. REV. 35, 36 (2015) (underlining the possibility to apprehend predatory innovation from a "free speech" angle). Because this notion is inoperative in Europe, and because this article is focused on antitrust law only, the author will not mention it any more.

20. Yet, predatory innovation is a nontariff strategy that can appeal to many companies. *See* Terry Calvani, *Non-Price Predation: A New Antitrust Horizon*, 54 ANTITRUST L.J. 409, 410 (1985) ("Let's take a minute and explore why an individual or group might undertake such a course of conduct. Why might non-price predation be an attractive strategic policy? [N]on-price predation is safer than its cousin, price predation."). It is a matter of recognizing that all predatory practices do not imply a price strategy. Companies can also implement less expensive eviction by using other variables. *See id.* at 410–11. On nontariff predation, Susan A. Creighton, then director of the Federal Trade Commission's Bureau of Competition, described these practices as "cheap," stressing that they cost little to the company that puts them into practice, and they have no pro-competitive quality. *See* Susan A. Creighton, Dir., Bureau of Competition Fed. Trade Comm'n, Cheap Exclusion, Remarks Before: Charles River Associates 9th Annual Conference, Current Topics in Antitrust Economics and Competition Policy (Feb. 8, 2005); *see also* ANDREJ FATUR, EU COMPETITION LAW AND THE INFORMATION AND COMMUNICATION TECHNOLOGY NETWORK INDUSTRIES 150 (2012) ("As unlikely as predation is, there are several additional reasons why network effects may make predation more likely.").

21. "Google Ngram Viewer . . . is an online search engine that charts frequencies of any set of comma-delimited search strings using a yearly count of n-grams

The fact that the author has not been able to identify any European legal studies specifically dedicated to predatory innovation on high tech markets reinforce the usefulness of the author's study to the extent that the new economy involves an infinite renewal of products/product features which must be analyzed.[22] It is then necessary to identify the different classifications of predatory innovation practices in order to determine which types of practices can be labeled as such.

A. Examination of Different Classifications for Predatory Innovation

Different classifications have been conceived for predatory innovation practices.[23] An appropriate nomenclature makes it possible to define which practices must be condemned and thus can be used by judges and authorities to concentrate their efforts on practices that actually require sanctions.[24]

The author will examine all of the classifications which have been recognized by the European and North American doctrine. Although none of them is sufficient, they all contribute to the creation of a new and more efficient dichotomy.

1. Presentation of Existing Classifications

Part of the North American doctrine argues that innovation is predatory when research and development (R&D) costs exceed expected gains.[25] It has been proved, however, that this theory is insufficient.[26] Another part of the

found in sources printed between 1500 and 2008 . . . ." *Google Ngram Viewer*, WIKIPEDIA, *https://en.wikipedia.org/wiki/Google_Ngram_Viewer* (last updated Sept. 19, 2017) (footnote omitted).

22. *See* Thibault Schrepel, *From Microsoft to Google: Eyes Wide Shut on Predatory Innovation?*, COMPETITION POL'Y INT'L 2 (July 2017), https://www.competitionpolicyinternational.com/wp-content/uploads/2017/07/Europe-Column-July-Full1.pdf.

23. *See* discussion *infra* Part II.A.1.

24. In 1982, James D. Hurwitz and William E. Kovacic stressed that the notion of innovation was ill-defined. For reasons that the author ignores, this statement has lost none of its veracity, more than 30 years later. *See* James D. Hurwitz & William E. Kovacic, *Judicial Analysis of Predation: The Emerging Trends*, 35 VAND. L. REV. 63, 66 n.5, 117–18 (1982); *see also* Thomas J. Campbell, *Predation and Competition in Antitrust: The Case of Nonfungible Goods*, 87 COLUM. L. REV. 1625, 1658 n.113 (1987) ("The complete identity of these two practices suggests that there should be many authors proposing tests for predatory product innovation, since there are so many with predatory pricing tests.").

25. *See* HERBERT HOVENKAMP ET AL., IP AND ANTITRUST: AN ANALYSIS OF ANTITRUST PRINCIPLES APPLIED TO INTELLECTUAL PROPERTY LAW § 12.02 (2d ed. 2010).

26. The main reason for this deficiency is that such an investment is *only* anticompetitive if competitors have to make a similar investment in order to be compet-

North American doctrine has thus started to work on the development of different classifications of predatory innovation practices.[27] They contribute to the creation of a better dichotomy.

a. Explicit and Implicit Classifications

i. Number 1: Type of Modification

Several authors including Ross D. Petty[28] have distinguished three kinds of predatory innovations based on the type of changes made on products. The first type of predatory innovation encompasses all modifications designed to eliminate a similar product; this type of predatory innovation modifies a product in order to convince consumers that the quality of a competitor's products is inferior.[29] The modification is expressly intended to eliminate an identified product.[30] The second type of predatory innovation covers changes tailored to eliminate comparable products: this type of predatory innovation implies a product modification designed to restrict or eliminate competition by improving the original product.[31] This strategy seeks to compete by enhancing product qualities.[32] The third type of predatory innovation embraces all modifications made on product components: this type of predatory innovation aims to modify a product in a way to remove the interoperability of competing products.[33]

ii. Number 2: Link Between Strategy and Technical Design

One European author has distinguished two categories of predatory innovation.[34] The first category of technical design changes includes all modifications in which the technical design of a product is affected.[35] These

itive. A company's overinvestment may simply result from the mismanagement of its resources, without, however, having breached antitrust law. For a full range of arguments against this theory, see *id.*

27. Note that several of these classifications do have some similarities. They are, however, reproduced in their entirety in order to preserve the logic of each one.

28. *See* Ross D. Petty, *Antitrust and Innovation: Are Product Modifications Ever Predatory*, 22 SUFFOLK U. L. REV. 997, 1023–24 (1988); *see also* MARIATERESA MAGGIOLINO, INTELLECTUAL PROPERTY AND ANTITRUST 116–18 (Steven D. Anderman ed., 2011).

29. *See* Petty, *supra* note 28, at 1024.

30. *See id.*

31. *See id.* at 1025.

32. *Id.*

33. *See id.* at 1026–27.

34. *See* Carlos Acuna-Quiroga, *Predatory Innovation: A Step Beyond?*, 15 INT'L REV. L. COMP. & TECH. 7, 7 (2001).

35. *See id.* at 16.

strategies aim at eliminating compatibility with competing products, or at integrating an independent product into another one.[36] It may be made, for instance, by removing the compatibility of a file format with a competing operating system.[37]

The second category of communication strategies includes all communication strategies by which a dominant company regularly announces the upcoming release of a new product—with fictional features—to dissuade its competitors from entering the market.[38] The purpose of such a strategy is generally to raise competitors' costs or to precipitate the market exit of an existing competing product.[39] This type of predatory innovation has no direct link with the technical modification of a product.[40]

iii. Number 3: Type of Tying

Another classification distinguishes three types of predatory innovations, some of which are similar to the first two categorizations discussed above.[41] The first type is a change of an existing product, where a dominant company seeks to modify its product in order to make it incompatible with those of its competitors.[42] The second type is technical ties, where a company integrates one of its products into another one.[43] This may be done, for instance, when the company chooses to integrate a photo editing software program into a much larger operating system.[44] Another type is traditional ties, where a company contractually ties a product to another one.[45]

iv. Number 4: Time Element

A final dichotomy distinguishes the different types of predatory innovation according to a temporal criterion.[46] It distinguishes between pure predatory innovation and predation due to timing. Pure predatory innovation

36. *See id.* at 15 ("The term technological tying is used to describe alterations to product design in order to render complementary products no longer compatible or unnecessary, either by denying means to interconnect or integrating former individual products.").

37. *See id.* at 21.

38. *See id.* at 25.

39. *See* Acuna-Quiroga, *supra* note 34, at 25.

40. *See id.*

41. *See* HOVENKAMP ET AL., *supra* note 25, § 12.03.

42. *See id.*

43. *See id.*

44. *See id.*

45. *See id.*

46. This dichotomy can be deduced from the article written by Daniel A. Crane. *See* Daniel A. Crane, *Legal Rules for Predatory Innovation*, CONCURRENCES:

involves the alteration of product's technical components in order to restrict competition.[47] Pure predatory innovation may happen when a dominant company chooses to modify connectors for a product. The anticompetitive strategy is implemented once the product is put on the market and adopted by the dominant company's competitors.[48] Predation due to timing occurs when a dominant company introduces a technical change without warning any other companies selling compatible products.[49] Predation due to timing also includes the untimely announcement of new products for the purpose of discouraging competitors.[50]

b. Criticism and Utility of These Classifications

The above classification schemes suffer from defects that tend to challenge their legitimacy. The first classification of type modifications suffers from including practices that are *not* predatory innovation.[51] Indeed, when a dominant firm decides to add a frivolous functionality to one of its products in order to differentiate it from competing products, the firm may be deceptive but such a practice is not a matter of antitrust law.[52] Specifically, without altering any core functionality of the product, such a practice does not constitute predatory innovation.[53] Therefore, type modification cannot, therefore, be granted full consideration.[54]

The second classification of link between strategy and technology suffers from the same flaw. The so-called vaporware practices—i.e., the repeated announcements of a new product and/or unachievable improvements—is a strategy that is not directly related to product technical designs.[55] The same goes for the strategy in which a dominant firm promises a lower price than the one actually offered so as to discourage competitors

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COMPETITION L.J. n.4, 4–8 (2013) (Fr.) (although the author does not explicitly address the temporal aspect as a central element).

47. *See id.* at 5.

48. *See id.*

49. *See id.* at 7.

50. *See id.* at 8.

51. *See* Petty, *supra* note 28, at 1028 (discussing how suggested guidelines should be used "to insure that antitrust laws condemn truly predatory product modifications but do not unduly chill legitimate ones.").

52. *See* Areeda & Turner, *supra* note 3, at 730–32.

53. *See id.*

54. *See id.*

55. *See* Acuna-Quiroga, *supra* note 34, at 25.

from developing their own products.[56] As a result, this classification does not correctly identify the practices of predatory innovation.[57]

The third classification focuses on the concept of ties. Technical tying does need to be re-qualified as predatory innovation, as the author will demonstrate in this article. Traditional tying made by contract, however, is not part of predatory innovation because product features are not affected.[58] Classification based on type of ties can be useful.

The fourth classification based on time is highly constructive because it integrates a temporal element that any analysis on predatory innovation should consider.[59] But, the author disputes the theory that the second strategy of predatory innovation—predation due to timing—must be condemned. Dominant companies have no legal obligation to help their competitors, which is acknowledged in North American and European jurisprudence.[60] By requiring an innovator to communicate to the public before the introduction of a new product,[61] the incentive to innovate would necessarily be reduced.[62] This classification must then help the creation of a new classification without repeating its entirety. In short, these different classifications discussed above, even though imperfect, are conducive to the creation of a new dichotomy specifically designed for high tech markets, as discussed below.

2. Proposal for a New Dichotomy

An effective typology must concur to a straightforward identification of predatory innovation practices, without encompassing others. It must also

56. *See* Areeda & Turner, *supra* note 3, at 704.

57. *See id.* at 705; Acuna-Quiroga, *supra* note 34, at 25.

58. *See* HOVENKAMP ET AL., *supra* note 25, § 12.03.

59. *See* Crane, *Legal Rules for Predatory Innovation*, *supra* note 46.

60. L'Autorité de la Concurrence [The Competition Authority], Sept. 4, 2014, n 14-D-09 (Fr.) (Nespresso ruling of the French Competition Authority) [hereinafter The Competition Authority].

61. To find support for imposing such a duty, see Mary L. Azcuenaga, Comm'r, *Panel Discussion on Technological Innovation, International Trade, and Competition Policy*, FED. TRADE COMM'N (Dec. 1, 1997), https://www.ftc.gov/public-statements/1997/12/panel-discussion-technological-innovation-international-trade-and.

62. The French Competition Authority required Nespresso to send its competitor technical information about its new machine eighteen weeks before the machine was marketed. The decision's interventionism is unequaled in the European area, and is an illustration that antitrust authorities and judges may be tempted to interfere in the management of companies. *See* The Competition Authority, *supra* note 60; *see also* Thibault Schrepel, *Nespresso S'Engage : Le Droit de la Concurrence L'Emporte-t-Il ? Pas Vraiment!*, LE CONCURRENTIALISTE (May 19, 2014) http://leconcurrentialiste.com/wp-content/uploads/2017/02/nespresso.pdf [https://perma.cc/5ZFZ-HM42] (Fr.).

make it easier for judges and companies to understand the legal outcomes of this legal concept by suggesting economic justifications that any company may provide in the event of a legal dispute.

The author proposes to distinguish the alteration of a product's platform from the modification of a product's technical design—whether it concerns software or hardware.[63]

a. The Author's Proposal: Modification of a Platform or an Independent Product

i. Modification of the Platform

The first type of predatory innovation concerns technological platforms[64] and interfaces.[65] The author means the term *platform*[66] in the sense of a digital environment allowing the management and/or the use of application services.[67] Windows operating system, for instance, is a technological inter-

63. Software allows the execution of a specific task while platforms allow the management of a set of elements. In some rare cases, these two products can be confused. *See* DAVID S. EVANS ET AL., INVISIBLE ENGINES: HOW SOFTWARE PLATFORMS DRIVE INNOVATION AND TRANSFORM INDUSTRIES 12 (2008). It is therefore necessary to consider which functions are the subject of predatory practices.

64. We use platforms on a daily basis. *See id.* at 223–25 (studies on the subject of the modification of platforms are very rare).

65. For the writing of platforms, see OCED POLICY ROUNDTABLES, TWO-SIDED MARKETS, ORGANISATION FOR ECONOMIC CO-OPERATION & DEVELOPMENT 20, at 27 (2009) ("Rather than each application developer writing the code for performing each task, the software platform producer incorporates code into the platform, and thereby avoids duplication costs. The functions of that code are made available to application developers through an application program interface.") (Fr.) [hereinafter TWO-SIDED MARKETS].

