SECTOR-SPECIFIC ESSENTIAL FACILITIES DOCTRINE: A TOOL FOR REMEDYING DISTORTIONS OF INNOVATION COMPETITION FOR FUTURE MARKETS

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ABSTRACT

In high value-added industries the anticompetitive effect of refusals to deal may not pertain to existing downstream markets but to the process of innovation competition for future markets. This reveals the limitation of the current exceptional circumstances test tailored by EU judicature under what could be called a European essential facilities doctrine. Moreover, the strictness of the current legal test has resulted in its circumvention on certain occasions through the imposition of *ad hoc* facility sharing obligations on dominant undertakings. Against this background, this article proposes a sector-specific approach to the assessment of input foreclosures that are capable of restricting disruptive innovation and the emergence of new markets. It is based on a two-stage legal test. First, the latter nuances antitrust liability according to the way in which the essential resource holder has attained that status. Second, the presence of key conditions shaping the innovation process in the respective industry is investigated. The aim is to mitigate excessive risks for innovation incentives associated with antitrust intervention in the context of competition *for* the market and increase legal certainty. It is argued that an innovation-centric essential facilities doctrine can function only as sector-specific.

JEL: D40, D42, K21, L40, O32

I. INTRODUCTION

One can hardly envisage the maintenance of a high value-added economy in the European Union without the central role of innovation securing its global competitiveness.[1] The term innovation encompasses both the activity of generating novelties and the result of that activity in the form of new or improved products, processes or a combination thereof, that differ from the previous state of art and that are made available for use.[2] The requirement for vertical integration under the essential facilities doctrine seems to be incompatible with the competition process in industries characterized to a high extent by business models focused on innovation competition and revolutionary products marketing. A strict implementation of this requirement renders potential refusals to deal of dominant undertakings towards disruptive rivals immune from antitrust intervention.[3] This is caused by the fact that they are neither actual nor potential competitors on an existing downstream market at the time of the refusal. If one would argue that EU competition law is aimed at preserving the competitive structure of markets in the context of competition in price and output, for the sake of coherence, it should at least to the same extent preserve the competitiveness of the innovation process that precedes their emergence. In certain circumstances, that process could be distorted by a refusal to grant access to a resource that is essential for viable R&D activities aimed at opening a future market through the introduction of a disruptive innovation.

The term *disruptive* innovation is used in this article as a reference to radical improvements of the status quo through which novel products, because of certain superior characteristics, displace existing product markets with

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[1] Article 173 TFEU vests the Union and its Member States with the responsibility to 'ensure that the conditions necessary for the competitiveness of the Union's industry exist'.

[2] OECD/Eurostat, Oslo Manual 2018: Guidelines for Collecting, Reporting and Using Data on Innovation. The Measurement of Scientific, Technological and Innovation Activities 20-21 (4th Edition, 2018); For further discussions on this notion, see Sofia Ranchordas, *Does Sharing Mean Caring? Regulating Innovation in the Sharing Economy*, 16 Minn. J.L. Sci. & Tech. 414, 426-428 (2015) and VIKTORIA H.S.E ROBERTSON, COMPETITION LAW'S INNOVATION FACTOR: THE RELEVANT MARKET IN DYNAMIC CONTEXTS IN THE EU AND THE US 67-68 (Hart Publishing, 2020).

[3] For the purpose of this article, it is unnecessary to make a distinction between refusals to license and general refusals to deal and engage with the debate whether a more stringent legal test is justified in relation to the imposition of duties to license. A competitor in innovation would in any case intend to introduce a new product, regardless of whether the requested input is protected by intellectual property rights.

new ones.[4] Market disruptions are typically produced by Schumpeterian competition aimed at "*creative destruction*".[5] For example, in the pharmaceutical industry there are usually multiple parallel R&D projects racing to respond to a single therapeutic demand. This form of innovation could be best understood through a comparison with *sustaining* innovation. This term refers, respectively, to improvements of existing products that rather build on the status-quo. These improvements retain and further develop certain valued by consumers characteristics of previous products.[6] In the realm of antitrust, the new products resulting from sustaining or incremental innovation are considered interchangeable with their predecessors. This is typically assessed from a supply-side, demand-side and potential competition perspective. Consequently, they compete with them within existing product markets and do not lead to their disruption.

In this context, an important question for high-tech competition policy arises: could the ability of disruptive rivals to challenge the status-quo be conditioned upon access to essential resources held by incumbents interested in prolonging that status-quo? The risks of input foreclosures of this kind are real in innovation-intensive industries due to three circumstances. First, a significant share of the companies in these sectors focus on innovation competition and market disruptions, rather than competition in price.[7] One could think of digital, electronics, the biotechnology industry, even defence manufacturing and agriculture. Second, the products through which these companies compete are usually complex. This means that they would in many cases utilize various inputs and rely on complex supply chains to secure their invention and marketing. Third, an important feature of technical development is that it is in many cases cumulative, in the sense that it builds upon and utilizes prior knowledge, creativity and innovation.[8] Follow-on innovations, however, need not necessarily be incremental.[9] To the same extend they can be breakthrough and disruptive in relation to the market status-quo. The ability to disrupt does not itself imply that the introduction of the innovation is invariably independent of access to any key assets. Think of a pipeline biotechnology product that utilizes patented compounds or research tools;[10] the fintech industry that poses a disruptive threat to traditional banking institutions but is nevertheless dependent on their services and information;[11] or a disruptive digital product that utilizes access to app store in order to reach consumers. The Court of Justice had the opportunity to face an essential facilities case involving anticompetitive exclusion of a disruptive rival back in the mid-1990s. The landmark *Magill* judgement concerned a company's attempt to introduce a comprehensive television guide which was blocked by broadcasting stations.[12] The latter claimed copyright protection over information contained in the single-station television guides they used to offer. It is plausible to assume that the introduction of a comprehensive television listing would eliminate demand for the single-station ones and hence disrupt the downstream market. Nevertheless, the case was processed and decided on the premise that the intended new product would have rather expanded that market.

US antitrust is also familiar with attempts of companies with substantial market power to protect their position by blocking disruptive rivals. The cases of *Lorraine Journal*, *AT&T*[13] and *Microsoft* are usually given as examples

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[4] Joseph L. Bower and Clayton M. Christensen, *Disruptive Technologies: Catching the Wave,* 73 Harvard Business Review 43, 45 (1995); See also ROBERTSON, *supra* note 2, 68 and INGE GRAEF, EU COMPETITION LAW, DATA PROTECTION AND ONLINE PLATFORMS: DATA AS ESSENTIAL FACILITY 68-71 (Wolters Kluwer, 2016).

[5] JOSEPH A. SCHUMPETER, CAPITALISM, SOCIALISM AND DEMOCRACY 1942 (Routledge, 2003).

[6] GRAEF, supra note 4.

[7] Of course, this does not mean that all undertakings in high-tech industries invariably adopt business models based on innovation competition. For example, manufacturers of generic pharmaceuticals in principle engage solely in price competition with innovative pharmaceutical companies. This brings balance into the industry as their presence is intended to remedy the limited affordability of originator medicines.

[8] Hanns Ullrich, *Patent Dependency Under European and European Union Patent Law – A Regulatory Gap*, Max Planck Institute for Innovation & Competition Research Paper No. 23-04, 23 (2023), available at SSRN: https://ssrn.com/abstract=4339426.

[9] Fiona Murray & Siobhán O'Mahony, *Exploring the Foundations of Cumulative Innovation: Implications for Organization Science,* 18(6) Organization Science 1006, 1015-1016: "*Incremental and radical innovation will likely differ in the diversity and origins of the knowledge they incorprorate, but accumulation processes are at work in both instances. The degree to which the rate and diversity of knowledge accumulation are disruptive to specific industries needs to be explored."*

[10] In annual reports of innovative pharmaceutical and biotech companies, the inability to obtain licenses under third-party patents or the assertion of such patents is commonly considered among the risk factors capable of impeding the development and commercialization of products and product candidates.

[11] See *Autoriteit Consument & Markt*, Fintechs in the Payment System: The Risk of Foreclosure, Report, 2, 4 (2017): "*A growing number of businesses see opportunities to enter the payment market with new and innovative services provided with innovative technologies… Banks possess information that fintechs need in order to provide their services. There is a genuine risk that banks will endeavor to exclude front-end providers. For example, front-end providers depend on banks for information about the payment account of a specific customer. Banks have market power because they have exclusive access to the payment information of individual customers. Furthermore, front-end providers can be or could become competitors of banks. It is plausible that banks will attempt to prevent this competition by excluding front-end providers*."

[12] Joined Cases C-241/91 P and C-242/91P RTE and ITP v Commission (Magill), ECLI:EU:C:1995:98.

[13] See, in particular, Spencer Weber Waller & Matthew Sag, *Promoting Innovation*, 100 Iowa L. Rev. 2223, 2231 (2015): "*The FCC forced the old Bell System to allow the connection of innovative equipment such as the Carter Hush-a-Phone, and eventually a plethora of differently*

of Section 2 enforcement based on such dynamic considerations.[14] While market disruptions today play an important role as a driver of progress in various high-tech industries, the similarities among the latter come to an end here. The pace of innovation across sectors varies substantially – ranging from short innovation cycles driven by start-ups in the digital markets setting[15] to lengthy[16], costly[17] and uncertain[18] R&D activities in the pharmaceutical industry that not every company can afford to undertake on their own. Moreover, the divergences in the level of transparency of R&D, the different regulatory and industry landscapes shaping business models and the different value society entrusts to potentially successful innovations, render the placement of all high-tech industries under the same denominator undesirable. This, in turn, introduces us to the rationale for adopting a sector-specific approach to the essential facilities doctrine. In cases of alleged impediments of market disruptions, the latter is capable of providing a valuable tool for assessment of unilateral conduct that obstructs access to essential resources. The proposed antitrust-based approach is not aimed at displacing sectoral *ex ante* regulations governing access or compulsory licensing regimes. The aim is to provide a flexible substantial and procedural complement to the web of regulation governing the innovation process, as a response to competition-related risks.[19]

While in traditional dominance-leveraging cases the harm for consumers amounts to higher prices, less product variety and improvements, the above-mentioned type of refusals to deal is, at a first glance, even more problematic. It is capable of depriving society of timely access to groundbreaking innovations and substantially slowing economic growth. Due to the unpredictable nature of market disruptions, however, the risks of both under and overenforcement of antitrust are further exacerbated. In these cases, it seems even harder to strike a reasonable balance between the special responsibility of dominant undertakings not to engage in conduct that abuses their dominant position,[20] on the one hand, and the fundamental rights to property and contractual freedom,[21] the very subject-matter of which pertains to the freedom to decide whether to deal or not,[22] on the other. The means through which this balance has so far been found is the concept of *exceptional circumstances.* It is a test tailored by EU courts to determine whether a property right is exercised within the boundaries of its essential function. The ultimate aim is to delineate cases where a refusal to deal amounts to an abuse of dominance from those of competition on the merits.

The exceptional circumstances, in the presence of which a violation of Article 102 TFEU is established, currently pertain to cases where: (i) the refused input is indispensable to compete on a downstream market; (ii) the refusal eliminates all competition therein[23]; (iii) in case the input is protected by intellectual property rights,

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designed and functional handsets produced by outside vendors. It was the private treble damage litigation brought by MCI which effectively put an end to AT&T's refusal to interconnect its local loop with MCI's microwave long distance service."

[14] *Id*, 2230-2235.

[15] The General Court in Case T-79/12 Cisco Systems & Messagenet v Commission EU:T:2013:635, para 69, followed the Commission's approach to market power assessment in the Microsoft/Skype merger and stated that "*the consumer communications sector is a recent and fast-growing sector which is characterised by short innovation cycles in which large market shares may turn out to be ephemeral. In such a dynamic context, high market shares are not necessarily indicative of market power and, therefore, of lasting damage to competition…*". In a context of abuse of dominance assessment, this implies that no dominant position, and accordingly an abuse, should be established in such industries as long as the relevant market is contestable and barriers to entry are low, despite the incumbent's high market share.

[16] As for 2009 it was estimated that it takes between two to ten years for a potential pharmaceutical to go through the three clinical trial phases before receiving a marketing authorization, see European Commission, Pharmaceutical Sector Inquiry, Final Report (2009), para 142. The adoption of big data analytics and AI in the context of drug development, however, has the potential to substantially accelerate the process of R&D in the near future.

[17] Recent studies suggest that the R&D costs of new medicines vary between 944 million USD to 2,826 billion USD, adjusted to 2019 prices, see Steven Simoens & Isabelle Huys, *R&D Costs of New Medicines: A Landscape Analysis*, 8 Front Med (2021).

[18] *Id*, supra note 15, paras 160-161: "*The attrition rate (percentage of failed projects) is very high at the basic research stage, but this rate decreases throughout the development process… According to industry figures, as few as 1 in 5,000 – 10,000 compounds tested are successfully launched. In the course of the sector inquiry it was not possible to verify this data, as many companies claimed that they were unable to provide the requested information*."

[19] See EKATERINA ROUSSEVA, RETHINKING EXCLUSIONARY ABUSES IN EU COMPETITION LAW 124-125 (Hart Publishing, 2010) and GRAEF, supra note 4, 221, discussing the need for antitrust scrutiny also in potential cases where a dominant undertaking prevents the development of a new market to the detriment of consumers; See also, Ullrich, supra note 8, 51: *"…unlike dependency licensing claims under patent law, which need to be raised by separate action, an Art. 102-claim may be raised as a defense in infringement proceedings."*

[20] Case C-307/18 - Generics (UK) and Others, ECLI:EU:C:2020:52, para 153.

[21] See Articles 16, 17 and 52(1) Charter of Fundamental Rights of the EU, OJ 2007 C 303/17.

[22] For a detailed discussion on the concepts of existence/exercise and specific subject-matter/essential function of property rights see Maurits Dolmans and Matthew Bennett, *Refusal to Deal* in EU COMPETITION LAW. ABUSE OF DOMINANCE UNDER ARTICLE 102 TFEU 385, 432-439 (Francisco Enrique Gonzalez-Diaz & Robert Snelders eds., Clayes & Casteels 2013).

[23] In Microsoft, the General Court departed from previous case law and stated that it is not necessary to demonstrate that a refusal to supply is capable of eliminating all downstream competition but all "*effective*" downstream competition: "*It must be made clear that the fact that the*

the emergence of a new product within that market must also be prevented; and lastly, (iv) no objective justification for that refusal should be present.[24] This is a notably high threshold for antitrust liability that would hardly be met in practice.[25] Instead of abstaining from the imposition of facility sharing obligations, however, the EU judicature seems to have established such outside the scope of this test. *Huawei*, *Lithuanian Railways* and *Google Shopping* are in this regard illustrative for what could be called *ad-hoc* derogations from this exceptional circumstances test.[26] This approach, however, rather contrasts with the need for establishment of a coherent and explicit judicial theory of obligations to deal allowing dominant undertakings to self-assess *ex ante* the legality of their conduct. Such is particularly warranted when the alleged abusive practice concerns impediments to disruptive competitors.

This article aims to propose a two-stage legal test for assessment of potential refusals to deal of this type. It builds upon the exceptional circumstances test established by the *Magill-Bronner-IMS Health* line of case law, although it inevitably abandons the requirement for vertical integration. In the first stage of application, the test adjusts antitrust liability based on the way in which the position of upstream dominance has been attained by the essential facility holder. To overcome the shortcomings of this approach, further sophistication of the test is administered. This is achieved in the second stage through the imposition of additional filters for antitrust liability. The latter investigate the presence or absence of certain key conditions shaping business models in the industry at stake. The results, accordingly, serve as a supplementary criterion for assessing whether an input foreclosure is to be sanctioned on grounds that it restricts a market disruption. The proposed sector-specific essential facilities doctrine has the potential to mitigate the excessive risks for innovation incentives otherwise inherent to a generalized imposition of obligations to deal in such cases. Lastly, it leads to more legal certainty in the realm of antitrust.

The article is divided into six sections. Section II sets the scene by discussing the current boundaries of resource-sharing obligations under Article 102 TFEU. The focus is on two particular limitations: (i) the requirement for vertical integration and (ii) the market-based framework for establishing an abuse. The rest of the article is aimed at demonstrating the rationale for adoption of a sector-specific essential facilities doctrine. For that purpose, its potential role in three input foreclosure scenarios is demonstrated. In all of them, unilateral obstructions of access to an essential resource allegedly prevent the introduction of a disruptive innovation. The difference lies in the way the essential resource holder has attained that status. In the first scenario, the resource is obtained or created through private investment and competition on the merits (section III). In the second scenario, it is entirely a result of statutory monopoly or public funding (section IV). In the last scenario, the essential resource is a result of mixture between public and private sources (section V). Section VI concludes the article.

II. SETTING THE SCENE

The European Union was the first major jurisdiction that applied the essential facilities doctrine to refusals to deal since its origination in the United States in beginning of 20th century.[27] The development of this concept throughout the decades on both sides of the Atlantic, however, seems to have taken divergent paths. While the Supreme Court implied in *Trinko* that no duty to deal could be imposed in cases where a monopolist had not separately marketed an essential resource,[28] the Court of Justice seems to have bypassed the requirement for a market-based dominant position under Article 102 TFEU by introducing the concept of "*potential*" or

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competitors of the dominant undertaking retain a marginal presence in certain niches on the market cannot suffice to substantiate the existence of such competition.", see Case T-201/04 Microsoft Corp v Commission of the European Communities, ECLI:EU:T:2007:289, para 563.

[24] Compare Magill, supra note 12, paras 53-56; Case C-7/97 Oscar Bronner GmbH & Co. KG v Mediaprint Zeitungs- und Zeitschriftenverlag GmbH & Co. KG, Mediaprint Zeitungsvertriebsgesellschaft mbH & Co. KG and Mediaprint Anzeigengesellschaft mbH & Co. KG Bronner, ECLI:EU:C:1998:569, paras 39-41; Case C-418/01IMS Health GmbH & Co. OHG v NDC Health GmbH & Co. KG, ECLI:EU:C:2004:257, paras 35-52 and *Microsoft*, *supra note 23*, paras 314-335.

[25] See Nicolas Petit, *"Stealth Licensing" - Or Antitrust Law and Trade Regulation Squeezing Patent Rights*, 9(3) European Competition Journal, 15-16 (2013), available at SSRN: https://ssrn.com/abstract=2426782.

[26] Case C-170/13 Huawei Technologies, ECLU:EU:C:2015:477; Case T-814/17 Lietuvos geležinkeliai v Commission (Lithuanian Railways), ECLI:EU:T:2020:545; Case T-612/17 Google and Alphabet v Commission (Google Shopping), ECLI:EU:T:2021:763.

[27] United States v. Terminal Railroad Association of St. Louis, (1912) 224 U.S. 383 was the first US case in this regard.

[28] Verizon Communications v. Law Offices of Curtis V. Trinko, LLP (Trinko), (2004) 540 U.S. 398; As Inge Graef observes: '*The US Supreme Court, to the contrary, does not seem to be willing to hold monopolists liable for refusing to supply a product which has not been marketed before. One of the grounds on the basis of which the Supreme Court denied antitrust liability in Trinko was that the systems to which Verizon had to offer its rivals access were not otherwise marketed or available to the public but existed 'only deep within the bowels of Verizon*', supra note 6, 212.

"*hypothetical*" upstream markets in *IMS Health*.[29] After its judgement in *Huawei*, it essentially left the door open for *ad hoc* impositions of duties to deal.[30] Nevertheless, the Commission has focused its enforcement priorities on one particular type of abusive refusals to deal – where a vertically integrated undertaking, holding a dominant position on an upstream market, refuses to supply a competitor on the downstream market. In fact, section D of the Commission's Guidance Paper addresses only this type of refusals as paragraph 76 provides that "*typically competition problems arise when the dominant undertaking competes on the 'downstream' market with the buyer whom it refuses to supply*".[31]

The Court of Justice's case law is in line with this approach. A sequence of cases starting from its very first essential facilities judgement – *Commercial Solvents*, and going through a number of notable decisions, including *Magill*, *Bronner* and *IMS Health,* expressly dealt with this particular type of conduct. The refusal to license cases among them – *Magill* and *IMS Health*, all dealt with exclusionary conducts that prevented the emergence of new products. In the view of the judicature, these products would have competed in an existing downstream market with products already offered by the essential facility holders. These were cases where it was claimed that the incumbents' behaviours restricted innovation in these particular downstream markets.[32] In this manner, two of the conditions in the even stricter test for abusive refusals to license were reconciled – that the conduct, at the same time, has to exclude all competition in a downstream market but also to prevent the emergence of a new product.

There are, however, two other conceivable scenarios in refusal to license, as well as general refusal to deal, cases. First, where the access seeker aims to introduce a product through which it will compete in an existing market where the incumbent is not present. And second, where the former aims to establish a novel downstream market.

A. The requirement for vertical integration and the role of sector-specific conditions in the European approach towards obligations to supply

The first scenario, mentioned above, is illustrated by the judgement of the General Court in *Ladbroke*. In that case, a license of a copyrighted input, claimed by Ladbroke to be indispensable for its operation in the Belgian market for betting services, was refused by the incumbent. The latter was not, however, its competitor on that geographic market. That refusal was thus considered not to constitute an abuse of dominance. The reason was not solely the absence of vertical integration and market power leveraging on behalf of the incumbent. In fact, the input itself – televised pictures and sound commentaries on horse races, could not have been considered indispensable to compete on the downstream market.[33]

Cases where a refusal to supply by a non-vertically integrated undertaking is claimed to prevent a competitor from operating on an existing downstream market would not in their majority entail antitrust scrutiny. For instance, Inge Graef argues that the existence of a downstream market and the presence of others on it without access to the input, suggests that the very first criterion for an abusive refusal to deal is not fulfilled – that the relevant input must be *indispensable* to compete.[34] This was exactly the case in *Ladbroke*.[35] If the resource, however, is indeed indispensable but other undertakings nevertheless operate on the downstream market, this would in principle mean that they are being supplied by the incumbent. In that scenario, the latter's refusal to supply a particular access seeker would amount to a discriminatory refusal to deal. The legality of such conduct would be assessed under a different legal test that does not impose as high a threshold for antitrust liability as the exceptional circumstances test. Nevertheless, it is unlikely that a discriminatory refusal to deal would be sanctioned under EU competition rules unless it is demonstrated that the anticompetitive effect reaches beyond

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[29] IMS Health, supra note 24, paras 42-45. For a further discussion on the concept of potential/hypothetical upstream markets see ROBERT O'DONOGHUE AND JORGE PADILLA, THE LAW AND ECONOMICS OF ARTICLE 102 TFEU 635-639 (3nd ed., 2013).