66. On the distinction between platform and application, see Bruce Abramson, *Promoting Innovation in The Software Industry: A First Principles Approach to Intellectual Property Reform*, 8 B.U. J. SCI. & TECH. L. 75, 113 (2002). The distinction suffers from alleviations, especially when the applications serve as a "quasi-platform." And yet, it remains absolutely crucial for any market analysis related to high tech.

67. This is also the meaning adopted by Judge Posner, stressing that platforms have no value in themselves. Compatible software and applications provide value. *See* Richard A. Posner, *Antitrust in the New Economy*, 68 ANTITRUST L.J. 925, 928 (2001).

> Networks are not valuable to the consumer in themselves; they are conduits for the services that the consumer values. This is one point at which vertical integration enters the new economy. An operating system is a platform for software applications, and so the writer of operating-system software may decide to write software applications to ride on it, in much

face on which many developers create compatible software, such as those performing video or photographic processing.[68]

From a theoretical perspective, considering platform modifications implies taking into account the two-sided nature of high tech markets—also referred as dual markets[69]—which allow interconnecting at least two distinct operators.[70] Google is a prime example. On the one hand, the company offers a "free" service to its users, and on the other, it charges advertisers for better visibility.[71] The modification of a platform implies therefore considering the effects on both markets,[72] which the doctrine rarely does adequately.[73]

Such markets generally involve high fixed costs and relatively low variable costs.[74] Author Jean Tirole underlines the failure of Coase's theorem[75]

> the same way that AT&T manufactured the terminal equipment attached to its telephone lines.

There is a doctrinal debate on how to define this concept. *See generally* Alfonso Lamadrid, *Regulating Platforms? A Competition Law Perspective*, CHILLIN' COMPETITION (Nov. 24, 2015), http://www.project-disco.org/competition/112415-regulating-platforms-a-competition-law-perspective [https://perma.cc/6ZLB-XSG7].

68. For instance, CyberLink PowerDirector, Corel VideoStudio, Pinnacle Studio, Photoshop, Gimp & Lightroom.

69. TWO-SIDED MARKETS, *supra* note 65, at 24 ("A two-sided platform helps the members of two distinct groups of customers to get together in a way that generates value for these customers and that these customers could not get as efficiently, or possibly at all, without the platform. The platform typically internalizes indirect network effects between the customer groups."); *see also* Marie-Anne Frison-Roche & Laurent Cytermann, *Economy of platforms: Regulating a Dominant Model?*, CONCURRENCES: COMPETITION L.J n 2-2015 (Fr.).

70. *See* Jean-Charles Rochet & Jean Tirole, *Two-Sided Markets: A Progress Report*, 37 RAND J. ECON. 645 (2006).

71. *See* Dirk Auer & Nicolas Petit, *Two-Sided Markets and the Challenge of Turning Economic Theory into Antitrust Policy*, 60 ANTITRUST BULL. 426, 426 (2015).

72. Measuring these effects requires antitrust law to take into account the fact that goods or services are offered for free to users. *See generally* Michal S. Gal & Daniel L. Rubinfeld, *The Hidden Costs of Free Goods: Implications for Antitrust Enforcement*, 80 ANTITRUST L.J. 521 (2016).

73. Frédéric Jenny, *L'Application du Droit de la Concurrence aux Innovations de Rupture aux États-Unis et dans L'Union Européenne in Innovation de Rupture, Droit et Concurrence*, CONCURRENCES: COMPETITION L.J. n 3-2016 (Fr.).

74. *See* Justus Haucap & Ulrich Heimeshoff, *Google, Facebook, Amazon, eBay—Is the Internet Driving Competition or Market Monopolization?*, 11 INT. ECON. POLICY 49, 55 (2014) ("In general, it can be observed that many two-sided markets are characterized by a cost structure with a relatively high proportion of fixed costs and relatively low variable costs.").

on the latter.[76] He indicates that anticompetitive strategies are numerous insofar as a company can weigh some of the anticompetitive effects on one side of the market—and not on consumers—which gives them some impunity.[77] The failure of Coase's theorem also tends to prove the multiplicity of anticompetitive practices, because when one side of the market is not quite satisfied, it may compensate for its harm by implementing such practices. Even though no empirical study—to the best of the author's knowledge—has ever confirmed this postulate of the failure of Coase's theorem on two-sided markets, the growing number of such practices demands a closer examination.

From a practical perspective, all strategies relating to the physical characteristics of a product are necessarily excluded from this category. Conversely, any changes made to operating systems, web or application servers, and finally web or software applications in the sense of multimedia libraries (e.g., online stores) and other digital workspaces are included.[78] The author also incorporates some changes made on internet browsers which, with the development of applications directly operable on them, can serve as a platform.[79]

In short, this strategy of a dominant firm is straightforward. It aims not at altering a competitor's product directly, but rather at preventing access and/or reducing the overall compatibility of a product with the rest of a plat-

75. Rochet & Tirole, *supra* note 70, at 649 (recalling Coase's contribution and concluding that "[t]he Coase theorem is a useful benchmark. In practice, though, various factors make it unlikely that the two parties will reach an efficient agreement from their perspective [where 'efficiency' refers to their joint surplus, and not to social surplus].").

76. Two authors pointed out that several definitions have been given to dual markets. One implies the exclusion of the Coase theorem by which exchanges between economic actors lead to an optimal allocation of resources when the property right is clearly defined and when they are no transaction costs. The other definition disregards this feature. *See* Dirk Auer & Nicolas Petit, *Two-Sided Markets and the Challenge of Turning Economic Theory into Antitrust Policy*, 60 ANTITRUST BULL. 426 (2015).

77. *See* Rochet & Tirole, *supra* note 70, at 649.

78. *See* Hanno F. Kaiser, *Are "Closed Systems" an Antitrust Problem?*, 7 COMP. POL'Y INT'L 91, 96 (2011). For an up-to-date overview of all multimedia layers in 2006, see EVANS ET AL., *supra* note 63, at 223.

79. *See* Michael L. Katz & William P. Rogerson, *The Applications Barrier to Entry and Its Implications for the Microsoft Remedies: Comment on Iansiti and Richards*, 75 ANTITRUST L.J. 723, 728 (2009). On this point, one author analyzed that platforms develop on the basis of other platforms. *See* Daniel O'Connor, *Understanding Online Platform Competition: Common Misunderstandings in Competition and Regulation of Online Platforms* 7 COMP. POL'Y INT'L 9, 16 (2016) ("Netflix, for example, uses Amazon Web Services (AWS) as its cloud infrastructure.").

form.[80] This strategy may have two purposes: to prevent the product of a competing firm from being fully integrated within the dominant company's platform, or to prevent the competing platform from interacting efficiently with that of the dominant company.[81] This strategy thus targets two types of competition, *between* platforms and *within* a platform.[82]

ii. Modification of an Independent Product Technical Design

From a theoretical perspective, the second type of predatory innovation takes place when a dominant company alters the functioning of a system software program, an application software program, an application,[83] a driver,[84] or a physical product.[85] Such a strategy aims at eliminating the compatibility of a product, at changing the way it operates, or at adding a (perhaps frivolous) functionality to it so as to affect competition between *contributors*, which include software developers, content and service providers,[86] as well as companies producing compatible hardware.[87]

From a practical perspective, by employing the second type of predatory innovation, a dominant company seeks to *directly affect the product* of its competitors.[88] The goal can be achieved by implementing modifications on

80. *See* Richard S. Markovits, *An Ideal Antitrust Law Regime*, 64 TEX. L. REV. 251, 293 (1985) (noting that predatory innovation can, in fact, aim at creating a period during which no compatible product is available); *see also* Philip J. Weiser, *Regulating Interoperability: Lessons from AT&T, Microsoft, and Beyond*, 76 ANTITRUST L.J. 271, 287 (2009) (on the inexorable tension between platforms and applications).

81. *See id.* (discussing how platform owner-applications developer relationship gives "rise to concepts like 'co-opetition' and 'network economics.'").

82. *See* Kaiser, *supra* note 78.

83. *Application*, MICROSOFT COMPUTER DICTIONARY (5th ed. 2002) (Applications are used to perform a specific task).

84. *Driver*, MICROSOFT COMPUTER DICTIONARY (5th ed. 2002) (A driver is software that allows the use of computer hardware).

85. It may be hardware, phones, camera or any technological object.

86. *See* Kaiser, *supra* note 78; *see also* Robert E. Bartkus, Note, *Innovation Competition Beyond* Telex v. IBM, 28 STAN. L. REV. 285, 296 (1976) ("A more likely means of deterring imitation by the use of design is for a manufacturer of both a principal product and its accessories periodically to redesign the connections, junctions, or plugs between products in order to force consumers to buy the accessories from the innovator during the period when competitors are redesigning their accessories to fit the altered principal product.").

87. It can be a charger or a device that physically interacts with another.

88. The OECD notes that such strategies are intimately linked to network effects. *See* TWO-SIDED MARKETS, *supra* note 65, at 34, ("One of the defining characteristics of a two-sided platform is the existence of indirect network effects across consumer groups. Indirect network effects between the two sides pro-

the technical aspects of a product (e.g., by altering coding or programming) or by modifying the external characteristic of a product (e.g., by revising an external design or physical functionalities). A modification of the internal *and* external technical characteristics may occur at the same time, for instance, when a company miniaturizes its connectors.[89]

b. The Usefulness of the Proposed Dichotomy

i. In Terms of Available Information

The dichotomy presented in this article is constructive to the analysis of predatory innovation because it makes it possible to differentiate two distinct types of predatory innovation practices and thus to identify more easily different strategies which are linked to each type.

The distinction between platform modification and independent product modification also makes it possible to integrate into the analysis the level of information available at the time of implementation. The modification of a platform, which contains multiple software programs, tends to suggest that a dominant firm does not have a specific knowledge of all the anticompetitive effects created on compatible products when modifying its platform. Several millions of software programs and applications are indeed operable on the most popular platforms.[90] It is not uncommon, therefore, that changes made on platforms have unintended consequences. Therefore, based on information available to the company and based on a temporal element, it should be presumed that platform modifications are anticompetitive because predicting their anticompetitive effects is often far too complex.

ii. In Terms of Effects on Competition

The modification of a platform, which has a potential effect on a large number of companies with developed compatible software or applications, tends to include both pro-competitive (for some competitors) and anticompetitive effects (for other competitors). The more open the platform is, the

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mote larger and fewer competing two-sided platforms. Platforms with more customers of each group are more valuable to the other group. More users make software platforms more valuable to developers, and more developers make software platforms more valuable to users.").

89. *Connector*, MICROSOFT COMPUTER DICTIONARY (5th ed. 2002) ("In hardware [a connector is] used to join cablels or to join a cable to a device.").

90. More than 3,300,000 apps are currently available on Android. *Number of Android Apps*, APPBRAIN (Sept. 24, 2017, 6:01 PM), https://www.appbrain.com/stats/number-of-android-apps. More than 2,200,000 are currently available on the Apple's iOS. Sam Costello, *How Many Apps Are in the App Store?*, LIFEWIRE (May 5, 2015), https://www.lifewire.com/how-many-apps-in-app-store-2000252.

greater is the presumption that the company is not aware of all compatible products.[91]

Sanctioning predatory innovation practices carried out on platforms must then require greater caution, the risk of type I errors[92] being higher.[93] In other words, a platform modification is more likely not to be purely anticompetitive[94] than an independent product alteration. It is indeed easier to modify the technical components of an independent product in order to alter the functioning of a specific competing product. Most interactions between software—as well as between physical products—are easier to identify than those resulting from a platform.

Moreover, the interplay between different software programs or physical products is actually designed by a developer who has expressly foreseen the latter—by allowing, for instance, a physical or a digital connection via Bluetooth, Wi-Fi, and other data transmission systems. It is thus easier for a developer to alter competing products by modifying its compatibility. In short, changes made to the technical components of a product tend to facilitate the implementation of a purely anticompetitive strategy which, in fact, can be condemned without creating type I errors.

It should be noted, however, that although the anticompetitive modification of product technical components is more likely to be characterized in this situation than when it is made on a platform, courts must not neglect the importance of the latter because its anticompetitive effects bear on a greater number of third parties. In other words, the author's interest on the subject is to detect predatory innovation strategies rather than to give a free pass to a particular type of predatory innovation.

The dichotomy proposed in this article is intended to allow judges to upbuild reasoned decisions and to endow parties write clear-cut conclusions. The dichotomy also makes it possible to clarify the debate on the issue, to

91. It should be noted here that, as for software, a platform may be "proprietary" when its creator is the only one enjoying the right to distribute and modify it—such as Apple and its App Store. It may be "free" when third parties can access the source code to study or adapt it, modify and redistribute it.

92. As a reminder, type I errors, also called "false positive," reflect the fact that a judge or a competition authority condemns an undertaking for having implemented one or more practices which, in reality, are not anticompetitive. For an analysis of the risk of type I errors with predatory innovation, see Kevin Coates & Sophie Lawrance, *Predatory Innovation*, Competition Law Insight (Feb. 21, 2017), http://www.competitionlawinsight.com/competition-issues/abuse-of-dominance/predatory-innovation—1.htm.

93. *Id.*

94. On the other hand, as Stephen Elop—then CEO of Nokia—pointed out, competition between companies is increasingly turning on platforms. *See* Chris Ziegler, *Nokia CEO Stephen Elop Rallies Troops in Brutally Honest 'Burning Platform' Memo?*, Engadget (Feb. 8, 2011), http://www.engadget.com/2011/02/08/nokia-ceo-stephen-elop-rallies-troops-in-brutally-honest-burnin.

provide a legal structure, and lastly, to facilitate the identification of what practices are—or not—predatory innovation.

B. Different Implementations of Predatory Innovation

Studying practices that fall within the scope of predatory innovation requires particular caution.[95] The Organisation for Economic Co-operation and Development (OECD) underlines the difficulty of analyzing practices in high tech markets,[96] a trend which the author's study confirms. While many practices seem to fall within the scope of predatory innovation, several of them should be excluded from it. The author then analyzes the ones that should be considered by courts or competition authorities.