[30] Huawei, supra note 26, paras 47-53.

[31] 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 (Guidance Paper) 2009 OJ C 45/7.

[32] Magill, supra note 12, paras 7-11, 51-58 and IMS Health, supra note 24, paras 32, 37, 48-49. In Microsoft, supra note 23, the General Court lowered the new product requirement to prevention of "*technical development*".

[33] See Case T-504/93 Tiercé Ladbroke SA v Commission of the European Communities, ECLI:EU:T:1997:84, paras 123-134.

[34] GRAEF, supra note 4, 220.

[35] *Ladbroke*, supra note 33, para 132*: "…the televised broadcasting of horse races… is not in itself indispensable for the exercise of bookmakers' main activity, namely the taking of bets, as is evidenced by the fact that the applicant is present on the Belgian betting market and occupies a significant position as regards bets on French races."*

the interests of the affected rival and substantially harms the competition process and, ultimately, consumers.[36] Otherwise, if an essential resource holder does not operate on a downstream market, they should generally have no incentive to refuse access because providing such would lead to increased revenues.[37]

A necessary resource holder might nevertheless, in certain cases, have a commercial interest to engage in *de novo* refusals or cut off existing supplies. That interest might be shaped by the particularities of the economic sector in which it operates. For instance, in the pharmaceutical sector, drug manufacturers have incentives to restrict parallel trade in order to secure sufficient recovery of their R&D expenditure. *Sot Lelos v Glaxo* is illustrative in this regard.[38] The conduct in that case amounted to reducing quantities of supplied medicines in Greece with the aim of preventing parallel trade to higher-priced markets. Such refusals to deal, however, might clash with the objective for building the EU internal market.[39] The Court thus considered that conduct a violation of EU competition rules as long as the respective orders by wholesalers were not out of the "*ordinary*".[40] Refusals to deal in the pharmaceutical sector are perhaps the cases where sector-specific considerations have left the most noticeable imprint on the decision-making process.

A refusal to deal might also be incentivized by the *plans* of the dominant undertaking to vertically integrate. *Commercial Solvents* can serve as a suitable example. In that case, the disruption of supplies of a raw material used for the production of a medicine was aimed at benefitting the incumbent's planned business activities on the derivative market.[41] Since that disruption eliminated all competition on part of its previous customer, and now an imminent competitor – Zoja, it was considered abusive.

This brief summary of some notable European refusal to deal cases leads to the following conclusions. First, the presence of unique industry-specific conditions is capable of influencing the way in which EU competition rules are applied. Second, vertical integration is generally considered a prerequisite for the imposition of duties to deal with competitors. Abuse would be established if, absent an objective justification, a dominant and vertically integrated undertaking refuses to supply an indispensable input with the result of eliminating all competition on the downstream market where it is present. Against this background, it seems at a first sight illogical not to protect access seekers threatened to be eliminated from the innovation race, simply because they are not in-market competitors of the input holder. This factual scenario is, however, far more challenging to tackle under the prohibition of abuse of dominance than it seems at a first sight.

B. Is the market-based approach under Article 102 TFEU an obstacle for sanctioning refusals to deal that block the emergence of novel downstream markets?

In traditional essential facilities cases, the dominant position, the abuse and its anticompetitive effect are spread over different antitrust markets. Since Article 102 TFEU requires a dominant position at the time of the abuse,[42] that position must be in the upstream market (A). It is also in that market where the abuse occurs. The

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[36] Guidance Paper, supra note 31, para 6: *"The emphasis of the Commission's enforcement activity in relation to exclusionary conduct is on safeguarding the competitive process in the internal market…the Commission is mindful that what really matters is protecting an effective competitive process and not simply protecting competitors.";* See also Case C-377/20 - Servizio Elettrico Nazionale and Others, ECLI:EU:C:2022:379, para 73: "*competition on the merits may…lead to the departure from the market or the marginalisation of competitors that are less efficient and so less attractive to consumers from the point of view of, among other things, price, choice, quality or innovation*"; As argued by Inge Graef, supra note 4, 242: "*…discriminatory refusals to deal should only be held abusive if the different treatment of competitors in similar situations results in substantial harm to competition and consumers that cannot be objectively justified."*

[37] GRAEF, supra note 4, 221.

[38] Opinion of Advocate General Jacobs in Case C-53/03, Synetairismos Farmakopoion Aitolias & Akarnanias (Syfait) and Others v GlaxoSmithKline plc and GlaxoSmithKline AEVE [2005] ECR I-4609, paras 89-93.

[39] As concluded by Edurne Navarro Varona & Cristina Caballero Candelario, *The Pharmaceutical Sector and Parallel Trade*, in EU LAW OF COMPETITION AND TRADE IN THE PHARMACEUTICAL SECTOR 405, 430 (Pablo Figueroa and Alejandro Guerrero eds., Edward Elgar 2019): *"…account must be taken that European competition law not only pursues consumer welfare, but also the creation of an internal market within the EU. In this regard, parallel trade is a phenomenon at the intersection of these two principles: on the one hand, wholesalers appeal to the principle of free movement of goods in order to defend the promotion of parallel trade while, on the other hand, the practice brings ambiguous and, in some cases, negative consequences for consumer welfare."*

[40] Cases C- 468/06 and C- 478/06 Sot. Lélos kai Sia EE and others v GlaxoSmithKline AEVE Farmakeft ikon Proionton, ECLI:EU:C:2008:504.

[41] Joined cases 6 and 7/73, Istituto Chemioterapico Italiano and Commercial Solvents v. Commission, ECLI:EU:C:1974:18.

[42] Josef Drexl, *Anticompetitive Stumbling Stones the Way to a Cleaner World: Protecting Competition in Innovation Without a Market*, 8 Journal of Competition Law and Economics 507, 541 (2012): *"European unilateral conduct rules require market dominance and, therefore, existing markets at the time of the abuse. This creates considerable loopholes for protecting competition in innovation where new markets still have to emerge*."; See also Nicolas Petit, *Understanding Market Power*, Robert Schuman Centre for Advanced Studies Research Paper No. RSC 2022/14, 41-43.

anticompetitive effect of the latter, however, occurs in a related downstream market (B). Which antitrust market is affected by a refusal to deal preventing the emergence of an innovative product that would itself establish a downstream market? Since the latter has not yet emerged at the time of the refusal, the anticompetitive effect pertains to merely a future market, if one at all emerges.

The concept of future markets has indeed been applied in merger cases in the EU and US where the merging parties competed in R&D to introduce innovative products.[43] This is understandable, considering the inherent *ex ante* approach of merger control that is concerned with the impact of the concentration on the future development of markets. Here, one could reasonably argue: if bilateral conduct, such as a merger between pharmaceutical competitors, could eliminate competition on the future market for a pipeline medicine they are developing in parallel, so can the unilateral conduct of a dominant undertaking towards its R&D rival. If bilateral and unilateral conducts are capable of producing an equivalent anticompetitive effect, it is intuitive to subject them to equivalent scrutiny under antitrust. The effects of conduct on a future market, however, can only be assessed when a sufficient degree of certainty is present in relation to its emergence and to the particular products that would comprise it.[44] As Victoria Robertson suggests, this might be the case with strongly regulated sectors, such as the pharmaceutical industry, where a medicine must go through three phases of clinical trials and receive a marketing authorization before being traded but is less so in areas in which companies are "*quietly working on their innovations*".[45]

Another solution could be the assessment of the anticompetitive effect of refusals to deal within the analytical framework of existing R&D or innovation markets, initially proposed for merger control.[46] In a refusal to deal context, these markets would be downstream. Antitrust agencies in the EU and US, however, nowadays seem to rely on an alternative screen for identifying harm to innovation – the concept of competition in innovation.[47] The latter has provided a substitute to market definition in merger cases and can serve a useful function also in cases where a more dynamic approach to unilateral conduct rules is necessary. It must be noted that a strict implementation of the market-based approach under Article 102 TFEU might be at odds with the goal of protecting disruptive innovation.[48] Imposing antitrust liability in refusal to deal cases where the upstream market is merely potential or hypothetical and the downstream market does not yet exist, would in practice render market definition more or less redundant.

C. A way forward

Despite these limitations, the article argues in favour of fine-tuning the essential facilities doctrine as a tool for assessment of input foreclosure strategies in high-tech industries. Obligations to supply competitors indeed are and should remain the exception. Nevertheless, competition policy should not render conduct capable of blocking disruptive rivals immune from scrutiny. The real challenge in this regard is to tailor a test for distinguishing procompetitive exclusions from those capable of inflicting substantial consumer harm by delaying the next wave of "creative destruction"[49].

The way in which the incumbent's position on the resource market has been developed should serve as a valuable basis of such a test. It offers a useful starting point for delineating cases where an access mandate could foster innovation competition from those, where it would be counterproductive.[50] Jorge Marcos Ramos justifiably argues that an inquiry into the origins of dominance should be a necessary step in the assessment of conduct under Article 102 TFEU if EU competition law is indeed aimed at protecting the competition *process*.[51] In a scenario

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[43] See ROBERTSON, supra note 2, 122-128 and the case-law analyzed.

[44] *Id*, 127; Sufficient knowledge regarding the characteristics of a novel product is key to determine the degree of substitutability it will have with existing products once it is launched. This would, accordingly, determine whether it would establish a new future market or merely expand an existing market.

[45] ROBERTSON, supra note 2, 127.

[46] See Richard J. Gilbert & Steven C. Sunshine, *Incorporating Dynamic Efficiency Concerns in Merger Analysis: The Use of Innovation Markets*, 63 Antitrust L.J. 569 (1994).

[47] Dow/DuPont (Case M.7932) Commission Decision of 27 March 2017, para 352; See Drexl, supra note 33, 516-522 and Robertson, supra note 2, 154.

[48] Drexl, supra note 42, 529: *"In the form of the European-style prohibition of abuse of market dominance, unilateral conduct rules do only apply to undertakings with a market-dominant position."*

[49] SCHUMPETER, supra note 5.

[50] As the Court provided in Case C-209/10 Post Danmark A/S v Konkurrencerådet, ECLI:EU:C:2012:172, para 23: *"When the existence of a dominant position has its origins in a former legal monopoly, that fact has to be taken into account."*

[51] JORGE MARCOS RAMOS, FIRM DOMINANCE IN EU COMPETITION LAW: THE COMPETITIVE PROCESS AND THE ORIGINS OF MARKET POWER 23 (Wolters Kluwer 2020): *"…the causes that led to the creation of dominant firms are part of the competitive process. They cannot be left outside of any analysis of functioning of markets nor of the enforcement that seeks to protect them."*

where the upstream dominance is entirely or partially a result of competition on the merits, the imposition of duties to deal would clash with obstacles that substantially increase the risk of enforcement errors. This article identifies four. First, the unforeseeable characteristics of products resulting from disruptive innovation entail a serious difficulty in applying the indispensability criterion, which should remain part of the liability test. Second, it is not clear to what extent access seekers' right of access to a necessary resource should be conditioned upon their capability to introduce an intended innovation. It is also not particularly clear how could that be assessed by resource holders. Third, in cases of alleged restrictions of market disruptions, it is far more difficult to determine a reasonable remuneration per granted access. Fourth, the characteristics of certain inputs might render access mandates under the essential facilities doctrine unsuitable.

These four obstacles for antitrust intervention are relevant in cases where essential resource holders have become such through competition on the merits. They are also relevant in cases where this is a result of a mixture between private and public investment, although to a lesser degree. If the status of an essential resource holder has been attained entirely through State resources, the risks for *ex ante* innovation incentives aren't substantial. Such companies will not innovate less if they provide access to upstream inputs for which they didn't compete in the first place. Therefore, a further sophistication of the proposed test is necessary in order to mitigate increased risks for innovation incentives in the first two types of cases. This is achieved through assessment of three sector-specific conditions as supplementary criteria for determining whether an antitrust duty to deal exists. They include:

(i) the degree of transparency of the R&D process in the industry;
(ii) the presence of incentives on behalf of resource holders to innovate optimally in the area in which they obstruct the efforts of others to do so;
(iii) the intensity of consumer harm stemming from a potentially successful input foreclosure.

III. OBLIGATIONS TO DEAL WHERE THE POSITION OF UPSTREAM DOMINANCE IS A RESULT OF COMPETITION ON THE MERITS

Antitrust is concerned only with refusals to deal of undertakings that hold a dominant position on an upstream market. When it is a market in the strict sense – one characterized by transactions between sellers and buyers resulting in potential transfers of property rights, an antitrust market is delineated by identifying the necessary input and its substitutes. The latter could be existing and already offered by competitors or merely potential[52]. This assessment takes place at the stage of market definition with the aim to outline the incumbent's competitors. It is, respectively, followed by an analysis of their market shares, the presence of entry barriers and countervailing buyer power. The aim is to determine whether the input holder is indeed dominant.

The other option is that an upstream market in the strict sense does not exist, i.e., it is merely potential or hypothetical.[53] Since the establishment of a dominant position is required by Article 102 TFEU to condemn a refusal to deal, case law illustrates that such would be presumed, if the incumbent is the *only source* of the indispensable input.[54] This itself implies that they are not subject to sufficient constraints from existing substitutes offered by competitors. It is therefore crucial to assess the availability of potential ones.[55] As the Court held in the landmark *Bronner* judgment, such availability can be considered absent if "*there are…technical, legal or even economic obstacles capable of making it impossible, or even unreasonably difficult…*" to duplicate the necessary resource.[56] This is indeed a high threshold. The chances to be met, however, are substantially greater when the upstream market is characterized by a strong role of scale and scope economies or network effects.

This section deals only with cases where the position of dominance, be it on an actual or potential upstream market, is attained through competition on the merits. On the one hand, while the definition of competition on the merits is not crystal-clear, this term could surely be used as a counterpoint to cases where the incumbent has reached this position through a certain form of State support. On the other hand, there is no doubt that even without State support, certain anticompetitive practices leading to upstream dominance would fall outside the scope of competition on the merits.

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[52] In this case, the threat of their timely introduction from potential competitors exerts a disciplining effect on the incumbent's ability to exercise market power.

[53] IMS Health, supra note 24, paras 43-45.

[54] Magill, supra note 12, para 47; See Josef Drexl, *Designing Competitive Markets for Industrial Data - Between Propertisation and Access*, 8 JIPITEC 257, 280-281 (2017).

[55] Graef, supra note 4, 215-216.

[56] Bronner, supra note 24, para 44.

The recent *Servizio Elettrico* judgment provides valuable insights into this concept. The Court stated that two types of conduct would certainly not amount to competition on the merits. First, it is those "*the implementation of which holds no economic interest for a dominant undertaking, except that of eliminating competitors*". And second, those, which an equally efficient competitor that is, however, not in a dominant position, is unable to adopt "*because that practice relies on the use of resources or means inherent to the holding of such a position*".[57] The facts of the case illustrate the latter scenario. They concerned an exclusionary conduct of a former legal monopolist in the production of electricity that consisted of seeking customers' consent to receive offers from companies in the former's group and from competitors in a discriminatory manner.[58] The customers' contacts base was, however, a resource established under the undertaking's statutory monopolist position. Therefore, if such a resource is utilized in a manner that is capable of producing an exclusionary effect and is adopted by a dominant undertaking, it would not only amount to competition outside the merits but also to an abuse.[59] Lastly, the Court reaffirmed its position in *AstraZeneca* that the legality of conduct under other areas of law does not exempt that conduct from competition law assessment, including in relation to whether it amounts to competition on the merits.[60]

The fundamental concern in duty to deal cases where the upstream position is a result of competition on the merits is that antitrust activism would ultimately disincentivize dominant undertakings to develop their assets at an optimal rate. It is at the same time feared that it would incentivize access seekers to free-ride.[61] These concerns seem reasonable regardless of whether access is mandated to physical infrastructure or IP-protected assets.[62] Consequently, the currently high exceptional circumstances threshold aims to minimize these potentially adverse effects on markets. The latter could be substantially more acute in cases where an access mandate is sought to enable the opening of a novel downstream market. The process of competition *for* the market is in fact highly uncertain and easily distortable. Remedying impediments to that process is indeed not lowering the threshold of antitrust liability as obligations to supply have already been imposed to allow the introduction of competing new products characterized by a lesser degree of innovativeness. The latter would have allowed them to only compete in existing downstream markets with the resource holders' products. It is nevertheless widening the scope of application of the essential facilities doctrine. Cases which are currently not addressed, or at least not through the means of antitrust, are now targeted. This presupposes the development of a coherent doctrine that takes into account the probabilistic nature of disruptive innovation and that does that in a particular context. Such a flexible approach would minimize to an optimal extent the potentially counterproductive effects of obligations to deal on the level of innovation in cases where such remedy is considered appropriate.

After discussing the four challenges for effective tackling of refusals to supply that restrict disruptive innovation, the article will analyse the extent to which a sector-specific essential facilities doctrine could mitigate their error-increasing impact. This would, accordingly, determine the extent to which innovation-centric obligations to deal could be considered appropriate.

A. Circumstances increasing the risks for false positives and false negatives in the assessment of antitrust obligations to deal

The central concern regarding the adoption of an innovation-centric essential facilities doctrine is its administrability. This sub-section analyses the inherent challenges capable of undermining this type of antitrust enforcement.

1. Applying the indispensability criterion

The threshold for establishing an anticompetitive effect in essential facilities cases is currently reached only when all downstream competition is eliminated because a refusal to deal blocks access to an indispensable input. These

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[57] *Servizio Elettrico*, supra note 36, paras 77-78.

[58] *Id*, para 102.

[59] *Id*, paras 61, 103.

[60] *Id*, para 67.

[61] Case C-42/21 P Lietuvos geležinkeliai AB v European Commission, Opinion of Advocate General Rantos, ECLI:EU:C:2022:537, para 65; see also, O'DONOGHUE & PADILLA, supra note 29, 609-610.

[62] See in this regard O'DONOGHUE & PADILLA, supra note 29, 618-621: "…*What matters in each case is the impact of forcing access on the incentives to invest, and not the nature of the property rights at stake. Economics therefore provides a sound basis for saying that IP rights and physical property should be treated essentially the same in analysing unilateral refusals to deal under Article 102 TFEU.*"

are therefore the first two interconnected elements of the current legal test.[63] Their objective is to balance conflicting economic interests in a way that not only stimulates competition in the short term but also preserves *ex ante* incentives of undertakings to invest in the creation of efficient facilities in the long term.[64] From that perspective, this higher liability threshold than the standard anticompetitive effects test is indeed justified.[65] Such a threshold is necessary because, by contrast to margin squeezes or impositions of unfair conditions of access, remedying outright refusals to deal requires the imposition of positive obligations instead of mere obligations to put an end to the abuse. As the Court provided in *Slovak Telekom*, the latter are "*less detrimental to the freedom of contract of the dominant undertaking and to its right to property than forcing it to give access to its infrastructure, where it has reserved that infrastructure for the needs of its own business* ".[66] Moreover, as observed by Pablo Ibáñez Colomo, the design of positive obligations, such as duties to conclude contracts with rivals, is associated with higher complexity and proneness to errors.[67] Consequently, the indispensability requirement should remain part of the legal test for assessment of refusals to deal that allegedly prevent the emergence of new markets, whenever the incumbent's upstream position is a result of competition on the merits. What is not clear in such cases is the exact scope of this requirement.

Currently, the indispensability criterion requires the fulfilment of two conditions: (i) the input needs to be objectively necessary to compete on a downstream market and (ii) there needs to be no actual or potential substitutes.[68] These conditions are cumulative. If one of them is not fulfilled, the indispensability criterion would not be considered met. The condition for absence of actual or potential substitutes is assessed solely in relation to the characteristics of the products comprising the upstream market. Its adaption to cases where disruptive innovation downstream is blocked is therefore not problematic. This is not the case with the first condition because it focuses on the vertical relationship between the input and the derivative product.

The meaning of the objective necessity condition when derivative markets exist is currently clear. It pertains to the lack of means, other than the relevant input and its substitutes, for a competitor to introduce thereon either the same product as the incumbent's or a new but interchangeable one. Against this background, it should not normally be problematic for an expert in the respective industry to demonstrate or rule out the relationship between the input and the intended product. It is indeed sufficient to apply common knowledge of the sector to decide whether an upstream resource is objectively necessary to manufacture and market a derivative product with certain projectable characteristics.[69] To tackle conduct that blocks the opening of a novel downstream market, the first condition of the indispensability criterion must be modified to mean that the refused input needs to be objectively necessary to compete *for* the downstream market. This, however, could be interpreted in two ways. It could either mean (i) objectively necessary to invent and market an innovative product that would open a future downstream market or (ii) objectively necessary to viably compete in innovation with the input holder for a future market.

Let us discuss both options. First, adopting a legal test requiring proof that a requested input is objectively necessary to invent and market an innovative product, would be indeed consistent with the practice of the Court of Justice. Broadcasting companies' copyright-protected programme listings in *Magill* were considered indispensable because they were objectively necessary to *create* a comprehensive television guide utilizing the information contained in them.[70] Interoperability information in *Microsoft* was objectively necessary for the *development and marketing* of competing work group server operating systems with innovative features.[71] The more innovative an intended product, however, the more difficult it becomes to assess whether a particular input is indeed objectively necessary for its successful introduction. A claim that a refusal to supply prevents the opening of a new downstream market would in many cases imply an exceptionally high level of innovativeness of the intended product. It could be in terms of form, functionalities, course of action or effectiveness that are unparalleled with the current state of art in the industry. In such cases, applying common knowledge of the sector might be far from sufficient to correctly assess objective necessity, if that would at all be possible. Such an

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[63] See ROUSSEVA, supra note 19, 122: "*A situation in which the indispensability condition is satisfied – but the 'elimination of competition in a downstream market' condition is not – is inconceivable. This means that one of the two requirements is redundant."*

[64] Case C-165/19 P - Slovak Telekom v Commission, ECLI:EU:C:2021:239, paras 47, 48.