1. Practices That Fall Outside the Scope of Predatory Innovation

The design of digital platforms cannot, in itself, be considered an anticompetitive strategy. The same goes for the integration of content within platforms,[97] which, although stigmatized by some as being anticompetitive, should not be sanctioned—at least not as predatory innovation.

a. The Design of Digital Platforms

i. Different Types of Platforms

The European Commission defines platforms as products using "the Internet to allow interactions between at least two distinct but interdependent groups of users so as to create value for at least one of the groups; Certain platforms [being] considered to be intermediary service providers."[98] A company may decide to design an open, a free, or a proprietary platform.

Platforms are said to be *open* in the presence of any communication, interconnection, exchange protocol, or data format whose technical specifica-

95. TWO-SIDED MARKETS, *supra* note 65, at 34 ("Evaluating the impact on social welfare of policy measures in markets where two-sided platforms operate can be very challenging.").

96. *Id.*

97. On the need not to presume the existence of an anticompetitive strategy when a dominant firm operates on a second market, see Patrick Rey et al., *The Activities of a Monopoly Firm in Adjacent Competitive Markets: Economic Consequences and Implications for Competition Policy*, INSTITUT D'ECONOMIE INDUSTRIELLE, UNIVERSITE DE TOULOUSE (2001) (Fr.).

98. On definition from the questionnaire on platforms launched by the European Commission, see European Commission Press Release, Have Your Say on Geo-Blocking and the Role of Platforms in the Online Economy, IP/15/5704 (Sept. 24, 2015) [hereinafter European Commission Press Release], http://europa.eu/rapid/press-release_IP-15-5704_en.htm.

tions are public and without restriction of access or implementation.[99] An open platform is not necessarily *free*.[100] Platforms are *free* or *open source* when a license[101] guarantees users the right to access the source code,[102]to study its functioning, to adapt it, to redistribute it,[103] and lastly, to improve it.[104]

Lastly, platforms are *closed* or *proprietary* when they carry data for which specifications are not public and/or whose use is restricted by their owner(s). Technical details are unknown or subject to a nondisclosure agreement.[105] The development of compatible software is generally hampered by this type of platform which does not legally or technically allow one to exercise—at the same time—the four software freedoms[106]: the execution of

99. *See* Thomas R. Eisenmann et al., Opening Platforms: How, When and Why?, 131 (Harv. Bus. Sch., Working Paper 09-030, 2009).

100. *See* Chris Murray, *Open Source and Open Platforms: the Questions You Should Be Asking*, OOMPH INC. (Oct. 6, 2017), https://www.oomphinc.com/notes/2009/05/open-source-open-platforms/.

101. *See* Michal S. Gal, *Viral Open Source: Competition vs. Synergy*, 8 J. COMPETITION L. & ECON. 469, 474 (2012) ("Today, commercial companies fully or partially fund, support, and govern many social-production FOSS projects.").

102. Similar to Facebook's model that has a partial open source policy, see *Open Source at Facebook*, FACEBOOK (Sept. 17, 2016), https://code.facebook.com/projects/p0 ("At Facebook, we have always been strong advocates of open software. From our earliest days—when the site was built on PHP, MySQL and memcached—we've been privileged to stand on the shoulders of open source giants. Ever since, we've worked hard to contribute our own work back to the community, and help other companies—both small and large—learn from our experience of building web, mobile, big data, and infrastructure stacks at scale. Most of our projects are on GitHub, and we also actively contribute elsewhere, such as to the Hadoop projects, LLVM, GNU grep, and Mercurial, amongst many others.").

103. *See* Elaine Chow, *Appeals Court Dismisses Open-Source Antitrust*, LAW360 (Nov. 10, 2006), https://www.law360.com/articles/13357/appeals-court-dismisses-open-source-antitrust-case ("GNU GPL is a free software license that allows the recipients of a computer program to study how a program works, modify it and redistribute copies of the modified program without punishment.").

104. *See also* EVANS ET AL., *supra* note 63, at 71. On the interest in companies to develop open source technology, see Josh Lerner et al., *The Dynamics of Open Source Contributors*, 96 AM. ECON. REV. 114 (2006).

105. *See* Lerner et al., *supra* note 104.

106. *See* Wendy Seltzer, *The Imperfect Is the Enemy of the Good: Anticircumvention Versus Open User Innovation*, 25 BERKELEY TECH. L.J. 909, 933 (2010) ("[A]ll four of these components are necessary to give users full autonomy in their software environment; to use and learn from the program and to modify it to suit their needs. They guard against lock-in to an uncooperative vendor or

software for any type of use, the access to its source code, the distribution of source code copies, as well as the modification and thus the improvement of the source code.[107] It should be noted, nonetheless, that some companies owning proprietary platforms allow access to a great deal of information in order to help developers.[108]

In fact, the distinction between the three types of platforms discussed above is not always manifest.[109] Some platforms are hybrids, which create difficulties of appreciation for competition authorities as in the case of the European Commission in its Android investigation.[110] Moreover, the expression of an *open system* is an oxymoron because each system, in fact, is differentiated from others by the perimeter covered by its technologies.[111] Three authors have thus represented the complexity of evaluating the nature of a platform:

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defunct system, and assure that users will be able to reuse their individual investments in the program.").

107. *Id.*

108. Other criteria can also be used to define an open source model. The modification of any open source model may involve the implementation of an anticompetitive strategy. *See* Jérôme Gstalter, *Open Standards and Competition Law: An Overview*, CONCURRENCES: COMPETITION L.J. n 1-2010, at 6–17 (Fr.).

109. This is the case for Microsoft. *See* HERBERT HOVENKAMP ET AL., IP AND ANTITRUST: AN ANALYSIS OF ANTITRUST PRINCIPLES APPLIED TO INTELLECTUAL PROPERTY LAW 51–52 (3d ed., 2016). On the support of openness by the dominant companies on high tech markets, see Michael Chapin, Note, *Sharing the Interoperability Ball on the Software Patent Playground*, 14 B.U. J. SCI. & TECH. L. 220, 242 (2008).

110. The European Commission is challenging Google's operating system hybrid nature. *See* European Commission Press Release, Antitrust: Commission Sends Statement of Objections to Google on Android Operating System and Application, IP/16/1492 (Apr. 20, 2016), http://europa.eu/rapid/press-release_IP-16-1492_en.htm ("Android is an open-source system, meaning that it can be freely used and developed by anyone to create a modified mobile operating system (a so-called 'Android fork'). However, if a manufacturer wishes to preinstall Google proprietary apps, including Google Play Store and Google Search, on any of its devices, Google requires it to enter into an 'Anti-Fragmentation Agreement' that commits it not to sell devices running on Android forks.").

111. Kaiser, *supra* note 78, at 91, 93.

Table 1: Comparison of Openness by Role in Platform-Mediated Networks[112]

	Linux	Windows	Macintosh	iPhone
Demand-Side User (End User)	Open	Open	Open	Open
Supply-Side User (Application Developer)	Open	Open	Open	**Closed**
Platform Provider (Hardware/OS Bundle)	Open	Open	**Closed**	**Closed**
Platform Sponsor (Design & IP Rights Owner)	Open	**Closed**	**Closed**	**Closed**

Moreover, the way in which a platform is organized is also helpful to help characterize its nature:

Table 2: Models for Organizing Platforms[113]

		Who Provides the Platform (*Provider Role*)?	
		One Firm	**Many Firms**
Who Controls Platform Technology (*Sponsor Role*)?	**One Firm**	***Proprietary*** • Macintosh • Playstation • Monster.com • Federal Express	***Licensing*** • Palm OS • American Express-branded MBNA cards • Scientific-Atlanta set-tops
	Many Firms	***Joint Venture*** • CareerBuilder (created by three newspaper groups) • Orbitz (created by several major airlines)	***Shared*** • Linux • Visa • DVD • UPC barcode

Most of the North American doctrine on predatory innovation advocates the pro-competitive aspect of open platforms,[114] underlining that they allow a

112. Eisenmann et al., *supra* note 99, at 2.

113. *Id.* at 5.

114. *See* Mark A. Lemley & David McGowan, *Could Java Change Everything? The Competitive Propriety of a Proprietary Standard*, 43 Antitrust 715, 741 (1998). Nevertheless, open platforms seem less likely to be the subject of anticompetitive strategies. *See* Josh Baskin, Note, *Competitive Regulation of Mobile Software Systems: Promoting Innovation Through Reform of Antitrust and Patent Laws*, 64 Hastings L.J. 1727, 1738 (2013); *see also* Seltzer, *supra* note 106, at 932; *see also* Michael J. Schallop, *The IPR Paradox: Leveraging Intellectual Property Rights to Encourage Interoperability in the Network Computing Age*, 28 AIPLA Q.J. 195, 241 (2000) (noting the two advantages of open source: social and utilitarian).

greater diversity of products.[115] This point of view would be hard to challenge, although different anticompetitive strategies may emerge—including fragmentation[116]—that can be used for anticompetitive purposes.[117] The doctrine is more divided to evaluate whether closed systems are pro- or anticompetitive by nature.[118]

In a distinguished article, Hanno F. Kaiser has raised many competitive advantages created by closed platforms.[119] The Kaiser article, which goes against part of the doctrine, features arguments which deserve to be considered.

First, closed platform may, for instance, allow the pro-competitive limitation of the number of users.[120] A company may indeed have an interest in limiting the presence of users on its platform.[121] For instance, social networks may want to limit the number of enrollees based on the population targeted, and a restaurant may want to control the number of its customers. The same logic applies to platforms which may want to limit the number of applications and software programs to reduce search costs associated with identifying the best ones.[122] In addition, paying for a poor-quality software program

115. *See* Jonathan Rosenberg, *The Meaning of Open*, Official Google Blog (Dec. 21, 2009), http://googleblog.blogspot.com/2009/12/meaning-of-open.html ("At Google we believe that open systems win. They lead to more innovation, value, freedom of choice for consumers, and a vibrant, profitable, and competitive ecosystem for business.").

116. The term "fragmentation" refers to the fact that open source software is modified by an operator so that several versions of the software, potentially incompatible with each other, are in circulation. On the existence of anticompetitive strategies on open source systems, see Gal, *supra* note 101, at 485. More generally, a company may want to help develop an open source system on a market A in order to deprive its competitors of monopoly profits so as to better compete with them in a market B.

117. *See* Mark A. Lemley, *Intellectual Property Rights and Standard-Setting Organizations*, 90 Cal. L. Rev. 1889, 1963 (2002) (Predatory innovation strategies may take place on open platform and a dominant company may fragment a competing open source software in order to make it less efficient, for the benefit of its proprietary software.)

118. *See* Kaiser, *supra* note 78, at 93; *see generally* Jonathan Zittrain, The Future of the Internet and How to Stop It (2008); Tim Wu, *How Apple's Closed Ways Could Land It Into Antitrust Trouble*, Techcrunch (Nov. 20, 2010), http://techcrunch.com/2010/11/20/apple-antitrust/.

119. *See* Kaiser, *supra* note 78, at 102.

120. *Id.* at 99–100.

121. *See* Florence Thépot, *Market Power in Online Search and Social Networking: A Matter of Two-Sided Markets*, 36 World Competition 195, 200 (2013).

122. *See* Nikos Smyrnaios & Franck Rebillard, *Entre Coopération et Concurrence: Les Relations Entre Infomédiaires et Editeurs de Contenus d'Actualité*, Concurrences: Competition L.J. n 3-2011, at 14 (Fr.).

may discourage the purchase of another software program on the same platform.[123]

Yet, the European Commission argued for an opposite view back in 2010 during the Microsoft and Yahoo merger, pointing out that in order to be successful, "a search engine needed to attract the most users on both sides of the platform."[124] The idea of network effects, which are central to technological tying issues, stems from the idea that companies necessarily want to attract the greatest number of users.[125] But the point deserves at least to be discussed in each individual case.[126] A company operating in high tech markets, even in search engines, may not want to attract an infinite number of users on both sides of the platform.[127]

Second, closed platforms may allow ensuring their safety.[128] Limiting competition within a platform—so-called "intra-platform" competition—may indeed be justified for security reasons.[129] The Android's mobile platform, known to be more open than Apple's, was the first to suffer a viral attack in March 2011.[130] Google then admitted the presence of fifty-eight

123. *See* David S. Evans, *The Antitrust Analysis of Rules and Standards for Software Platforms*, 10 COMP. POL'Y INT'L 2, 74 (2014) ("The classic story involves the collapse of the Atari game console business in the early 1980s. Atari used a game cartridge that was an open standard making it possible for third parties to write games. Consumers could not observe the quality of a game until they played it. The availability of reviews was much more limited than it is today. A flood of low-quality games appeared and contributed to the rapid decline of this pioneering game company. The successful game console companies such as Sony (for its PlayStation) that followed Atari limited the ability of third parties to publish games for their platforms and imposed quality controls.").

124. Eur. Comm'n Case No. COMP/M. 5727-Microsoft/Yahoo! EUR-Lex 32010M5727, ¶ 48 (Feb. 18, 2010) ("[I]n order to be successful, a search engine operator will try to attract as many participants on both sides of the platform as possible.").

125. *See generally* Michael L. Katz & Carl Shapiro, *Network Externalities, Competition, and Compatibility*, 75 AM. ECON. REV. 424 (1985).

126. For instance, some companies may want to provide a service that saves consumer various "research costs" by sorting upstream information. In such a case, increasing the number of users and available information is not an objective pursued. On the contrary, it is a matter of providing quality information by allowing access to only certain users. *See* Smyrnaios & Rebillard, *supra* note 122; Kaiser, *supra* note 78.

127. *See* Smyrnaios & Rebillard, *supra* note 122 and accompanying text.

128. *See* Kaiser, *supra* note 78, at 91.