[65] See Pablo Ibáñez Colomo, *Legal Tests in EU Competition Law: Taxonomy and Operation*, 10(7) Journal of European Competition Law & Practice 424, 436-437 (2019).

[66] Slovak Telekom, supra note 54, para 51.

[67] Colomo, supra note 65, 437.

[68] Graef, supra note 4, 216.

[69] *Id*.

[70] Magill, supra note 12, para 53.

[71] Microsoft, supra note 23, para 653.

assessment undertaken by a competition authority or a court could be highly speculative and prone to errors due to the need to apply exceptionally high level of sector-specific expertise. Moreover, R&D processes are usually characterized by a high level of uncertainty and interplay of numerous factors determining their potential success in the form of innovation. They range from proficiency to serendipity and mere luck.[72] Accordingly, in certain cases, input holders themselves might not be in a position to determine which particular input is indeed objectively necessary for an intended innovation. At the time of the request, they might not even be in a position to determine whether their in-house R&D, utilizing that input, would lead to any success at all. Considering refusals to supply of such incumbents abusive, could in many cases create legal uncertainty. Even diligent undertakings acting in good faith might not always be able to self-assess *ex ante* whether their conduct complies with competition rules in the light of the indispensability criterion.

Second, to mitigate these shortcomings, one could propose a potential legal test requiring proof that a requested input is (ii) objectively necessary to merely compete effectively in R&D. Under this interpretation, it would no longer be necessary for access seekers to prove that absent the input or its substitutes, the introduction of an intended innovation would be impeded. It would suffice to show that they would be merely prevented from engaging in effective R&D competition in a particular field. The concern that the potential success of R&D is determined by multiple factors, however, remains relevant also under this interpretation. In certain cases, it would be far from easy to determine which factors, respectively inputs, are less important, more important or, ultimately, *objectively necessary* to effectively compete in R&D.

Such a test might be, nevertheless, appropriate in highly regulated sectors, such as the pharmaceutical industry, where the innovation process is relatively observable. For example, the pharmaceutical sector inquiry launched by the Commission in 2008 outlined cases where originator manufacturers engaging in clinical trials needed access to comparator medicines for the testing of their pipeline medicines' efficacy. In case comparator medicines were not available in the commercial supply chain and needed to be sourced directly from the manufacturer, companies active in the sourcing of such drugs reported cases of substantial price raising, delays in the delivery of comparator drugs and, in some cases, refusals to supply.[73] While in potential cases of this kind it would not be problematic to demonstrate that access to a resource is objectively necessary to compete in R&D, in a large set of cases this interpretation would also border with a leeway for arbitrariness in administrative action and legal uncertainty. This highlights again the central role sector-specific considerations should play in the application of the essential facilities doctrine.

2. Access seekers' innovation capabilities as a criterion for establishing antitrust obligations to deal?

The "*as-efficient-competitor*" test (AEC test) has so far been particularly relevant in the context of exclusionary price-related practices for determining the abusive nature of conduct. Margin squeezes in this regard require particular attention. They ultimately lead to identical outcomes as leveraging refusals to deal, yet through a different mechanism. In *Deutsche Telekom* and *TeliaSonera,* the Court of Justice essentially limited antitrust liability to cases where that conduct excluded or prevented market entry from equally efficient actual or potential competitors.[74] In other words, it is necessary to prove that the dominant undertaking itself would not have been able to do business under the access conditions it imposes on competitors.

The AEC test has not been applied to non-price exclusionary practices and, in particular, to dominance-leveraging refusals to supply. Nevertheless, the current interpretation of the objective necessity condition, discussed in subsection 1, deprives of protection access seekers, whose lack of efficiency is the sole circumstance preventing them from doing business absent the requested input. In cases concerning impediments to the introduction of disruptive innovations, it is important to ask whether the AEC analysis could play a more prominent role by establishing a limiting principle of antitrust liability. Put differently, should obligations to supply essential resources be limited to cases where a reasonable assumption could be made that the access seeker is indeed capable of introducing an intended innovation?[75] It could be argued that such a limitation would offer a valuable benchmark allowing resource holders to assess *ex ante* the legality of potential refusals.

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[72] See Marvin B. Lieberman & David B. Montgomery, *First-mover advantages*, 9 Strategic Management Journal 41, 49-50 (1988); Emily Hargrave-Thomas, Bo Yu & Jóhannes Reynisson, *Serendipity in Anticancer Drug Discovery,* 3(1) World J Clin Oncol 1 (2012) found that the discovery of 5.8% of all drugs on the market involved serendipity, while 18.3% of the pharmaceuticals in use at the time were chemical derivatives of such.

[73] Pharmaceutical Sector Inquiry, supra note 8, paras 1200-1203.

[74] Case C-280/08 P - Deutsche Telekom v Commission, ECLI:EU:C:2010:603, para 177; Case C-52/09 - TeliaSonera Sverige, ECLI:EU:C:2011:83, paras 42-43.

[75] On the notion of dynamic capabilities, see David J. Teece, Gary Pisano & Amy Shuen, *Dynamic Capabilities and Strategic Management,* 18(7) Strategic Management Journal 509, 515 (1997): "*…the firm's ability to integrate, build, and reconfigure internal and external*

In *Microsoft,* where a refusal to provide access to interoperability information was at stake, the access seekers' history of innovation was one of the factors considered in the assessment of whether Microsoft's conduct limited the introduction of potential new products or mere copying.[76] Had not a limitation on technical development been found, the refusal to supply would not have been considered abusive. Certain factors, such as access seekers' prior success in innovations, access to financial and human resources or stage of advancement of R&D, could indeed lead to a reasonable assumption that they would be at least as efficient competitors of input holders in the process of innovation competition *for* the market. Solely from that perspective, it seems reasonable to expect input holders to consider access requests only from such competitors. And potentially, sanction refusals only regarding them. One could argue that an antitrust standard that is not based on considering the capability of the access seeker to introduce a particular innovation, risks cutting too deeply into dominant undertakings' property rights. They would essentially be obliged to deal upon the mere request of any undertaking that is able to pay for the requested input.

Adopting a criterion for duties to deal that internalizes access seekers' qualities, however, also hides risks. Innovation is not necessarily produced by a group of big, established and equally efficient companies. For instance, Inge Graef gives an example with Skype and WhatsApp as an illustration of disruptive innovations that came from small start-ups and "*started to attack the business model of telecommunications operators".*[77] As Richard Gilbert highlights, *"innovations often come from unexpected directions, including from firms in unrelated industries or individual inventors".*[78] An example is in turn provided with the semiconductor manufacturing industry and the photolithography technologies which had their origins in the optical instruments industry but enabled the miniaturization of semiconductor circuitry.[79]

Overall, where disruptive innovation is at stake, a capabilities-based standard for obligations to deal might offer limited effectiveness in mitigating uncertainty and risks for arbitrariness. First, one should not overlook the possibility for undermining that standard by providing misleading information regarding one's innovation potential in a particular field. Second, in certain cases, resource holders might not at all be in a position to reasonably determine whether a competitor has the necessary capabilities in the first place. When the characteristics of an intended innovation are still surrounded by uncertainty, it might be highly speculative to determine which access seeker is in fact capable of introducing it. Is it the one with most financial resources, the one with most highly qualified employees or the one with most experience in prior innovation?

3. Determining a fair remuneration for the provided access

The remedy for an abusive refusal to deal will be a corresponding obligation to conclude a contract, regardless of whether that refusal excludes the access seeker from a downstream market or prevents them from opening a new market. There is currently a substantial ambiguity regarding the methodology for setting contractual terms and the practice of the Commission provides limited guidance in this regard.[80] Access to a necessary input under competition law could in principle be mandated either royalty-free or against a remuneration. Royalty-free access is generally unsuitable in cases where the input is protected by intellectual property or, even if this is not the case, developed through competition on the merits. It is certainly unsuitable in cases where the indispensable input is requested for utilization in a competing R&D activity. To preserve dynamic incentives to invest and innovate, access must be provided against an appropriate remuneration, if one should at all be provided. Two questions arise in this regard: (i) what mechanism of valuation could secure the appropriateness of that remuneration and (ii) who is best placed to do this assessment.[81]

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competences to address rapidly changing environments." See also, Tor Helge Aas & Karl Joachim Breunig, *Conceptualizing innovation capabilities: A contingency perspective*, 13(1) Journal of Entrepreneurship, Management and Innovation 7 (2017): *"...we suggest that the innovation capabilities necessary for success are contingent upon innovation novelty and market characteristics."*

[76] Microsoft, supra note 23, para 654.

[77] GRAEF, supra note 4, p. 187.

[78] RICHARD J. GILBERT, INNOVATION MATTERS: COMPETITION POLICY FOR THE HIGH-TECHNOLOGY ECONOMY 109 (The MIT Press, 2020).

[79] *Id*.

[80] See O'DONOGHUE & PADILLA, supra note 29, 1185-1186.

[81] See in this regard, Damien Geradin, *Limiting the Scope of Article 82 EC: What Can the EU Learn from the U.S. Supreme Court's Judgment in Trinko in the Wake of Microsoft, IMS, and Deutsche Telekom*?, 41 Common Market L. Rev. 1519, 1544 (2004): *"Pricing decisions are notoriously hard to take as they require making a choice between several methodologies (e.g. LRIC, ECPR, etc.). They also require a wide range of information about costs and other related issues".*

Regarding the first question, it is unclear how central role the foreseeable profits from successful introduction of the intended innovation should play in the valuation mechanism. If the input has never been separately marketed and the costs for its creation cannot be accurately measured, this projection becomes an indispensable benchmark for calculating price of access.[82] On the one side, since the prospects of commercial success downstream are a corollary of the input's valuableness, they cannot be disregarded from the latter's price calculation. The more successful downstream products the access seeker would be enabled to market, utilizing the input, the higher remuneration should the input holder receive. It should not be forgotten that the latter is meanwhile also competing *for* the downstream market. On the other side, such an assessment could be highly speculative. Consider, for example, the lack of clarity on how consumers would respond to the new product once and if it is marketed. First-mover advantages or disadvantages may also influence the ultimate profits in unpredictable ways. It could be far from easy to predict at the time of the remuneration calculation, whether the input holder or the access seeker will be the winner of the innovation race. Hence, one should acknowledge the high potential for disputes concerning the need for follow-on adjustments of remunerations. Overall, the risks for overpricing or underpricing assets are even higher in cases where disruptive downstream innovations are at stake.

Let us turn to the question of who is best placed to determine the fair price of the essential asset. The limited resources and industry-specific knowledge of competition authorities and courts might render such a valuation problematic. Mandating R&D competitors to agree on access terms would unlikely be a sustainable solution either. The interests of input holders and access seekers regarding the price of access are opposing – the former would attempt to extract the highest price, while the latter, accordingly, the lowest. In a context of inherent uncertainty underpinning the process of innovation competition, even if an agreement is reached, the risks of undercompensating the input holder or rendering it unprofitable for the access seeker to compete in R&D, are substantial under such mandated contracts.

4. Mandating access to data – intended vs actual use

Considering the widespread commodification of data throughout different industries, there seems to be no doubt that access to big data is capable of conferring competitive advantage to dataset holders. When the respective dataset has been collected in the context of economies of scale and scope or network effects, it is possible that it might be found indispensable to viably do business.[83] Therefore, an access mandate under the essential facilities doctrine is one possible solution. The challenges for subjecting datasets to obligations to supply are essentially the same in cases where the refusals prevent access seekers from competing against dataset holders on existing downstream markets and where these refusals prevent them from opening novel ones. As Vikas Kathuria and Jure Globocnik argue, once access to a dataset is mandated, these data could in principle be used beyond the market affected by the abuse.[84] Antitrust regulators and courts could indeed impose a limitation on the purposes for which the respective dataset could be used. It is questioned, however, to what extent such a limitation is in practice enforceable.[85] Data could indeed be provided to allow the access seeker to introduce a particular innovation or merely to compete effectively *for* the market. Yet, they might end up in practice utilized to gain undue competitive advantage in different markets. This is accordingly capable of causing distortions of competition therein. Considering that R&D competition for future markets is in many cases a risky and costly undertaking that might not lead to any success, competitors might indeed be tempted to recoup their expenses, including the price paid for access, by utilizing the respective dataset for the purposes of their activities in various existing markets.

Providing access to data under the essential facilities doctrine is rendered even more problematic when the dataset consists of personal data. It must be noted that in the era of big data, effective anonymization might not always be possible.[86] Therefore, mandating access might clash with the data protection regime under the GDPR.[87]

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[82] See O'DONOGHUE & PADILLA, supra note 29, 1187-1194 for a detailed discussion on the basic options for access terms.

[83] See Guidance Paper, supra note 31, paras 17, 20; *Autorité de la concurrence & Bundeskartellamt*, *Competition Law and Data*, 10.05.2016, 53: "*Data is "non rivalrous" in the sense that access to data by an operator does not, in and of itself, preclude access by other operators… However, accessing this data in the first place may be conditioned on the capacity for the firm to build a sufficiently large customer base, which in turn depends on the extent to which network and experience effects as well as scale economies act as barriers to entry.";* See also Michal S. Gal and Oshrit Aviv, *The Competitive Effects of the GDPR*, 16(3) Journal of Competition Law & Economics 349, 383-384 (2020).

[84] See Vikas Kathuria & Jure Globocnik, *Exclusionary conduct in data-driven markets: limitations of data sharing remedy*, 8(3) Journal of Antitrust Enforcement 511, 523 (2020).

[85] *Id*: "*such a limitation would be almost impossible to monitor in practice and is therefore not a viable solution*".

[86] On the challenges for effects anonymization, see ibid, 532-533 and Gal & Oshrit, supra note 83, 379-380.

[87] See Kathuria & Globocnik, supra note 84; For a broader discussion on the impact of the GDPR on competition, see Gal & Oshrit, supra note 83.

Since this problem is equally acute in the context of leveraging refusals to deal, it does not require further elaboration for the purpose of this article.

B. Conditions assessed under a sector-specific essential facilities doctrine

The presence of these four obstacles for establishing innovation-centric obligations to supply does not mean that antitrust is inherently incapable of regulating dynamic competition. While the substantial uncertainty in such cases elevates the risks for distortions of the innovation process due to enforcement errors, these risks can be mitigated to an appreciable extent. This could be achieved through the assessment of the three sector-specific conditions briefly outlined in section II: (i) the degree of transparency of the R&D process in the industry; (ii) the presence of incentives on behalf of resource holders to innovate at an optimal rate in the relevant area; and (iii) the intensity of consumer harm stemming from the alleged foreclosure. These conditions need to be analysed only cumulatively. Only this way, agencies and courts would be able to generate the comprehensive data necessary to determine the appropriateness of antitrust obligations to supply in a context of innovation competition.

1. Transparency of R&D

One condition that could mitigate the risks for enforcement errors related to the imposition of innovation-centric duties to deal is the high degree of transparency of R&D in the industry. For instance, in the pharmaceutical sector, the process of clinical trials that precedes the marketing authorization of an innovative drug is lengthy and strongly regulated. As already briefly mentioned, regulation itself might render certain inputs held by other companies objectively necessary. This is the case, for instance, where comparator medicines have to be used in the context of a clinical trial to demonstrate the efficacy of an investigational drug and could be sourced only directly from the manufacturer.[88]

Patent disclosures can be considered another important factor contributing to transparency in R&D. In the pharmaceutical industry, patent protection is obtained early in the innovation process – usually by the end of preclinical research.[89] The time between filling an application for the first compound patent and the launch of the final product can be substantial. In their empirical study on the role of knowledge spillovers through patent disclosures in pharmaceutical R&D, Magazzini et al. describe the innovation process in the industry as "*races for reaching the market, in which competitors pursue parallel research trajectories learning from both each other's successes and failures*".[90]

Indeed, certain amount of data about pipeline drugs is publicly available long before they receive a marketing authorization. These data could regard, *inter alia*, the project's stage of development, the intended therapeutic use of the investigational drug as well as its particular mechanism of action. Sadao Nagaoka, for instance, empirically demonstrates that disclosing a new mechanism of action through patent application is a key factor enabling within-mechanism competition in drug development.[91] From a bilateral perspective, the readily available information regarding pipeline products allows for a reliable assessment of whether a certain merger in the industry is capable of eliminating competing R&D.[92]

The presence of a high level of observability of R&D in an industry, facilitated by dense regulation and knowledge spillovers, has an important implication for the appropriateness of innovation-centric duties to deal. It

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[88] Supra note 8.

[89] *Id*, para 138.

[90] Laura Magazzini, Fabio Pammolli, Massimo Riccaboni & Maria Alessandra Rossi, *Patent Disclosure and R&D Competition in Pharmaceuticals*, 18(5) Economics of Innovation and New Technology 467, 469 (2009).

[91] Sadao Nagaoka, *Sources of Innovation of Drug Discovery in Japan and Its Implications* in DRUG DISCOVERY IN JAPAN: INVESTIGATING THE SOURCE OF INNOVATION 285, 315-322 (Sadao Nagaoka ed., Springer 2019).

[92] See Novartis/GaxoSmithKline Oncology Business (Case M.7275) Commission Decision of 28 January 2015, paras 89-94: "*In the pharmaceutical industry, the process of innovation is structured in such a way that it is typically possible at an early stage to identify competing clinical research programs. Competing clinical research programs can be defined as R&D efforts aimed at developing substitutable products and having similar timing. The potential for such clinical research programs to deliver substitutable products should be assessed by reference to the products' characteristics and intended therapeutic use, in particular by reference to their mechanism of action and to the cancer types for which they are being investigated.*"; In an empirical study of the effects of pharmaceutical mergers, Colleen Cunningham, Florian Ederer and Song Ma, 'Killer Acquistions' (2021) 129(3) Journal of Polit Econ 649, 668-669, rely on Pharmaprojects data tracking drug projects from early stage development to launch or discontinuation. These data were collected directly from pharmaceutical companies or researchers and from press releases, patent filings, conference proceedings, regulatory agencies' reports and the medical literature. The authors state that "*the data set therefore allows us to observe a broad set of activities that indicate the development of a drug, including, but not limited to, progress through clinical trials… Pharmaprojects includes information about each drug's intended therapeutic market (e.g., "hypertension") and mechanism of action (e.g., "calcium channel antagonist"), which we use to identify overlapping projects and products as well as competition.*"

allows both enforcers and companies to make relatively accurate predictions of whether an R&D project would be eliminated absent access to a particular upstream resource. The innovation process in certain sectors, however, can be characterized by a lesser degree of observability. Defence and national security or the software industry can serve as examples. Depending on the degree of haziness, such a finding needs to be considered in the legal test as an argument against antitrust intervention due to the potential difficulty for establishing a vertical relationship between the resource and the intended innovation. In such context, the inherent uncertainty associated with the regulation of innovation competition through antitrust, is further amplified.

2. Is the input holder incentivized to innovate at an optimal rate while blocking an access seeker's parallel R&D?

An incumbent that does not plan to compete themselves in innovation *for* a particular market would generally have no incentives to refuse to supply an access seeker that intend to do so. Depending on the valuableness of the input, its holder could profit substantially upon concluding a contract. Moreover, some undertakings' business models are not based on innovation in the first place. The example provided by Marvin B. Lieberman and David B. Montgomery with Matsushita's business model is particularly relevant in this regard. The company did not pursue first-mover advantages through new product innovations but rather let others innovate and prove the market. As the authors note, "*Matsushita then takes a position based on its manufacturing and marketing capabilities. [It] invests in R&D to be ready to enter the market when it begins rapid growth…*".[93] From an essential facilities perspective, providing competitors with access to a necessary resource for innovation, would not only increase revenues, but would be entirely aligned with such incumbents' business strategies. It is input holders that are either current R&D competitors of the access seekers or that plan to become such, who would be incentivized to refuse access. When assessing such conduct's compliance with competition law, a key factor to be considered in the proposed legal test is whether these incumbents are themselves innovating at an optimal rate while blocking their rivals. The result of this inquiry needs to be weighed up against the obstacles for imposing innovation-centric duties to deal, discussed above.

If the assessment of the relevant sector-specific conditions leads to a conclusion that the incumbent is optimally engaged in the R&D process, this should be considered an argument *against* antitrust intervention. Two reasons lead to this conclusion. First, the incumbent has created or acquired the necessary input through competition on the merits, which implies creativity, investment and entrepreneurship that deserve sufficiently strong protection.[94] Second, while such an incumbent's refusal to supply is indeed capable of harming their R&D competitor, the same might not be true regarding the process of innovation.[95] The latter already functions optimally and mandating access to the incumbent's resources at best would not add any additional innovation incentives on their behalf. It would essentially bring an efficient competitor into the R&D race. This would make the latter more competitive only in that sense. Indeed, there is a theoretical probability that a competitor might deliver a valuable innovation to consumers at a higher speed by outperforming an already optimally innovating incumbent. That probability, however, needs to be weighed up against the incumbent's past investments and innovation with regard to the creation of the upstream resource. From that perspective, considering the excessive risk for adverse effects on innovation incentives, an antitrust access mandate does not seem justified.

If the assessment of the relevant sector-specific conditions, however, leads to a conclusion that the incumbent is not incentivized to innovate at an optimal rate in the relevant area, this should be considered an argument *in favour* of antitrust intervention. Refusals to supply of such incumbents should entail greater antitrust scrutiny because they eliminate the competitiveness of the R&D process and, in return, offer little in terms of innovation to consumers. Blocking access seekers' R&D is accordingly capable of substantially delaying the next wave of "*creative destruction*"[96].

The practical challenge is to identify which are the sector-specific conditions creating incentives for optimal or, respectively, sub-optimal innovation on behalf of incumbents. This inquiry would necessitate antitrust agencies and courts to engage in an in-depth economic analysis of the respective sector and individual case.

2.1. Cases where incumbents innovate at an optimal rate

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[93] Lieberman & Montgomery, supra note 72, 54.