129. The safety objective by itself does not appear to be part of antitrust law objectives. This is, however, a matter for day-to-day management. *See id.*

130. *See id.*

malicious applications on its platform.[131] At that time, the Android system simply sent Google a signal to point out which applications were vulnerable and needed to be deleted, while Apple's system provided an *a priori* security in which each proposed application was previously subjected to a security test before entering its online store.[132] But as a matter of fact, it is difficult to evaluate which model benefits consumers the most, both having the potential to increase consumer welfare, schematically, by encouraging the creation of many applications or by ensuring optimal security.[133]

Lastly, limiting cross-platform competition can be justified by the need to create software programs or applications specifically designed to ensure their efficiency within a platform.[134] The simultaneous development of applications for several platforms,[135] facilitated by the existence of technical intermediaries,[136] is not necessarily beneficial to consumers in terms of how the final product will be designed.[137]

In short, closed platforms should not be condemned *per se*,[138] nor can it be assumed that open platforms only produce pro-competitive effects.[139] It is

131. Jason Kincaid, *Google Responds to Android Malware, Will Fix Infected Devices and 'Remote Kill' Malicious Apps*, TECHCRUNCH (Mar. 5, 2011), https://techcrunch.com/2011/03/05/android-malware-rootkit-google-response/ [https://perma.cc/M4R7-TS4K] ("58 malicious applications were uploaded to Android Market, and that they were downloaded onto around 260,000 devices.").

132. *See* Kaiser, *supra* note 78, at 91.

133. *See generally id.*

134. *The Economics of Open and Closed Systems*, FRENCH COMPETITION AUTH. & COMPETITION & MKTS. AUTH. 31 (Dec. 16, 2014), https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/387718/The_economics_of_open_and_closed_systems.pdf [https://perma.cc/BJ8E-LDEX].

135. *See id.*

136. *See Middleware*, BARRON'S BUSINESS DICTIONARIES: DICTIONARY OF COMPUTER AND INTERNET TERMS (11th ed. 2013) (stating that technical intermediation is provided by middleware, which serves as a communication intermediary between several applications).

137. *See* Michael L. Katz & Carl Shapiro, *Systems Competition and Network Effects*, 8 J. ECON. PERSPECTIVES 93, 95 (1994); *see also* Joseph Farrell & Philip J. Weiser, *Modularity, Vertical Integration, and Open Access Policies: Towards a Convergence of Antitrust and Regulation in the Internet Age*, 17 HARV. J. LAW & TECH. 85, 99 (2003).

138. Several authors underline that the closed nature of a network *cannot* be challenged, in particular, because of the presence of intellectual property rights which confer the right to maintain it. *See* HOVENKAMP ET AL., *supra* note 109, at § 12.03.

139. *See id.*

necessary to study all practices taking place on these platforms and not to condemn them wholesale, or even to postulate their anticompetitive effect.[140]

b. Content Integration Within Platforms

The integration of content—being understood as any information or software—is generally analyzed under the legal concept of tying.[141]

In the *Intel* case,[142] the company emphasized the need to distinguish technological ties from integrating one product into another.[143] The company argued that the former was achieved through the joint sale of two distinct products, while the latter resulted from the integration of one product.[144] In fact, the distinction between these two practices is not an easy one because technological tying can be achieved by integrating one product into another, for instance, by integrating an Internet browser into the source code of an operating system.[145] Regardless of this distinction, it is necessary to analyze the pro- or anticompetitive character of strategies falling within that scope.[146]

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140. *See id.*

141. *See* Two-Sided Markets, *supra* note 69, at 175. Also note the following:

> Tying can be a very effective mechanism through which a dominant firm in a related market can penetrate one side of the two-sided platform to gain an advantage in competition for the other side. Both Rochet and Tirole (2003) and Choi (2004), however, are tailored to analyze specific cases of the payment card and media software industries, respectively. It would be desirable to develop a unified and more general framework that can encompass a variety of two-sided platform situations.

Id.

142. Commission Decision No. COMP/M.5984, (*Intel/McAfee*) of 26 Jan. 2011, 120.

143. *See id.*

144. *Id.* Also note the following:

> Lastly, according to Intel, there is an important distinction to be made between technical tying (which is making inseparable products that can equally function separately) and product integration (which is integrating products to improve their global performance). According to Intel, while it has never engaged in technological tying, it has integrated new functionalities into its microprocessors and chipsets, whereby bringing substantial improvements in terms of performance, functionality or reduction of costs for its customers.

Id.

145. *See id.*

146. *See id.*

i. A Pro-Competitive Foreclosure Effect

The integration[147] of software programs—or application—into a platform is sometimes described as being predatory.[148] This type of practice, illustrated by the European Microsoft case, is said to have the effect of foreclosing competitors because dominant company enjoys an essential facility with its platform.[149]

Several authors[150] have stressed, however, that it may be in a company's and consumers' best interest to integrate a product into another because it saves labor for the user, generates economies of scale, and allows anticipation of technical problems.[151] Moreover, unlike the traditional foreclosure effect, the integration of one software program within a platform does not have the systemic effect of eliminating competitors.[152] And even if an eviction does arise, it results ineluctably from a natural competition process by which the company holding the platform has won the approval of its users.[153]

In fact, if an embedded software program has poorer performance than a competing product, it is not established that consumers would keep the first software program available to him—just look at how many users actually use QuickTime on their Mac.[154] Transfer costs almost never prove to be strong enough to lock a user into an inferior technology.[155] Platform owners must

147. *See* Jonathan Jacobson et al., *Predatory Innovation: An Analysis of* Allied Orthopedic v. Tyco *in the Context of Section 2 Jurisprudence*, 23 LOY. CONSUMER L. REV. 1, 9 (2010) (noting the existence of two types of integration, those aimed at improving the product and those aimed at locking the consumer).

148. *See* Kaiser, *supra* note 118, at 97.

149. *See* Roberto Pardolesi & Andrea Renda, *The European Commission's Case Against Microsoft: Kill Bill?*, 27 WORLD COMPETITION & ECON. REV. 513, 541–44 (2004).

150. Kevin M. Murphy, *Economic Perspectives on Software Design: PC Operating Systems and Platforms*, *in* MICROSOFT, ANTITRUST AND THE NEW ECONOMY: SELECTED ESSAYS (2002).

151. *See* Rey et al., *supra* note 97.

152. It can be used for a subsequent increase in prices, what Jean Tirole stressed in one of its contributions to economic literature. Such an increase cannot, however, be sanctioned under predatory innovation as it intervenes in a second phase and on issues that are outside the definition of predatory innovation. *See id.* at 21.

153. *See id.*

154. *See After 20 Years, is QuickTime Still Relevant for the Web?*, PINGDOM ROYAL (Jan. 3, 2012), http://royal.pingdom.com/2012/01/03/after-20-years-is-quicktime-still-relevant-for-the-web.

155. *See* WILLIAM H. PAGE & JOHN E. LOPATKA, THE MICROSOFT CASE: ANTITRUST, HIGH TECHNOLOGY, AND CONSUMER WELFARE (2007).

then be free to alter their platform, according to ownership principles.[156] In short, software integration within a platform is not—and should not be recognized as—anticompetitive *per se*.[157]

ii. Illustration with the Microsoft Case

Microsoft's decision to integrate its Windows Media Player into its operating system cannot be labeled as anticompetitive *per se* as long as its users are free to download competing software.[158] In this case, Microsoft consumers actually benefited from a multimedia software program without having to engage any cost.[159] It undoubtedly had a pro-competitive advantage, which should have prevented the sanctioning of the practice, whether or not network effects were otherwise created.[160] In fact, all network effects potentially created as a result of this practice were annihilated as soon as Microsoft users decided to use an alternative software program.[161] Condemning such a practice is similar to condemning the holder of telecom infrastructure for offering a phone subscription service.

Vigilance, however, remains necessary. Courts must be cautious when a company owning the platform, in addition to integrating software, also implements other practices whose only effect is anticompetitive.[162] In the Microsoft example, by eradicating a feature that allows removing the internet browser from the operating system, and by programming the system so as to bug when certain browser-related files are deleted, the company certainly engaged in predatory innovation.[163] This case then illustrates the need to distinguish different practices that may appear as one.[164]

2. Practices Falling Within the Scope of Predatory Innovation

One author notes that the frequency of predatory innovation tends to be amplified when the interests of platform owners diverge from those of content developers.[165] The dichotomy the author has introduced indicates two

156. *See* Kaiser, *supra* note 78, at 105.

157. *See id.* at 102–03.

158. *See id.*; *see also* Toshiaki Takigawa, *A Comparative Analysis of U.S., EU, and Japanese Microsoft Cases: How to Regulate Exclusionary Conduct by a Dominant Firm in a Network Industry*, 50 Antitrust Bull. 237, 245 (2005).

159. *See* Takigawa, *supra* note 158, at 259.

160. *See id.* at 257.

161. *See id.* at 245.

162. *See, e.g.*, Spencer Weber Waller, *Microsoft and Trinko: A Tale of Two Courts*, 2006 Utah L. Rev. 741, 751 (2006).

163. *See id.* at 744.

164. *See id.*

165. Weiser, *supra* note 80.

types of such strategies. Some involve a change of platform type, causing a competitive harm. Others, also labeled as *products redesign*, imply the modification of a product in a way to remove compatibility. Again, all practices of this kind are not to be condemned wholesale, and it is therefore required to delimit their perimeter.

a. Changing Platform Type

Changing the type of platforms[166] may create a window for implementing an anticompetitive strategy.[167] As a reminder, open platforms imply that all technical specifications are publicly available, without restriction of access or implementation.[168] They also allow the development of compatible software by third parties.[169] Conversely, closed platforms let their creators control the available content.[170] The development of compatible software can thus be prevented.[171]

The author then proposes to study all platforms alteration strategies whose effects can be pro- and/or anticompetitive. In more details, the alteration of a closed platform into an open platform seems *a priori* pro-competitive,[172] but the transformation of an open platform into a closed one is more contentious, the effects of such strategies being composite.[173]

i. From a Closed Platform to an Open Platform

1. Antitrust Issues

A platform can be changed in two ways: from an open one to a closed one, or vice versa. In the first case, a company may choose not to ensure any compatibility between its operating system and software programs developed by third parties.[174] In the second one, the company may decide to open its

166. For an examination of all possible ways to open or close a platform, see generally THOMAS R. EISENMANN ET AL., OPENING PLATFORMS: HOW, WHEN AND WHY? (Annabelle Gawer ed. 2009).

167. HOVENKAMP ET AL., *supra* note 109, at "*Altering Existing Interfaces*".

168. *See* discussion *supra* Part II.B.i.b.

169. *See* Rosenberg, *supra* note 115; Lemley & McGowan, *supra* note 114, at 741. Nevertheless, open platforms seem less likely to be the subject of anticompetitive strategies. *See* Baskin, *supra* note 114, at 1738; *see also* Seltzer, *supra* note 106, at 932; *see also* Schallop, *supra* note 114, at 241 (noting the two advantages of open source: social and utilitarian).

170. *See supra* note 123 and accompanying text.

171. *See supra* note 125 and accompanying text.

172. Baskin, *supra* note 114; *see also* Gal, *supra* note 101, at 478.

173. Baskin, *supra* note 114.

174. *The Economics of Open and Closed Systems*, *supra* note 134, at 27.

operating system so that third parties can offer compatible software programs for sale.

While the European and North American doctrines seem—at the moment—to bear little significance to the anticompetitive strategies which may be nested[175] in such transformation of the platform type, real problems may arise in terms of antitrust law.[176]

Professors Katz & Shapiro have stressed that opening a platform could have the effect of harming competing platforms.[177] The existence of network effects may imply a strong competition between closed systems.[178] Opening a platform may then reduce competitive pressure on the market.[179] Moving a closed to an open platform seems, as a result, to be anticompetitive in certain cases,[180] but it is necessary to have a closer look.

2. Different Strategies

The opening of a platform may be total or partial.[181] In the first case, a company may want to set off competitive damages at several levels.[182] Suppose that a company, named A, decides to entirely open its platform. Also assume that this platform was partially closed until then, meaning that company A controlled what software was available on it. Suppose further that the platform is popular and that one of the direct effects of opening is a drastic increase in the number of applications and software programs available on the platform.

Several consequences should be discerned. First, network effects will be ineluctably increased, to the detriment of competing platforms.[183] Second, the opening of the platform may have the effect of reducing the market shares of

175. Some authors even argue that an open platform cannot feature *any* competitive risk. *See* Giovanna Massarotto, *Open Source Paradigm: Beyond the Solution to the Software Patentability Debate*, 15 J. MARSHALL REV. INTELL. PROP. L. 647, 675 (2016).

176. Matt Asay, *Open Source as an Antitrust Strategy*, CNET.COM, http://www.cnet.com/news/open-source-as-an-antitrust-strategy (last visited Nov. 2, 2009).

177. *See* Michael L. Katz & Carl Shapiro, *Technology Adoption in the Presence of Network Externalities*, 94 J. POL. ECON. 822 (1986) (noting that the choice to create a closed platform is the fruit of hard thinking).

178. *Id.*

179. *Id.*

180. *Id.*

181. EISENMANN ET AL., *supra* note 166, at 131–32.

182. *See* Gal, *supra* note 101, at 469, 474–75.

183. Mikołaj Czajkowski & Macieh Sobolewski, Switching Costs and Network Effects—How Much Do they Really Matter in Mobile Telecommunications? (U. of Warsaw, Working Paper No. 29/2013 (114), 2013).

a competing company, called B, which is selling compatible software.[184] Company B may suddenly face increased competition on its core market, forcing it to reduce its selling price.[185] If B is also selling a competing operating system, the opening of the platform may then create a foreclosure effect[186] beneficial to A on its core market.

Meanwhile, in such a situation, consumer welfare will nevertheless be increased. The programming of more software—to the detriment of B—is a salutary competitive process that should not be condemned. Some of the effects created by this practice are thus pro-competitive, which is typically true when a company entirely opens its platforms because the company is changing its business model for the benefit of certain consumers. As a result, the total opening of a platform should not be considered as a violation of antitrust law.

The case of a platform partial opening may be more problematic. Imagine that a dominant company chooses to move from a closed platform—in which it controls the content—to a semi-open platform—in which it reserves the right to accept third-party content, or to reject it. One understands here that the dominant company may want to accept the software/applications of small companies—in order to increase the overall utility of its platform—and to refuse the software/applications of bigger companies that may compete with it in other markets. Consequently, if the dominant company designs its platform to create technical incompatibility with the products of strong competitors for unjustified reasons, the partial opening of the platform *may* have an anticompetitive effect which should be condemned under the label of predatory innovation.

ii. From an Open Platform to a Closed Platform

A company owning an open platform may decide to shift it into a closed system, whether it is for pro-competitive reasons or to lock the market.[187] The probability that anticompetitive effects will be created is, in fact, more serious than when the opposite change is made.[188] Judges must then assess whether such a change is justified by an economic reason—other than the anticompetitive effects to eliminate competition.[189]

184. EISENMANN ET AL., *supra* note 166, at 131.

185. *Id.*

186. *See* Gal, *supra* note 101, at 485–86 (describing a variant of this strategy).