[94] Case C-7/97 Bronner, Opinion of Advocate General Jacobs, ECLI:EU:C:1998:264, para 62; For a discussion on the role of investment efforts in Article 102 TFEU assessment, see RAMOS, supra note 51, 120-152.

[95] Even though the process of R&D competition indeed precedes the emergence of antitrust markets, competition law should play a role in securing that innovation-focused undertakings face sufficient pressure so as not to innovate at a sub-optimal rate.

[96] SCHUMPETER, supra note 5.

In certain industries, the strategic behaviour of innovation-focused undertakings is determined by their perception of first-mover advantages as crucial for their business models. Implications from economics, management and psychology literature indeed suggest that pioneering firms could benefit from factors beyond the patent premium compared to late movers. As summarized by Marvin B. Lieberman and David B. Montgomery, early entrants can benefit from a cost advantage derived from the learning curve with costs falling with cumulative output.[97] It could also be easier for them to acquire scarce resources necessary for their business models.[98] Riccardo Vecchiato suggests that these resources may even pertain to customer's perceptual space,[99] while Halberstadt et al. point out to the opportunity for an early retention of highly qualified employees.[100] Halberstadt et al. further note that "*for online start-ups, the position of pioneers may better equip them to raise venture capital due to the innovativeness of the business idea*".[101]

Switching costs and buyers' perception of pioneer firms can play an important role in maximizing first-movers' profits.[102] As discussed by Lieberman and Montgomery in their seminal research, switching costs can stem from "*initial transactions costs or investment*" that buyers need to make in order to switch to late-movers' products; from buyer's adaption to specific characteristics of pioneer's products; or due to an already established network of contracts between the first-mover and buyers on the market.[103] Carpenter and Nakamoto further argue that the order of entry has an important role in the formation of consumers' preferences and the pioneer *"occupies a favourable perceptual position that is difficult to imitate and costly to compete against".*[104] Once brand loyalty is then established, even if products of a better quality are made available, customers might not be willing to switch due to search costs or imperfect information.[105]

An empirical study administered in the US manufacturing sector by Wesley M. Cohen, Richard R. Nelson and John P. Walsh in 1994 observed that lead time advantages were considered a central mechanism through which firms appropriated the returns to their innovations.[106] In steel, metal products, general purpose machines, special purpose machines, computers, communications equipment, TV/radio, medical equipment, precision instruments, auto parts, cars and trucks and aerospace, lead time was reported by R&D managers to be the most important mechanism of all to protect a product innovation.[107]

2.2. Cases where incumbents innovate at a sub-optimal rate

It is far from easy to identify what industry and market conditions incentivize sub-optimal innovation on behalf of undertakings. However, a useful first step is to identify which industries are characterized by a prolonged lack of innovation and subject them to an increased antitrust scrutiny. An incumbent's refusals to supply an access seeker, intending to introduce a disruptive innovation in such an industry, should at minimum be carefully examined.

Let us construct a model where an essential facility holder (A) is a monopolist on a certain downstream market. Consumers on that market are locked-in to that company's product due to the presence of substantial entry barriers that potential competitors face. Lastly, let us suppose that the incumbent has engaged in further pre-emptive

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[97] Lieberman & Montgomery, supra note 72, 42-43: "*In the standard learning-curve model, unit production costs fall with cumulative output. This generates a sustainable cost advantage for the early entrant if learning can be kept proprietary and the firm can maintain leadership in market share. This argument was popularized by the Boston Consulting Group during the 1970s and has had a considerable influence on the strategic management field.*".

[98] *Id*.

[99] Riccardo Vecchiato, *Creating value through foresight: First mover advantages and strategic agility*, 101 Technological Forecasting and Social Change 25, 28 (2015).

[100] Jantje Halberstadt, Sophia Kollhoff, Sascha Kraus & Amandeep Dhir, *Early bird or early worm? First-mover (dis)advantages and the success of web-based social enterprises*, 181 Technological Forecasting and Social Change, 3 (2022).

[101] *Id*.

[102] Lieberman & Montgomery, supra note 72, 46-47.

[103] *Id*.

[104] Gregory S. Carpenter & Kent Nakamoto, *Consumer Preference Formation and Pioneering Advantage*, 26 Journal of Marketing Research 285, 298 (1989): *"All are compared with the pioneer, the ideal brand is perceived as close to it, and the pioneer is perceived as prototypical - representative yet competitively distinct*."

[105] Lieberman & Montgomery, supra note 72, 46.

[106] Wesley M. Cohen, Richard R. Nelson & John P. Walsh, *Protecting their intellectual assets: appropriability conditions and why US manufacturing firms patent (or not)*, Working paper series (National Bureau of Economic Research), no. 7552 (2000).

[107] *Id*, 10.

strategies to protect their position on that market.[108] At a certain point, undertaking (B) approaches the incumbent (A) and requests access to a necessary input held by the latter with the intent to utilize it for the introduction of a disruptive innovation that would obliterate the market on which (A) holds a monopoly. If the essential facility holder perceives this threat, they would refuse to supply. In such a model, Arrow's replacement effect is particularly strong.[109] The incumbent is not under pressure to innovate at an optimal rate because a potential introduction of a disruptive innovation themselves would cannibalize their stable monopolistic profit. At the same time, the exclusive access to an essential facility erects an insurmountable barrier for other innovation-focused undertakings to set up a novel market. A finding of such an industry context is a mitigating factor regarding the obstacles for imposing duties to deal and needs to be interpreted as an argument *in favour* of opening up the R&D process to competition. As Richard Gilbert observes, "*it is critical that established firms do not erect artificial barriers to new competition, because disruptive innovations are often likely to come from rivals that are new to the industry*."[110]

In certain cases, Arrow's replacement effect might indeed be counterbalanced by dominant incumbents' incentives to innovate pre-emptively in order to preserve their position.[111] Economic research has, however, highlighted the bias of incumbents in concentrated industries towards incremental improvements in existing products or technologies rather than disruptive innovations.[112] As Clayton M. Christensen suggests, "*perhaps the most powerful protection that small entrant firms enjoy as they build the emerging markets for disruptive technologies is that they are doing something that it simply does not make sense for the established leaders to do*".[113] In a refusal to supply model, the essential facility holder might not be incentivized to compete with the foreclosed access seeker for the introduction of a disruptive innovation. The former might nevertheless be incentivized to produce incremental innovations on the existing market, which that access seeker threatens to obliterate. In such a case, a trade-off between incremental and disruptive innovation seems inevitable. While both innovation processes bring benefits to society,[114] enforcers seem more likely to favour a market disruption.

3. Intensity of consumer harm stemming from potential restrictions of disruptive innovation

All types of anticompetitive conduct that is capable of restricting innovation are sanctioned under competition law because that restriction is a form of consumer harm. The intensity of the latter, however, can vary substantially depending on the industry in which innovation is being restricted.

Innovation produced by certain industries is indispensable for social welfare and, accordingly, restrictions on it are capable of having an excessively adverse impact on society. As Frank R. Lichtenberg observes, in the periods 1970-80 and 1980-91 pharmaceutical innovation has led to a substantial reduction of mortality and an increase in life expectancy in the US. This, in turn, has had a large-scale positive impact on long-run economic growth.[115] At a patient level, unilateral anticompetitive conduct that restricts life-saving pharmaceutical innovation or, respectively, patients' access to it, could hardly be reconciled with the fundamental rights to life and to the highest attainable standard of health.[116] Such conduct is not merely an antitrust violation but seems to fall short of incumbents' corporate responsibilities to respect human rights.[117] Outside the pharmaceutical sector, unilateral

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[108] For example, in their empirical study of killer acquisitions in the pharmaceutical sector, Cunningham, Ederer & Ma, supra note 92, conclude that "*incumbents acquire firms with overlapping drug projects and…overlapping acquired drugs are less likely to be developed, particularly when the acquirer has strong incentives to protect his existing market power".*

[109] Kenneth J. Arrow, *Economic Welfare and the Allocation of Resources to Invention* in THE RATE AND DIRECTION OF INVENTIVE ACTIVITY 609 (Richard R. Nelson ed., Princeton University Press, 1962).

[110] See GILBERT, supra note 78, 75.

[111] *Id*, 47-50.

[112] Ibid, 121-122 and the literature discussed; see also CLAYTON M. CHRISTENSEN, THE INNOVATOR'S DILEMMA: THE REVOLUTIONARY BOOK THAT WILL CHANGED THE WAY YOU DO BUSINESS (HarperCollins, 2003).

[113] CHRISTENSEN, supra note 112, 260.

[114] Supra note 5.

[115] Frank L. Lichtenberg, *Pharmaceutical innovation as a process of creative destruction* in KNOWLEDGE ACCUMULATION AND INDUSTRY EVOLUTION: THE CASE OF PHARMA-BIOTECH 21 (Mariana Mazzucato & Giovanni Dosi eds., Cambridge University Press, 2009).

[116] See Article 2 Convention for the Protection of Human Rights and Fundamental Freedoms, ECHR, Council of Europe, (1950); Article 2, supra note 21 and Article 12 International Covenant on Economic, Social and Cultural Rights, General Assembly resolution 2200A (XXI) (1966). See also JOO-YOUNG LEE, A HUMAN RIGHTS FRAMEWORK FOR INTELLECTUAL PROPERTY, INNOVATION AND ACCESS TO MEDICINES 122-134 (Ashgate, 2015).

[117] See Kwanghyuk Yoo, *Interaction of Human Rights Law and Competition Law: The Right to Access to Medicines and Consumer Welfare in the U.S. Pharmaceutical Sector*, 43 Vermont Law Review 123, 149 (2018): "*While access to medicines is crucial and imperative to the*

anticompetitive conduct that restricts potentially disruptive innovations, for instance, in the area of safety mechanisms in vehicles or medical devices, is capable of having a comparable long-term negative impact on consumer and, ultimately, social welfare.

Input foreclosures capable of causing consumer harm of an exceptionally high degree should be reviewed through the lens of antitrust with priority. The consumer harm factor, however, should be perceived only as a prioritization criterion and supplementary to the former two sector-specific conditions. The potential harm to consumers from a restriction on disruptive innovation in a particular industry might indeed be exceptionally intense. Such a finding alone, however, should not lead to the imposition of an access mandate. If it is established that the relevant sector-specific conditions incentivize the incumbent to innovate at an optimal rate and the lack of transparency of R&D further amplifies the risk for enforcement errors, antitrust intervention is likely to be counterproductive and ultimately lead to more consumer harm in the long run. This conclusion is reversed, however, if the relevant sector-specific conditions incentivize sub-optimal innovation on behalf of the input holder and the level of observability of the R&D is sufficiently high. This serves to prove that the three factors comprising the proposed sector-specific legal test need to be assessed only cumulatively and weighed up against one another.

C. Making sense of a sector-specific essential facilities doctrine

The ultimate purpose of the proposed legal test is to outline with sufficient precision the circumstances which render refusals to supply disruptive rivals problematic from an *antitrust* perspective. To that end, the three criteria underpinning the presented analytical framework are assessed in a hierarchical order with the aim to determine whether excessive enforcement risks are mitigated to a sufficient extent. Following the potential prioritization of cases based on the consumer harm criterion, one needs to establish a sufficient transparency of R&D in the relevant industry as an important initial filter for antitrust liability. The transparency criterion is designed to mitigate the difficulty for establishing indispensability of the requested resource. As already discussed, that is necessary for the assessment of the resource holder's market power which is, in turn, a prerequisite for the application of Article 102 TFEU. If the relevant upstream resource is not indispensable, no duty to deal under antitrust should exist.