187. *The Economics of Open and Closed Systems*, *supra* note 134, at 20; *see also* Baskin *supra* note 114.

188. *The Economics of Open and Closed Systems*, *supra* note 134, at 21–24.

189. *Id.*

1. Pro- and Anticompetitive Reasons Explaining Such a Change

A recent joint report of the French Competition Authority and the Competition and Markets Authority lays out six reasons why a company might want to close its platform.[190] The first reason is to protect its core business. A company operating in the market of software may use its experience as a springboard to ultimately compete with a dominant firm in the market of platforms.[191]The second reason is that the owner of a platform may want to lock one of its faces in order to strengthen a dominant position on the other.[192] For instance, a company may want to close down its users' faces "by preventing them from transferring their data to another platform in order to increase its market power on the sellers" side.[193] Also, a wrapping strategy may aim at reinforcing the company's presence on as many sides as possible in order to encourage its users to use them all.[194]

The report states that the third reason is that the company may wish to close its platform in order to reduce competition on the market of compatible products.[195] The goal here is to eliminate competition from products that can be used independently of the system.[196] The fourth reason is that, to the extent that the price on the platform is regulated and remains below the one maximizing the profits of the dominant firm while the price of components is not, the latter may want to close the components market in order to realize additional profits.[197]The fifth reason is that software and application developers may ask for a license at the most competitive price from a platform owner, which may result in monopoly profits loss.[198] Closing the platform may resolve this problem.[199]

The sixth and last reason is price discrimination. The owner of a platform may wish to practice on its users depending on how they use its platform.[200] A closed system is indeed required to impose a higher price on the users who are using its platform the most.[201] These various anticompetitive reasons tend to explain why a platform owner might want to close its plat-

190. *Id.* at 25.

191. *Id.*

192. *Id.*

193. *Id.*

194. *The Economics of Open and Closed Systems*, *supra* note 134, at 25.

195. *Id.*

196. *Id.*

197. *Id.*

198. *Id.*

199. *Id.*

200. *The Economics of Open and Closed Systems*, *supra* note 134, at 25.

201. *Id.*

form.[202] In these different cases, the company would be implementing a practice of predatory innovation and should be sanctioned accordingly.

But the transition from an open platform to a closed platform may also cause heavy losses to the company implementing it. Suppose that a company, named APL, decides to close its mobile operating system, called *iOC*, to all third parties. All mobile applications developed by third parties would in fact become incompatible with the *iOC*. It goes without saying that it would be impossible for this company to recreate millions of application users available on its platform before it was closed. In this case, mending an open platform into a closed one would cause enormous damages that the company could certainly not offset over the long run. It is then essential for judges to take into consideration all reasons that may lead a company to make such a change, for instance, by considering that if a company takes the risk of doing so, a valid economic reason may justify it. Such reasons are in fact numerous. They can lie, for instance, in the need to increase security, or to allow a more fluid use of the platform, or even to control the content in order to avoid negative externalities.[203]

2. The Effects of Such Mutation

Moving from an open to a closed platform can affect all software and applications operable on it, but it can also affect other platforms.[204] There are, in fact, different ways for a company to close its platform, which create different effects.[205]

In the first hypothesis, a dominant firm may affect compatible software and applications by intentionally seeking, by technical means, to forbid its competitors from accessing it.[206] But the platform closure may also result from the regular introduction of a product's new versions creating indirect incompatibility with competing products.[207] The report of the French Competition Authority and the Competition & Markets Authority finally underlines the possibility that the incompatibility may result from contractual arrange-

202. EISENMANN ET AL., *supra* note 166, at *Abstract* ("At the platform provider and sponsor levels, these decisions entail: 1) interoperating with established rival platforms; 2) licensing additional platform providers; or 3) broadening sponsorship. With respect to end users and complementors, decisions to open or close a mature platform involve: 1) backward compatibility with prior platform generations; 2) securing exclusive rights to certain complements; or 3) absorbing complements into the core platform.").

203. *The Economics of Open and Closed Systems*, *supra* note 134, at 27.

204. *Id.* at 13.

205. *Id.*

206. *Id.*

207. *.Id.*

ments.[208] It is the case when purchasing a mobile phone on which no plan can be concluded with third parties.[209]

In the second hypothesis, closing the platform may affect other platforms whenever users of the third party's platform can no longer interact with those of the dominant company.[210] The removal of a competing platform's portability may also cause anticompetitive damages.[211] The closing of the platform can finally result from incompatibility with other platform components.[212]

Several examples corroborate how numerous are the ways to close a platform. Among the major cases dealing with predatory innovation is the *IBM* case in which a company had decided to change the type of interface between its computers and hard disks.[213] *Berkey Photo v. Eastman Kodak and C.R. Bard v. M3 Systems* also exposes a similar strategy.[214] It should be noted, however, that to the best of the author's knowledge, no European case falls under this type of predatory innovation. And yet, some recent examples illustrate that such strategies are increasingly common, which proves that antitrust law suffers from not having the necessary tools.

In 2010, Google blocked the automatic export of user data to another website, unless the information can flow back and forth. The company accused Facebook of not allowing data export,[215] the reason why, apparently, it had decided to remove the portability in retaliation.[216]

In 2012, Twitter limited the ability for its users to use multiple applications running on Twitter at the same time.[217] As a reminder, these applications allowed the inclusion of additional features to the service proposed by

208. *Id.*

209. *The Economics of Open and Closed Systems*, *supra* note 134, at 27.

210. *Id.* at 21–24.

211. *Id.*

212. *Id.* at 13.

213. *See* Cal. Comput. Prods., Inc. v. Int'l Bus. Machs. Corp., 613 F.2d 727 (9th Cir. 1979) (rejecting claims that IBM had violated antitrust law by changing the interfaces between its computers and external tape and disk drives).

214. *See* C.R. Bard, Inc. v. M3 Sys., 157 F.3d 1340 (Fed. Cir. 1998); *see also* Berkey Photo, Inc. v. Eastman Kodak Co., 603 F.2d 263 (2d Cir. 1979).

215. Alexei Oreskovic, *Google Bars Data from Facebook as Rivalry Heats Up*, Reuters (Nov. 5, 2010), http://www.reuters.com/article/2010/11/05/us-google-facebook-idUSTRE6A455420101105.

216. The term portability refers to the fact that data can be transferred from one website to another.

217. Ryan Lawler, *Twitter Gives Devs 6 Months to Display Tweets Properly, Use New Authentication and Rate Limits*, TechCrunch (Aug. 16, 2012), http://techcrunch.com/2012/08/16/twitter-gives-developers-6-months-to-properly-display-tweet-use-new-authentication-and-rate-limts/.

Twitter.[218] They can be activated for an unlimited period. It may happen, as a result, that the limitation of these applications number was aimed at preventing these apps that could become essential and compete with the initial functionalities proposed by Twitter.[219]

In 2012, Facebook prevented its users from sharing their Instagram photos—which it had just acquired—on Twitter.[220] As a reminder, Instagram is a social network allowing the sharing of photographs. Once a photo is published, the user can choose to share it on other social networks that are not specialized in photographs sharing.[221] It seems that the rivalry between Twitter and Facebook in this market has led the latter to prevent the photos published on Instagram from being shared on Twitter.[222]

In 2013, Facebook prevented all iPhone game developers from using virtual currencies other than its own.[223]

In 2016, Instagram blocked an application called Being which allowed its content to be read without having to use Instagram.[224] Instagram intended to prevent its users from accessing its service through a third-party application that would allow accessing its content for obvious reasons linked to advertising revenues.[225]

Each of these practices meets the criteria of predatory innovation. Nevertheless, a case-by-case analysis would have been necessary in order to assess whether or not a technical justification was provided, and thus, whether the company should have been convicted or not. Irrespective of the verdict that each of these cases may have received, it shows that many practices meet the criteria for predatory innovation.

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218. *Id.*

219. *Id.*

220. Leena Rao, *Instagram Photos Will No Longer Appear in Twitter Streams at All*, TechCrunch, https://techcrunch.com/2012/12/09/it-appears-that-instagram-photos-arent-showing-up-in-twitter-streams-at-all (last visited Dec. 9, 2012) ("Last week, Facebook-owned Instagram decided to turn off support for Twitter Card functionality for its photos. Basically, you would no longer see the full images; rather, you'd see a cropped version.").

221. *Id.*

222. *Id.*

223. Ron Knox, *Facebook Fires Back at Monopoly Accuser*, Global Comptetion Rev. (Oct. 21, 2013), http://globalcompetitionreview.com/article/1058126/facebook-fires-back-at-monopoly-accuser.

224. Sarah Perez, *Instagram Kills Newly Launched 'Being' App, Which Saw 50K Downloads Its First Week*, TechCrunch (Mar. 9, 2016), https://techcrunch.com/2016/03/09/instagram-kills-newly-launched-being-app-which-saw-50k-downloads-its-first-week.

225. *Id.*

b. Product Modification to (Partially) Remove Compatibilities

i. Specificities Associated with This Type of Predatory Innovation

Product interoperability is often described as the ability to exchange information and to use this information.[226]

The modification of software or application can fulfill similar objectives to those exposed to the change of platform type. Amending product interoperability may affect a competitor in the same market. This would be the case if PCs were suddenly incompatible with Macs or a competitor in a downstream market—for instance, when audio speakers are suddenly incompatible with Macs.

There is, however, a specific characteristic of this type of predatory innovation: the potential changes in the product are less a matter of an overall philosophy than it is for the choice of an open or proprietary platform.[227] Many companies justify their choice to offer an open platform because this encourages sharing and a *free* world in which the concept of computer ownership is forsaken for the benefit of the community which is free to develop various software programs or applications.[228] Such motivation is much less common regarding software development insofar as they are not intended to allow other applications to operate on it.

On the contrary, such a modification aims at changing a product's functioning so that its interaction with other products is improved, or deteriorated in the case of a strictly anticompetitive practice. The possible economic justification for this type of predatory innovation is related to short-term efficiency.[229]

This type of predatory innovation also involves cheaper and faster changes than for mutations in the platform type. Removing wireless technology from an electronic device may result, for instance, from the elimination of a single line of computer code, unlike the change of platform type that requires entirely new global settings.[230] In other words, this type of practice implies a lower cost than altering a platform, which tends to escalate its implementations.

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226. *See Interoperability*, WIKIPEDIA, https://en.wikipedia.org/wiki/Interoperability [https://perma.cc/RW2C-KR6J] (last visited Sept. 23, 2017).

227. *Id.*

228. *See Open and Closed Systems in Social Science*, WIKIPEDIA, https://en.wikipedia.org/wiki/Open_and_closed_systems_in_social_science (last visited Sept. 4, 2018).

229. *See Interoperability*, *supra* note 226.

230. *Id.*

ii. The Various Concretizations of Such Strategy

Such a predatory innovation may aim at *removing* a product function. It could be, for instance, when files generated by one product cannot be executed on another product.

Predatory innovation can also result from *changing* the functionality of a product. For instance, a phone manufacturer may decide to change the wireless communication mode of its devices, from Bluetooth to Wi-Fi. The wireless communication functionality is maintained, but the latter is modified so that the compatibility with a competitor product is eliminated. As a result, wireless speakers using Bluetooth technology will be incompatible for the benefit of a dominant company, which will be able to increase the sales of its own Wi-Fi speakers.

Such a strategy of predatory innovation can finally result from *adding* a frivolous function to a product. A company may decide to allow its users to execute an abandoned programming language. It can, as a result, require all compatible products to allow the execution of that language, because some compatible software may then require its use. In such a situation, compatibility with competing products could be eliminated on the grounds that they do not allow the execution of an additional programming language which is obsolete.

These different strategies of removing, changing or adding functionalities have recent manifestations. The *Intel*[231] and *iPod iTunes Litigation*[232] cases are two examples illustrating the antitrust issue of removing direct interoperability with competitor products.[233] And many other examples also testify the regular occurrence of such practices.[234]

Predatory innovation practices, besides the fact that they are numerous, may also take many forms that this study profiles into two main categories. The utility of the author's dichotomy is intended to allow the identification of these practices whose forms evolve along with technological evolution. To seek listing every single one of them would be unsuccessful, the reason why it is of particular importance to have the tools for identifying them when necessary.

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231. FED. TRADE COMM'N, STATEMENT IN THE MATTER OF INTEL CORPORATION, FTC Docket No. 9341 (Dec. 16, 2009).

232. Apple iPod iTunes Antitrust Litig., 05-CV-0037 YGR, 2014 WL 4809288, at *2 (N.D. Cal. Sept. 26, 2014).

233. Some less well-known cases concern the same issues in which the dispute was defined as such. *See In re* Keurig Green Mountain Single-Serve Coffee Antitrust Litigation, 24 F. Supp. 3d 1361 (J.P.M.L. 2014); *see also* Arminak & Associates, Inc. v. Saint-Gobain Calmar, Inc., 789 F. Supp. 2d 1201 (C.D. Cal. 2011).

234. *See* New York v. Microsoft Corp., 224 F. Supp. 2d 76, 96 (D.D.C. 2002), *aff'd,* 373 F.3d 1199 (D.C. Cir. 2004); *Apple*, 2014 WL 4809288, at *1.

The damages caused by many practices on the economy must lead antitrust law specialists to develop a legal regime that addresses predatory innovation. The need to recognize a specific regime for these practices seems to be indisputable insofar as current antitrust rules do not make it possible to apprehend these practices without creating judicial errors. The implementation of a specific regime will thus increase firms' legal certainty while giving judges the ability to impose clear-cut decisions. As a consequence, such a regime does not lead to *more* sanctions, but on the contrary, it leads to *better* sanctions. It will strengthen "free markets"—by allowing companies to compete on nonfrivolous innovations—which is the only driving force not impeding with innovation in opposition to interventionism.

III. THE NEED FOR AN AUTONOMOUS LEGAL REGIME FOR PREDATORY INNOVATION

Legal categories are tools that reflect the objectives assigned to antitrust law,[235] the reason why legal qualification given to predatory innovation is essential.

Numerous legal decisions, from the United States and Europe, apprehend predatory innovation practices using the legal rules of tying.[236] More precisely, the concept of *technological tying* is often used to analyze certain practices of predatory innovation. Yet, these two notions must be separated from one another. The need to create a coherent legal regime implies the creation of some legal rules dedicated to predatory innovation. It would eventually imply to remove the teetering concept of *technological tying* so as

235. Nicholas Economides & Ioannis Lianos, *The Elusive Antitrust Standard on Bundling in Europe and in the United States in the Aftermath of the Microsoft Cases*, 76 ANTITRUST L.J. 483, 486 (2009) ("Antitrust categories are not just analytical tools. They also reflect the objectives and underlying premises of the entire competition law system."); *see also* Charles M. Gastle & Susan Boughs, *Microsoft III and the Metes and Bounds of Software Design and Technological Tying Doctrine*, 6 VA. J.L. & TECH. 1, 1 n.113 (2001) (noting that, on the issue of which objectives to assign antitrust law, some authors argue that it should pursue economic efficiency, it is called *consumer welfare*, while some others, defending *total welfare*, assign the protection of many more parameters, such as employment); OLIVIER FRÉGET, LA CONCURRENCE, UNE IDÉE TOUJOURS NEUVE EN EUROPE ET EN FRANCE 14–15 (Odile Jacob ed. 2016) (arguing that antitrust law has a social purpose, not an economic one; talking about "economism" to denounce the fact that economic theories take an increasingly important place in antitrust law to the detriment of legal concepts); Daniel A. Crane, *Antitrust and Wealth Inequality*, 101 CORNELL L. REV. 1171, 1228 (2016), ("[A]ntitrust law is generally ill positioned to describe how the pie is allocated or to prescribe how it should be allocated[.]").

236. Jean Tirole, *The Analysis of Tying Cases: A Primer*, 1 COMPETITION POL. INT'L 1, 2 (2005).

to create, instead, a more coherent legal regime that could be understood by business leaders without creating type I or II errors.[237]

In short, the author intends to answer two questions: Is *technological tying* recognized by courts as being independent from *general tying*? The author demonstrates the great deal of ambiguity surrounding this issue.[238] But then, even by supposing that a legal regime should be created for technological tying, will it be good enough to address entirely the question of predatory innovation? The answer the author gives is straightforward: no, it is not.[239]

A. Similarity and Disparity Between Predatory Innovation and Technological Tying

Professor Bosco has underlined how difficult it is to redefine the legal framework, asking, "is there ever a real change for legal concepts?" and adding, "will they be tomorrow fundamentally different from what they are today? The author has reasons to believe they will never be really new nor truly remodeled to the point of showing a new face."[240]And yet, it is essential to reconsider several of them, including *technological tying.* The author will then recall its perimeter in order to identify its similarities with the notion of predatory innovation.

1. The Legal Regime of (Technological) Tying

In both the United States and Europe, the concept of tying has been the subject of extensive case law.[241] The same statement cannot be made regarding the concept of *technological tying*—also said *technical tying*.

a. The General Rules of Tying

i. Its Mechanism

Tying practices consist of offering two distinct products (the tying and the tied products) in one batch.[242] Ties may result from the specific character-

237. As a reminder, type I errors, also called "false positive," reflect the fact that a judge or a competition authority condemns an undertaking for having implemented one or more practices which, in reality, are not anticompetitive. Conversely, type II errors, also called "false negative," reflect the fact that a judge or a competition authority decides not to condemn a company which has implemented one or more practices which are in fact anticompetitive.

238. Tirole, *supra* note 236, at 3.

239. *Id.*

240. David Bosco, *Regards sur la Modernisation de L'Abus de Position Dominante*, Les Petites Affiches (Fr.), n 133, July 2008, at 14.

241. *See Google Ngram Viewer*, *supra* note 21 (indicating that tying is the trendiest of Article 102 TFEU and Section 2 Sherman Act anticompetitive categories).

242. Consolidated Version of the Treaty on the Functioning of the European Union art. 102, Sept. 5, 2008, 2008 O.J. (C 115) 89 ("[M]aking the conclusion of

istics of the product (a pair of shoes is usually sold with laces), a contractual bond (the obligation to contract an insurance when buying a car), or an integrated design (as may be the integration of an internet browser within an operating system).[243]

While it is widely acknowledged that ties are usually pro-competitive,[244] courts have stressed over the years that tying may also produce anticompetitive effects.[245] In fact, North American judges were the first to use a four-step test to determine whether a tie should be condemned or not.[246] They analyzed:

(1) the existence of a dominant position in the tying product market;
(2) the existence of a separate product for which exists an autonomous demand;
(3) the impossibility of buying one of two products without buying the other;
(4) the existence of competition distortion in the tied product market.[247]

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contracts subject to acceptance by the other parties of supplementary obligations which, by their nature or according to commercial usage, have no connection with the subject of such contracts.").

243. J. Gregory Sidak, *Do Free Mobile Apps Harm Consumers?*, 52 SAN DIEGO L. REV. 619, 623 (2015).

244. *See* Sarita Frattaroli, Note, *Dodging the Bullet Again: Microsoft III's Reformulation of the Foremost Technological Tying Doctrine*, 90 B.U.L. REV. 1909, 1913 (2010); *see also* Richard J. Gilbert & Michael H. Riordan, Product Improvement and Technological Tying in a Winner-Take-All Market 4 (Oct. 13, 2003) (unpublished manuscript), http://www.jftc.go.jp/cprc/discussionpapers/h17/index.files/CPDP-17-E.pdf (noting that tying can also harm the company which is implementing it by removing its ability to exploit the benefit of a superior compatible product).

245. *See* Alan Devlin & Michael Jacobs, *Anticompetitive Innovation and the Quality of Invention*, 27 BERKELEY TECH. L.J. 1, 16 n.82 (2012) (intra-brand ties are one of the last practices condemned in theory under a *per se* rule, although the legal regime applied by the courts is actually more complex); *see also* Kaiser, *supra* note 78, at 95 n.38; *see also* Tirole, *supra* note 236; *see also* R. Preston McAfee et al., *Multiproduct Monopoly, Commodity Bundling, and Correlation of Values*, 104 Q.J. ECON. 371, 372 (1989) (on the interest companies have to implement anticompetitive strategies); *see also* Stefan Stremersch & Gerard J. Tellis, *Strategic Bundling of Products and Prices: A New Synthesis for Marketing*, 66 J. MARKETING 55, 57 (2002) (indicating that the anticompetitive interest of these practices is reinforced by studies on consumer behavior when confronted to pure tying practices).

246. Jefferson Parish Hospital District No. 2 v. Hyde, 466 U.S. 2 (1984).

247. *Id.*

This four-step test, as defined by North American jurisprudence, frames the notion of tying which cannot be used to appreciate practices outside of its own scope.[248]

European courts apply the same test but they add a fifth independent criterion: the lack of objective justification.[249] The guidance on its enforcement priorities in applying Article 82 of the EC Treaty (now 102 TFEU) admits the possibility of proving any *efficiency gains*,[250] even when the first four criteria failed.

ii. Evaluation in North American and European Antitrust Law

In the United Stated, allegations of ties[251] are generally dealt with under Section 1 of the Sherman Act,[252] but several cases illustrate the possibility of using Section 2 of the Sherman Act.[253] It should be underlined, however, that ties are then subjected to a distinct regime from the one of *monopolization.*[254]

In Europe, the concept of tying is subjected to different rules[255] from the ones applied to other predatory practices—which Jean Tirole criticizes[256]—although both ties and predation practices are generally addressed under Arti-

248. Eirik Østerud, *Identifying Exclusionary Abuses by Dominant Undertakings Under EU Competition Law: The Spectrum of Tests*, *in* 45 INTERNATIONAL COMPETITION LAW SERIES 141 (Alastair Sutton ed. 2010).

249. *See* Case T-30/89, Hilti AG v. Comm'n Eur. Cmtys., 1991 E.C.R. 11-1439, at 96; *see also* Case T-83/91, Tetra Pak Int'l v. Comm'n Eur. Cmtys., 1994 E.C.R. 11-755, at 136.

250. Communication from the Commission—Guidance on the Commission's Enforcement Priorities in Applying Article 82 of the EC Treaty to Abusive Exclusionary Conduct by Dominant Undertakings, 2009 O.J. (C 45) 1 [hereinafter Guidance on Comm'n Enforcement Priorities].

251. *See id.* at 7.

252. *See id.* at 6.

253. *See* Kate Wallace, *The Wonderful World of Tying*, A.B.A. 101 PRAC. SERIES (2012), https://www.americanbar.org/groups/young_lawyers/publications/the_101_201_practice_series/the_wonderful_world_of_tying.html. In fact, several texts could be invoked, as noticed by Wallace in her article entitled. *See id.*

254. *See* Maria Lillà Montagnani, *Predatory and Exclusionary Innovation: Which Legal Standard for Software Integration in the Context of the Competition versus Intellectual Property Rights Clash?*, 37 INT'L REV. INTELL. PROP. & COMPETITION L. 304, 325 (2006) (A regime distinct from monopolization is not the case in Europe.).

255. *See* European Commission Press Release, *supra* note 98, at 8 (distinguishing several types of monopolization: exclusive agreements, tied and bundled sales, refusal of supply, and margin compression).

256. *See* Tirole, *supra* note 236, at 3 (defending the idea that the distinction between tying and predation is unjustified).

cle 102 TFEU.[257] European judges have condemned indirect ties in *Hoffmann-Laroche* for the first time.[258] It also results from several cases, including *Hilti* and *Tetra Pak II*,[259] where the evaluation of tying practices is subjected to the rule of reason,[260] even though they are condemned *by object*[261] and without evaluating their *effects*. In short, the rules of general tying are straightforward and result from years of jurisprudence. Such is not the case for technological tying.

b. Technological Tying: Different from General Tying?

i. Its Mechanism

Technological tying involves the simultaneous purchase of two products[262] forced by technical design, or, in other words, the modification of a product so that another one will be tied to it.[263]

257. *See* Montagnani *supra* note 254, at 310; *see also* Comm'n Regulation 330/2010 of April 20, 2010, on the Application of Article 101(3) of the Treaty on the Functioning of the European Union to Categories of Vertical Agreements and Concerted Practices, 2010 O.J. (L 102/1) (guidance on the enforcement priorities in applying Article 82 EC to foreclosure practices by dominant undertakings also deal with the issue of tying; however, it should be noted that ties may also be addressed under Article 101 of the TFEU).

258. *See* Case 85/76, Hoffmann-La Roche v. Comm'n, 1979 E.C.R 461.

259. *See* Case T-30/89, Hilti AG v. Comm'n Eur. Cmtys., 1991 E.C.R. 11-1439, at 96 (cited in the Microsoft case before European courts); Case T-83/91, Tetra Pak Int'l v. Comm'n Eur. Cmtys., 1994 E.C.R. 11-755, at 136 (same). *But see* Benjamin Edelman, *Does Google Leverage Market Power Through Tying and Bundling?,* 11 J. Competition L. & Econ. 365, 368 (2015) (few decisions condemning this practice are available) ("[T]he European Commission has issued few decisions concerning tying. Best known is its 2004 finding that Microsoft abused its dominant position in the PC OS market by tying Windows with Windows Media Player (WMP)."); *see also* Pablo Ibáñez Colomo, *Beyond the 'More Economics-Based Approach': A Legal Perspective on Article 102 TFEU Case Law*, 53 Common Mkt. L. Rev. 4, 12 (2016).

260. *See* Bosco, *supra* note 240, at 11.

261. *See* Colomo, *supra* note 259, at 12.

262. *See* Yanos Bakos & Erik Brynjolfsson, *Bundling Information Goods: Pricing, Profits, and Efficiency*, 45 Mgmt. Sci. 1613, 1614 (1999) (as may be the case, for instance, when a company decides to change the connections of its devices in order to force the consumer to buy its product, such as the charger, the video cable).

263. *See* Frattaroli, *supra* note 244, at 1916 ("Technological tying is a functional form of tying where a firm designs a product so that it functions only when used with a complementary product.").

This type of strategy occurs when a dominant company designs a product in a way to force its consumer to buy another product.[264] This can be done by refusing to set up means for interconnection or by integrating products into one.[265] It may also happen when the external design of a product creates incompatibility with competing products, for instance, when a dominant firm modifies its software to force its consumers to purchase its software.[266]

ii. The Need to Define a Separate Legal Regime for General Tying

In the United States, the concept of technological tying was used in various proceedings against Microsoft.[267] Part of the doctrine argued that the regime for general tie could have been applied to technological matters, thus denying the need to create a separate regime for technological ties.[268] Another part of the doctrine, supported by several courts including the one dealing with these cases, argued for the necessity to apply a distinct regime for these two types of ties.[269]

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264. *See* Gastle & Boughs, *supra* note 235, at 25.

265. Acuna-Quiroga, *supra* note 34, at 15 ("The term technological tying is used to describe alterations to product design in order to render complementary products no longer compatible or unnecessary, either by denying means to interconnect or integrating former individual products. As a result of these variations a firm may leverage its dominance in one market to the market for complementary products or to the new market created for the new, integrated product.").

266. *See* Gastle & Boughs, *supra* note 235, at 25.

267. United States v. Microsoft Corp, 147 F.3d 935, 946 (D.D.C. 1998); Caldera Inc. v. Microsoft Corp., 72 F. Supp. 2d 1295, 1297 (Utah Dist. Ct. 1999); United States v. Microsoft Corp, CIV. A. 98-1232 TPJ, 1999 WL 1419040, at *1 (D.D.C. Dec. 20, 1999); United States v. Microsoft Corp, 87 F.2d 30, 35 (D.D.C. 2000).