Let us presume that the level of transparency of R&D in the relevant sector is sufficiently high to mitigate the difficulty for establishing a vertical relationship between an essential resource and an intended disruptive innovation. In other words, it allows for a reliable identification of excessive market power due to exclusive access to an indispensable input. Considering the remaining uncertainties surrounding innovation races, discussed in this article, meeting the transparency criterion should not on its own entail an obligation to provide access. One should not forget that the essential facilities doctrine constitutes a tool for safeguarding the innovation *process*, rather than the interests of particular competitors. The demarcation line between these two cases needs to be ultimately drawn by assessing whether the resource holder, while obstructing access, is under sufficient pressure to maintain themselves the optimality of the innovation process. If this is *not* the case, a market power irregularity of a sufficient magnitude can be identified, which, accordingly, justifies the role of antitrust. Despite the enforcement risks, antitrust obligations to deal in such cases can play an important regulatory role by preventing and remedying input foreclosure strategies aimed at artificially sustaining the market status-quo. If input holders themselves innovate optimally, however, an *antitrust* harm of a sufficient degree can hardly be established. While achieving merely diversity in R&D could indeed constitute a legitimate policy objective for certain sectors, other legal regimes are certainly better suited to attain that objective. The proposed legal test suggests that, where impediments to market disruptions are at stake, obligations to supply *under antitrust* should be limited to cases where (i) the degree of transparency in R&D is sufficiently high and (ii) the resource holder is not under sufficient pressure to innovate optimally in the relevant area.

In cases where the transparency of R&D in the relevant sector is not sufficient, essentiality of resources cannot be established and, accordingly, the existence and utilization of excessive market power on behalf of their holders. Therefore, antitrust obligations to supply are not justified already on this ground. It is unnecessary to assess whether resource holders innovate optimally because no such responsibility can be imposed on non-dominant undertakings in the first place. The following table summarizes the different hypotheticals in input foreclosure cases, where market disruptions are allegedly blocked.

Table 1. Hypotheticals

Transparency of R&D	Rate of innovation (incumbent)	Intensity of consumer harm	Antitrust obligation to deal?

human enjoyment of sustainable health and life, corporate practices and structural shortcomings in the pharmaceutical industry increasingly drive derogation from this fundamental right."

High	Optimal	High	No
High	Optimal	Low	No
High	Sub-optimal	Low	Yes
High	Sub-optimal	High	Yes
Low	Optimal	High	No
Low	Optimal	Low	No
Low	Sub-optimal	Low	No
Low	Sub-optimal	High	No

IV. OBLIGATIONS TO DEAL WHERE THE POSITION OF UPSTREAM DOMINANCE IS A RESULT OF STATUTORY MONOPOLY OR ATTAINED ENTIRELY THROUGH STATE RESOURCES

By contrast to section III, this section focuses on cases where undertakings have attained the status of necessary input holders under their former statutory monopolistic position or entirely through State resources. With regard to such cases, the Commission's Guidance Paper provides that "*it may be clear that imposing an obligation to supply is manifestly not capable of having negative effects on the input owner's … incentives to invest and innovate upstream, whether ex ante or ex post*".[118] For that reason, the Commission considers unnecessary to apply the current exceptional circumstances test requiring proof of a likely elimination of all downstream competition due to indispensability of the refused input. Consequently, a mere anticompetitive foreclosure, that is likely to be caused by the refusal, would be sufficient to justify an antitrust obligation to supply.[119]

In its recent *Lithuanian Railway* judgment, the General Court highlighted that the purpose of the exceptional circumstances test is to protect dominant undertakings' incentives to invest in the creation of essential facilities and a requirement for such a protection is not present "*where the dominant position which the undertaking has acquired on the market derives from a former State monopoly".*[120] According to the judgement, the lack of investment in the construction of infrastructure developed through public funds has to be taken into consideration in the context of Article 102 TFEU enforcement.[121] In his opinion, Advocate General Rantos further states that *"the criteria set out* [in the Bronner judgment] *apply to infrastructure of which the dominant undertaking is the owner and which, in principle, results from its own investment".*[122]

This line of reasoning is particularly important for potential cases where a former monopolist's refusal to supply allegedly blocks the introduction of a disruptive innovation. First, it is made clear that the current exceptional circumstances test does not apply invariably and in all circumstances. This provides leeway for potential impositions of obligations to supply in cases where the consumer harm stems from distortions of the R&D process and no vertical integration can be established. Since the intended derivative product would not compete in an existing downstream market with products offered by the input holder, a strict application of the existing legal test would otherwise prevent antitrust liability. Second, by nuancing the standard of liability on the basis of how the upstream position has been attained, this approach acknowledges that not all duties to supply put at an equal risk undertakings' incentives to invest and innovate. This is indeed one of the central assumptions on which the proposed sector-specific essential facilities doctrine is based. The more substantial role State support has played in the development of a particular resource, the more unjustified it becomes for its holder to claim that *ex ante* incentives would be curbed by an access mandate.[123] The involvement of State resources is itself a factor that mitigates the risks for errors in the assessment of conduct, the alleged anticompetitive effects of which pertain to the process of innovation competition. There is accordingly no need to further investigate other sector-specific factors, such as transparency of R&D or presence of incentives for optimal innovation on behalf of the necessary input holder.

It would be indeed difficult for former monopolists to claim that refusals to supply should not be sanctioned because of the challenges for establishing facility sharing obligations, outlined in section III. Access mandates to upstream inputs developed entirely through State resources are unlikely to result in less investment in future facilities or less fierce competition in R&D. And this holds true regardless of the outcome of the three-pronged sector-specific analysis proposed in this article. On the contrary, sharing a necessary input with a competitor is

[118] Guidance Paper, supra note 31, para 82.

[119] *Id.*

[120] Lithuanian Railways, supra note 26, paras 90-91.

[121] *Id*, para 93.

[122] Rantos, supra note 61, para 85.

[123] See RAMOS, supra note 51, 83-84.

capable of incentivizing the former monopolist to optimize their R&D activities in the face of the increased threat to be overtaken by that competitor. In these cases, facility sharing obligations could effectively play a residual role in securing optimal functioning of the R&D process to the benefit of consumers. One could, nevertheless, reasonably raise a concern that the boundaries between private investment and State resources might not always be clear-cut in the real world. This is subject of discussion in the following section.

V. OBLIGATIONS TO DEAL WHERE THE POSITION OF UPSTREAM DOMINANCE IS PARTIALLY A RESULT OF PUBLIC FUNDING OR CERTAIN SPECIAL OR EXCLUSIVE RIGHTS

A delineation criterion for antitrust liability in refusal to deal cases, based solely on the way in which the upstream position has been attained, could indeed be criticized.[124] A particularly relevant point of criticism is that in certain cases the role of public funding in attaining the position of upstream dominance might not be accurately measurable. As commentators note, assets developed under State monopoly might be subject to substantial investment and significant improvements after privatization.[125] Even undertakings that have not been State monopolies might have been granted certain special or exclusive rights. These rights may, accordingly, have been combined with private investment resulting in the production of a truly valuable and unique upstream resource.

If the role of special or exclusive rights in the development of the necessary input is detrimental and private investment is insignificant, an obligation to deal could be imposed regarding the entire asset, as long as the access seeker is indeed blocked from opening a new market. Such an intervention is unlikely to pose substantial risks for innovation incentives that necessitate mitigation through the proposed sector-specific analysis.

Let us now look into potential cases where the input holder's private investment is more substantial or even prevailing. Put differently, the necessary input is truly a mixture of private and public resources. Do these cases necessitate the application also of the second stage of the sector-specific test in order to assess the legality of the foreclosure? The involvement of private resources is an argument in favour of such, while the involvement of public ones – against. This article argues that the solution to this dilemma depends on whether the relevant input is divisible.

In certain cases, upstream inputs might be divisible and only partially a result of public funding. Large datasets can serve as an example. Specific segments of data could have been collected in different periods, conditions and through different means. For instance, certain data might have been collected in the context of a former monopoly, while other – in a perfectly competitive environment through substantial investment. Partial obligations to supply could constitute a solution to such cases. Their implementation would require delineating the part of the input developed through State support from that developed through competition on the merits. Once delineated, the two parts can be subject to different access regimes, depending on their origin. An access mandate in relation to the data collected under non-competitive conditions could be imposed upon establishing mere anticompetitive effect. Applying the first stage of the sector-specific legal test seems therefore sufficient. The appropriateness of sharing the data collected through competition on the merits, however, needs to be assessed also under the second stage of the test. The three sector-specific factors proposed in the article – transparency of R&D, incentives for optimal innovation and intensity of consumer harm, can provide valuable guidance as to whether the increased enforcement risks are sufficiently mitigated. Only if this is the case, sharing obligations should be imposed in relation to the entire asset.

In certain cases, however, upstream inputs might not divisible. Think of a technology patent that is result of a research collaboration involving utilization of both private and public resources. The application of parallel legal standards would not be possible in such cases. The involvement of private investment indeed increases the risk for chilling innovation incentives, although less acutely, compared to cases where the asset has been entirely developed through such. From that perspective, the application of the second stage of the proposed legal test seems once again justified. Overall, the mixed origin of essential resources does not constitute an insurmountable obstacle for application of the essential facilities doctrine in a context of innovation competition.

VI. CONCLUSION

[124] See in this regard, O'DONOGHUE & PADILLA, supra note 29, 674-676 and DAMIEN GERADIN, ANNE LAYNE-FARRAR & NICOLAS PETIT, EU COMPETITION LAW AND ECONOMICS 266 (Oxford University Press, 2012).

[125] O'DONOGHUE & PADILLA, supra note 29, 676; RAMOS, supra note 51, 84.

Strategies impeding access to essential resources can influence the formation of future antitrust markets as much as they can produce anticompetitive effects on already existing markets. In industries where innovation is a central parameter of competition, cautious approach is warranted in relation to input foreclosures capable of restricting market disruptions. While the anticompetitive effect of such conduct is clearly identifiable, applying EU competition rules in a dynamic context is not without risks. The latter are caused by the inherent uncertainty of innovation races.

This article outlined four challenges for tackling essential input foreclosures in innovative industries. In response, a sector-specific approach to the essential facilities doctrine was proposed. The latter retains the current exceptional circumstances analysis and complements it with a two-stage legal test for distinguishing procompetitive from anticompetitive exclusions. The first stage investigates the origins of the incumbent's status of an essential input holder. The second stage examines the industry-specific context of the exclusion by considering cumulatively three conditions: (i) the degree of transparency of R&D; (ii) the extent to which the input holder is incentivized to innovate at an optimal rate in the relevant field; and (iii) the intensity of consumer harm stemming from the conduct.

The information accumulated under this conceptual framework is capable of reliably outlining the cases where competition law could be effectively utilized as a residual tool for stimulating innovation, along with traditionally used mechanisms such as intellectual property, education and labour policy, tax incentives and infrastructure development.