268. *See* Einer Elhauge, *Tying, Bundled Discounts, and the Death of the Single Monopoly Profit Theory*, 123 HARV. L. REV. 397, 447 (2009).

269. *See* Response of Carolina, Inc. v. Leasco Response, Inc., 537 F.2d 1307, 1327 (5th Cir. 1976); *see also* David S. Evans & Richard Schmalensee, *Some Economic Aspects of Antitrust Analysis in Dynamically Competitive Industries*, 2 INNOVATION POL'Y & ECON. 1, 37 (2002) (noting that the Jefferson Parish held that a *per se* test should be applied: "[i]t is far too late in the history of our antitrust jurisprudence to question the proposition that certain tying arrangements pose an unacceptable risk of stifling competition and therefore are unreasonable 'per se.'" (quoting Jefferson Par. Hosp. Dist. No. 2 v. Hyde, 466 U.S. 2, 9 (1984)). The author notes that the first judgment in the Microsoft case applied the Jefferson Parish test, however, this test was subsequently dismissed by the D.C. Circuit. *See* David A. Heiner, *Assessing Tying Claims in the Context of Software Integration: A Suggested Framework for Applying the Rule of Reason Analysis*, 72 U. CHI. L. REV. 123, 143 (2005).

In Europe, the treaties[270] and jurisprudence do not address this issue,[271] which tends to confirm the absence of an independent regime for technological tying.[272] The European Commission only makes a reference to it in its guidance on its enforcement priorities in applying Article 82 of the EC Treaty (now 102 TFEU), stressing the following: "The risk of anticompetitive foreclosure is expected to be greater where the dominant undertaking makes its tying or bundling strategy a lasting one, for example through technical tying which is costly to reverse. Technical tying also reduces the opportunities for resale of individual components."[273]

To the best of the author's knowledge, the *Microsoft* case in the General Court of the European Union is the only one expressly referring to the term *technological tying*[274] which was put forward by the company.[275] One analyst also noted that this case gave an opportunity for the European Commission to distinguish between traditional ties and technological ones.[276] By acknowledging the possibility for users to download other media players *via* the internet, the Commission indeed emphasized the need to analyze practical *effects* on competition rather than to recognize illegality *by object* as it does for general ties.[277]

Microsoft challenged this analysis on the ground that the Commission didn't prove the anticompetitive nature of its practice.[278] Its arguments were rejected by the General Court without further clarification, leaving doubt as

270. Consolidated Version of the Treaty on the Functioning of the European Union art. 102, Sept. 05, 2008, 2008 O.J. (C 115) 89.

271. *See* Damien Gerard, *The Effects-Based Approach Under Article 101 TFEU and Its Paradoxes: Modernisation at War With Itself*, *in* TEN YEARS OF EFFECTS-BASED APPROACH IN EU COMPETITION LAW (Jacques Bourgeois & Denis Waelbroeck eds. 2012). Microsoft argued that acknowledging technological ties prevented the application of the classic rules in terms of refusal to sell, evoking Joined Cases C-241 and C-242/91P. RTE and ITP v. Comm'n, 1995 E.C.R. 1-743; *see also* Case C-418/01, IMS Health v. NDC Health, 2004 E.C.R. 1-5039; Case T-201/04, Microsoft Corp. v. Comm'n, 5 C.M.L.R. 11 (2007).

272. *See* Christopher D. David & James F. Ponsoldt, *A Comparison Between U.S. and E.U. Antitrust Treatment of Tying Claims Against Microsoft: When Should the Bundling of Computer Software be Permitted?*, 27 NW. J. INT'L L. & BUS. 448, 451 (2007); *see also* Pardolesi & Renda, *supra* note 149, at 514.

273. *See* Guidance on Comm'n Enforcement Priorities, *supra* note 250, at 53.

274. *See* Case T-201/04, Microsoft Corp. v. Comm'n, 5 C.M.L.R. 11 (2007).

275. It should also be noted that the European Commission refers to the term of "technical tie." *See* Commission Decision No. COMP/M.5984 (Intel/McAfee), slip op. ¶ 221 (Jan. 26, 2011).

276. *See* Østerud, *supra* note 248.

277. *See* Case T-201/04, Microsoft Corp. v. Comm'n, 2007 5 C.M.L.R. 11.

278. *Id.*

to the existence of a truly separate legal regime for technological ties.[279] Because the guidance of 2009 did not enshrine this distinction, its existence is doubtful.

In fact, legal uncertainty appears to have been deliberately maintained around the need to recognize a separate regime for technological tying. But the aim of the author's study is not to determine whether such a regime should be acknowledged, because it would not, in any case, give the courts and antitrust authorities the opportunity to apprehend the whole range of practices, as the author will demonstrate.

2. Apparent Similarities Between Technological Ties and Predatory Innovation

The concepts of predatory innovation and technological tying sometimes involve similar mechanisms which may explain why the label of technological ties actually ousted the one of predatory innovation.[280] Some authors have asked for these two notions to be addressed under the same legal regime, which should not be done.

a. The Visible Similarity of the Two Mechanisms

i. Sanctioning Internal Practices

Legal frameworks for the two practices, technological tying and predatory innovation, intend to punish a company when it implements *internal* practices which aim at restricting competition.[281] In general, antitrust law is more stringent with restrictive practices directly imposed on *third parties*.[282] The notions of technological ties and predatory innovation thus complement the legal arsenal available to judges and authorities in this field.[283]

ii. Two Strategies That Can Be Confused

Literature and jurisprudence clearly distinguish predation strategies from ties.[284] However, it is worth noting these two infringements have a com-

279. Renato Nazzini, *Google and the (Ever-Stretching) Boundaries of Article 102 TFUE*, 6 J. Eur. Competition L. & Prac. 301, 313 (2015).

280. *See* Bosco, *supra* note 240, at 11.

281. Dennis W. Carlton, *The Relevance for Antitrust Policy of Theoretical and Empirical Advances in Industrial Organization*, 12 Geo. Mason L. Rev. 47, 53 (2003).

282. *Id.*

283. *Id.* at 87.

284. *See* Tirole, *supra* note 236, at 19.

mon nature. An author also underlines that most cases generally involve simultaneously some predation, ties, price discrimination and discounting.[285]

The concepts of technological ties and predatory innovation may cover identical practices insofar as they may induce the purchase of two distinct products,[286] the reason why judges sometimes have difficulties distinguishing the two practices. In the *Nespresso* case, for instance, the French Competition Authority characterized the practices as being illegal tying because the company created incompatibility with competing capsules.[287] And yet, the legal uncertainty created by the legal regime of tying—in addition to being imprecise—does not permit the strategy technical nature to be taken into account, which could have been circumvented by applying the legal regime of predatory innovation.

b. The Plea for a Single Legal Regime

i. Defending a Single Legal Regime

Part of the doctrine in the United States argued that ties and predatory practices should be analyzed under the same legal regime on the basis that analyzing predatory innovation in itself would be too complex.[288] This partial renunciation is unlikely to improve antitrust law over the long run. What is well conceived is clearly said and the absence of distinction between these two notions would generate lots of confusion,[289] which would lead to ineffective rulings.[290]

ii. The Concept of Technological Tying is a Charade

Some jurisdictions have recognized the need to distinguish between the two concepts.[291] Moreover, as pointed out by part of the North American

285. Kara E. Harchuck, Note, *Microsoft IV: The Dangers to Innovation Posed by the Irresponsible Application of a Rule of Reason Analysis to Product Design Claims*, 97 Nw. U. L. Rev. 395, 414 (2002).

286. *Id.* at 398.

287. Thibault Schrepel, *Nespresso S'Engage : Le Droit de la Concurrence L'Emporte-t-Il ? Pas Vraiment !*, Revue Concurrentialiste, May 2014, at 2, http://leconcurrentialiste.com/wp-content/uploads/2017/02/nespresso.pdf (Fr.) (stressing that it is not certain that regulating products interoperability encourages companies to invest on the long term, contrary to what was put forward by the French Competition Authority in its *Nespresso* decision).

288. Harchuck, *supra* note 285, at 399.

289. Such confusion was apparent in *United States v. Microsoft Corp.* (*Microsoft II*), 147 F.3d 935 (D.C. Cir. 1998). *See id.* at 409.

290. *See id.* at 437.

291. *Id.* at 409.

doctrine,[292] the risk of type I errors[293] is higher for predatory innovation than it is for tying. It is then appropriate to assign it a proper legal regime so to prevent such legal errors occurrence.[294]

Meanwhile, the concept of tying is used as a charade. Professors Waller and Sag have stressed the following:

> [T]he court tortured existing tying doctrine to carve out a new rule of reason test for software tying in order to not second guess what are separate and new products being unlawfully tied together by a dominant firm and what are new features of existing products that would serve the needs of consumers and promote innovation.[295]

The legal regime for predatory innovation requires addressing these issues. This means that the concept of tying should not be used as a magical trick to hide the inadequate analysis in the field.

Technological tying and predatory innovation have some similar roots, which have led some scholars to argue that the first one should take over predatory innovation. But even assuming that a truly distinct legal regime does exist for technological tying, the fact of the matter is that predatory innovation is broader and generally more complex. An independent legal regime should then be created instead of relying on the one for technological tying.

B. The Absolute Necessity to Acknowledge an Independent Legal Regime

The concept of technological tying is unsuitable to address every predatory innovation practices. Predatory innovation must thus be acknowledged as an autonomous legal concept.

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292. U.S. Dep't of Justice, Competition and Monopoly: Single-Firm Conduct Under Section 2 of the Sherman Act 88 (2008) ("The Department agrees with courts and panelists urging restraint in the area of product design and believes that great caution should be exercised before condemning a technological tie under the antitrust laws. Firms make many decisions about the design of their products, the vast majority of which—including those made by monopolists—raise no competitive concern.").

293. As a reminder, type I errors, also called "false positive," reflect the fact that a judge or a competition authority condemns an undertaking for having implemented one or more practices which, in reality, are not anticompetitive. For an analysis of the risk type I error with predatory innovation.

294. Competition and Monopoly: Single-Firm Conduct Under Section 2 of the Sherman Act, *supra* note 292, at 87; *see* Ronald W. Davis, *The Antitrust Divisions Report on Section 2: Firm Foundation for Enforcement or a Bridge to Nowhere?*, 23 Antitrust 42, 47 (2008) (noting that the DOJ "forgot" to mention predatory innovation in its report on Section 2).

295. Spencer Weber Waller & Matthew Sag, *Promoting Innovation*, 100 Iowa L. Rev. 2223 (2015).

1. The Impossible Applicability of the Legal Regime for Technological Tying

The regime for technological tying is ambiguous, which has the effect of decreasing the level of legal uncertainty. It suffers, besides, from many shortcomings that disqualify it from assessing all predatory innovation practices.

a. The Inaccuracy of the Legal Regime for Technological Tying

i. The Lack of Coordination between European and North American law

The current regime for general tying is not the same in Europe and the United States.[296] Although European judges have taken over the entire four-step test set out in North American jurisprudence, they do so by adding a fifth step regarding the practice justification.[297] The North American test, for its part, does not seem to consider potential efficiencies that a tie is likely to create.[298] Also, as previously indicated, U.S. law distinguishes tying from other practices of *monopolization,*[299] which is not the case for European rules, thus creating an increased level of complexity.

ii. The Occasional Recognition of a Separate Legal Regime for Technological Tying

As the author has demonstrated, the recognition of a specific regime for technological tying is not constant. North American judges, for instance, have refused to recognize the existence of such a legal regime in several cases on the ground that competitors remained free to create products compatible with products of dominant firms.[300] And in any case, even when

296. *See* Montagnani, *supra* note 254, at 329–30 ("[I]n the US, maintaining the distinction causes different standards to be used to assess predatory behaviors: monopolization, on the one hand, and tying, on the other hand (the latter also giving rise to wide debate on the tying being per se legal or illegal or needing a rule of reason approach). Whereas, in the EU, the abuse offense test is common for both contractual and technological tie-ins. This distinction, likely to lead to different outcomes depending on the system under which a tying is assessed.").

297. Economides & Lianos, *supra* note 235, at 519.

298. Montagnani, *supra* note 254.

299. *See generally* Frank H. Easterbrook, *Predatory Strategies and Counterstrategies*, 48 U. CHI. L. REV. 263 (1981) (on the difference between "monopolization" and predatory practices).

300. Suzanne Van Arsdale & Cody Venzk, *Predatory Innovation in Software Markets*, 29 HARV. J.L. & TECH. 243, 253 (2015).

judges have admitted the existence of technological ties, they have not clearly identified a legal regime.[301]

The fact is that dominant high tech companies often have a global strategy.[302] Software, for instance, is distributed in a single version across multiple continents. Applying a different methodology to the same practice, depending on where the trial is brought, may significantly decrease legal certainty. The importance of defining a stable and established methodology for all practices must lead to the creation of an independent legal regime.

b. Deficiencies in the Legal Regime for Tying

i. A Legal Arsenal Overly Discordant

The concept of tying does not cover the same practices in Europe and the United States.[303] The subordination of one product purchase to another, by technical or contractual measures, is sanctioned in both continents.[304] But the European conception of tying also intersects[305] with what the North American jurisprudence sanctions under the label of pure bundling, in which several distinct products are sold together in fixed and unchangeable proportions.[306]

Once again, legal certainty is necessarily reduced because of this terminological confusion, which is also reflected in the regime applicable to these different practices. The Department of Justice and the Federal Trade Commission note that "courts have sometimes analyzed bundling under the rubric of tying,"[307] but this is not typically the case.[308] In *Jefferson Parish*, the Supreme Court ruled that selling identical products together—which is pure bundling—is not anticompetitive and that tying can be condemned if they create a foreclosure effect.[309] According to this jurisprudence, the two no-

301. Evans & Schmalensee, *supra* note 269, at 31; *see also* Gönenç Gürkaynak et al., *Antitrust on the Internet: A Comparative Assessment of Competition Law Enforcement in the Internet Realm*, 14 Bus. L. Int'l 51, 80 (2013) (the legal concept of tied selling is still blurry as underlined).

302. Catherine Prieto & David Bosco, Droit Européen de la Concurrence 1003 (Broché ed., 2013) (Fr.).

303. *Id.*

304. *Id.*

305. Two markets are thus affected insofar as the company seeks to create a leverage effect.

306. In this situation, one market is affected only.

307. U.S. Dep't of Justice & Fed. Trade Comm'n, Antitrust Enforcement and Intellectual Property Rights: Promoting Innovation and Competition 106 (2007) ("[C]ourts have sometimes analyzed bundling under the rubric of tying.").

308. *Id.*

309. Jefferson Parish Hospital Dist. No. 2 v. Hyde, 466 U.S. 2 (1984).

tions benefit from a different legal regime,[310] which is not how European law analyzes them.

It goes without saying that this different interpretation of general tying necessarily leads to a divergence regarding technological tying.

ii. Tying is an Incomplete Legal Arsenal

In the *Microsoft IV* case, the concepts of tying and predatory innovation were mentioned simultaneously.[311] Yet, in North American law, predatory practices are a form of *monopolization*,[312] while ties generally fall under Section 1 of the Sherman Act.[313] The analysis in terms of market shares is necessarily divergent.

There again, case law illustrates the incapacity to apprehend accurately predatory innovation when applying tying rules. Section 1 of the Sherman Act does not require an analysis of the market power, and without establishing such power, it is nearly impossible to prove a company's interest in implementing predatory innovation strategies.[314]

2. Predatory Innovation as an Autonomous Legal Regime

The legal regime for technological tying—by supposing that a clear definition of it actually exists—is inappropriate for two reasons. First, it does not cover all the practices of predatory innovation and may thus lead to the creation of type II errors.[315] Second, even for the practices of predatory innovation that it actually covers, it participates in the creation of type I errors. Conversely, the creation of a legal regime for predatory innovation will make it possible to assess such practices without risking judicial errors which are particularly harmful in high tech markets.

a. The Singularity of Predatory Innovation

Clarifying the legal regime for technological tying will not resolve the equation. As the author has said, technological ties and predatory innovation cover some of the same practices—whenever a company is imposing the purchase of two distinct products—but predatory innovation also covers other practices.[316] For that reason, it is essential to create an autonomous

310. The Jefferson Parish judgment refers to *Times-Picayune Pub. Co. v. United States*, 345 U.S. 594, 605 (1953); *Hyde*, 466 U.S. at 13 (on the separate regime for pure bundling).

311. United States v. Microsoft Corp. (*Microsoft IV*), 253 F.3d 34 (D.C. Cir. 2001) (en banc).

312. Harchuck, *supra* note 288, at 398.

313. *Id.*

314. *Id.* at 426.

315. *See id.* at 408.

316. *Id.*

regime for the notion of predatory innovation so that all practices will be looked from the same angle. As discussed below, four reasons corroborate this need.

i. No Need for Two Distinct Products

Unlike tying, predatory innovation practices do not require the existence of two distinct products.[317] When assessing whether a practice constitutes a tie, it could be incredibly difficult to determine if products A and B are truly distinct from one another.[318] And without proving that they actually are,[319] no sanction may be imposed, even if an anticompetitive practice required so.[320]

Two authors have also underlined that the product separability test is more stringent in the United States than it is in Europe.[321] A company may prove in the United States that two products are more efficient when sold together and as a result, they will be considered as being a single product.[322] Such a mechanism is not allowed in Europe.[323]

In fact, the necessity to prove the existence of two distinct products may lead judges not to condemn some practices that should be.[324] Some anticompetitive practices may indeed be subject to antitrust law under predatory innovation while they are not under tying: these are all strategies in which a dominant firm modifies an existing product without imposing directly the purchase of a separate product. For instance, as the author has demonstrated, moving from an open platform into a closed platform[325]—or removing func-

317. *See* J. Gregory Sidak, *An Antitrust Rule for Software Integration*, 18 YALE J. ON REG. 1, 26 (2001) (arguing for the need to demonstrate the existence of two distinct products should be abandoned, considering the task too difficult and too far removed from the central issue of the damage to the consumer).

318. *See id.*

319. *See* Tirole, *supra* note 236, at 8 (on the difficulty to determine what two distinct products are).

320. Jon Polenberg, Comment, *tfosorciM and croMiftos: Why High-Technology Antitrust Inquiry Is Backwards and Inside-Out*, 57 U. MIAMI L. REV. 1275, 1293 (2003).

321. *See* Timothy Cowen & Stephen Dnes, *Antitrust in the EU Digital Markets: A Case Study*, COMPETITION POL'Y INT'L (July 17, 2016), https://www.competitionpolicyinternational.com/antitrust-in-the-eu-digital-markets-a-case-study.

322. United States v. Microsoft Corp. (*Microsoft II*), 147 F.3d 935, 958 (D.C. Cir. 1998).

323. *See* Cowen & Dnes, *supra* note 321.

324. Frattaroli, *supra* note 244, at 1920.

325. A closed platform implies that its creator maintains a more or less absolute control over the content which is available. He can control which software is distributed and compatible with its platform.

tionality from a product—raises issues that tying actually ignores.[326] The dominant firm's goal may be to eliminate a competitor on market B for compatible products without offering any alternative, so as to reduce the competitor's profits and thus the competitive pressure it may exercise on market A.

Moreover, the concept of technological tying is unfit to cover all of the predatory innovation practices in which, for technical reasons, two distinct products have become one. This is a *de facto* incoherence of technological ties.

ii. Assessing the Anticompetitive Effects in Related Markets

A practice can be condemned under the legal regime of technological tying *only if* it creates an anticompetitive effect on the tying product market (market A), or the market of the tied product (market B).[327] Three authors have noted that tying strategies generally aim at strengthening the monopoly power of a dominant firm in market A, which is where its core activity is focused.[328]

Yet, deleting the compatibility between two products may have no meaningful anticompetitive effect in these two markets. It is the case when, despite the compatibility removal, some other competing products are available to the consumer which welfare is maintained at the same level.[329] The anticompetitive effect may then occur in another market—market C, an issue which tying cannot address.

Assume that the dominant firm on market A actually intends to create an anticompetitive effect by reducing a competing firm's profits on market B to compete with it on the market C. In fact, the legal regime of tying is too limited to examine a practice that may aim at affecting the entire ecosystem because it only allows analyzing the anticompetitive effects on the markets for the tying product (market A) and the tied product (market B).[330]

For instance, a dominant company in the production of a mobile phone (market A) may be willing to reduce the profits of a competing company in the market for digital tablet (market B) so as to reduce its investing capacity and then benefit from a competitive advantage on the market for digital watches (market C). Only the creation of a legal regime for predatory innovation will allow grasping this strategy.

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326. *See id.*

327. *See* Rey et al., *supra* note 97, at 21.

328. *See id.*

329. *See* Dennis W. Carlton & Michael Waldman, *The Strategic Use of Tying to Preserve and Create Market Power in Evolving Industries*, 33 RAND J. ECON. 194 (2002) (underlining that technological ties may also aim to extend a dominant position on another market).

330. Rey et al., *supra* note 97.

iii. Indifference to Monopoly Power and Leverage Effect

It is not clear, based on case law, if a tie implemented with the aim of obtaining a competitive advantage—and not a monopoly power—on the tied market can be sanctioned under Section 2 of the Sherman Act.[331] Conversely, practices of predatory innovation may aim at eliminating only one competitor, without eliminating all of them. For instance, the interoperability of a product can be removed with one competing product only, a practice which would be covered by predatory innovation, unlike tying.

Also, it should be noted that the North American concept of tying simply apprehends the practices which create a leverage effect[332] and concept of ties then only authorizes to deal with the strategies implying two distinct markets. Predatory innovation practices *may* create such a leverage effect,[333] but it is not typically the case.[334] The mechanism of tying is thus too limited by nature, which is why judges had to contort it to be able to apply it to practices falling under another mechanism.

iv. Conclusion on the Unworkable Adaptability of Ties

Part of the doctrine proposes to distinguish between cases involving only one practice of technological tying and those involving another predatory strategy.[335] They suggest using the rule of reason for technological ties and a *per se* legality rule for predation.[336] While this distinction may seem satisfactory, it does not actually address any of the issues raised about the ineptitude of the technological tie to predatory innovation. As the author has demonstrated, the mechanism of technological ties is unsuitable for dealing with all of the issues created by this type of practice.[337] The distinction between technological tying, on the one hand, and *pure* predatory innovation

331. *See* Robert H. Bork & J. Gregory Sidak, *What Does the Chicago School Teach About Internet Search and the Antitrust Treatment of Google?*, 8 J. COMPETITION L. & ECON. 663, 663–64 (2012) (indicating that it might be assumed that this legal regime follows from the influence of the Chicago school, which advocated the impossibility of using monopoly power in a market in order to obtain another monopoly on a second market without sacrificing its profits).

332. *See* John M. Newman, *Anticompetitive Product Design in the New Economy*, 39 FLA. ST. U. L. REV. 681, 683 (2012) (using the term "leverage" to describe the strategy by which a firm uses its dominant position in a market to gain an advantage in other markets).

333. *See id.*

334. A strategy of predatory innovation may aim at eliminating competitors in one market by removing compatibility between software.

335. Harchuck, *supra* note 285.

336. *See id.* at 437.

337. *Id.*

practices, on the other hand, is not only unsatisfactory, but it may also damage the economy by reducing incentives to invest.

b. An Autonomous Legal Regime Designed to Incentivize Investments

i. The Specificities of Innovation as a Predatory Strategy

Predatory innovation could lead to three different foreclosure effects: (1) foreclosure on the main market; (2) foreclosure on related markets; and (3) vertical exclusion. Only the first two are generally analyzed, but vertical exclusion is a real issue regarding predatory innovation. Integrating software programs within a platform, for instance, is perceived by some authors as a predatory strategy that must be condemned.[338]

The analysis of predatory innovation is also complex as it relies only in part on traditional patterns of predation practices.[339] The latter traditionally implies that a dominant firm incurs initial losses in hopes of recovering them subsequently. While predatory practices may imply a similar strategy, these losses are far from being systematic.

In fact, a dominant firm may reduce the quality of its products without having to bear short-term losses. It happens, for instance, when a company creates incompatibility between its product and a new technology that is yet little used, although very promising.[340] The traditional mechanism of predation is reversed as short-term losses will rarely occur,[341] contrary to long-term ones which could appear if there is a decrease in sales.[342]

Predatory innovation also responds to different patterns from those generally found for most predatory practices. Several authors have stressed that all predatory strategies aim at increasing rivals' costs, or, in other words, to allow the dominant firm to sell its goods at a lower price than one of its competitors.[343] This is not necessarily the case for predatory innovation that

338. *Id.*

339. *See* Terry Calvani & Neil W. Averitt, *Non-Price Predation: An Introduction*, 16(2) J. Reprints Antitrust L. & Econ. 683, 685 (1986) ("A second great advantage of non-price predation is that it creates fewer legal risks. Its anticompetitive goal may be harder to detect and prove."). Predatory innovation is therefore more difficult to detect than predation based on pricing.

340. In this example, the consumer may not suffer from a direct harm if a product becomes incompatible with a new technology that is not very popular yet. Nevertheless, the utility of the product is not increased. It may be necessary to wait until the new technology allowing data transfer is popularized so that sales of the incompatible product may actually start to decline.

341. *See* Tirole, *supra* note 236 (on the challenge imposed by predatory strategies that incur low costs in the short term).

342. *Id.*

343. Calvani & Averitt, *supra* note 339; *see* Pierre F. de Ravel d'Esclapon, *Non-Price Predation and the Improper Use of U.S. Unfair Trade Laws*, 56 Anti-

can aim at purely and simply foreclose them. Predatory innovation thus deserves a legal regime tailored over these different specificities.

ii. Predatory Innovation: A More Effective Legal Arsenal

When a company is implementing ties, its aim is to derive a *direct* benefit from the practice, which the legal regime of tying can address. But the fact that it may also eliminate competition on the long run is not truly taken into account when analyzing the anticompetitive nature of this kind of practice. To the contrary, analyzing predatory innovation includes considering the fact that a dominant company precisely aims to modify its products in order to reduce the competitive pressure. Therefore, analyzing reasons that led the company to adopt such a practice is a fundamental element that allows the company to be condemned.

In fact, tying disregards the idea of innovation. Yet, ignoring the anticompetitive nature of an *alleged innovation* deprives judges of the initial step necessary to apprehend the strategy. A dominant company may aim at eliminating competition under the guise of improving its product, thus proving the development of a more elaborate strategy than a simple tying. A judge must thus determine what constitutes a true or a frivolous innovation.[344] The importance of this distinction requires, once again, a legal regime be fully adopted.

IV. CONCLUSION

The legal regime for general tying is helpful to analyze contractual arrangements. It does not cover the practices of predatory innovation which imply to consider a technical element. On the contrary, the concept of *technological ties* must be abandoned for a new and coherent legal regime adapted to the practices it intends to sanction. In fact, only the creation of an independent legal regime for predatory innovation will ensure there are no consequences from legal uncertainty surrounding the notion of technological ties and to apprehend many practices that cannot be reached under the legal regime of technological ties. An independent legal regime will also grant judges the opportunity to complete a comprehensive analysis of the practices that are today wrongfully analyzed under technological tying and create a legal regime that will avoid legal errors, thereby benefiting innovation.

As illustrated in the article, predatory innovation practices are numerous, protean, and ever-changing. Only the creation of a dedicated legal regime will enable to address these practices which are threatening innovation as a whole. Working on which legal regime should be applied to predatory

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TRUST L.J. 543, 543–45 (1987) (making the mistake of assimilating non-tariff predatory practices with those aimed at increasing its competitor costs).

344. *See* Koren W. Wong-Ervin et al., *Product Hopping and the Limits of Antitrust the Danger of Micromanaging Innovation*, CPI ANTITRUST CHRON. 2 (Dec. 2015) (identifying *sham innovations*).

innovation is a necessity, but it implies, in the first instance, to recognize the need to deal with it—the purpose of this article. Now is the time to convince courts and competition authorities to recognize the notion of *predatory innovation.* Tomorrow will be the time to work on the specificities of such a regime, which will also consider North American and European antitrust laws.