

Collusion in Technical Development: A Perspective on EC's Emission Cleaning Judgement

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Abstract

In July 2021, the European Commission (EC) came out with a decision in a matter involving the issue of collusion in technical development with reference to emission cleaning for new diesel passenger cars. The said decision is the first of its kind, wherein the EC ruled that meeting of minds amongst competitors placed at a horizontal level with a view to limit technical development and competition on innovation in the area of emission cleaning technologies for passenger cars amounts to cartelisation, leading to the imposition of penalty on the five colluding parties. Taking clues from the above ruling of EC, this paper, by using doctrinal research methods, establishes a parallel between technology lock-in, network externalities, and collusion in technical development so far as their anti-competitive outcomes are concerned and provides that, in both technological lock-in and technical collusion, markets fail to produce efficient/competitive outcome. The paper supplements existing literature by advocating prompt regulatory intervention in both situations to correct market aberrations. Even though the ruling under reference relates to emission cleaning technologies for passenger cars, similar conduct may be present in other sectors. Accordingly, the paper suggests prompt regulatory action by competition authorities to ensure effective competition in the technology and innovation fields and for the benefit of society as a whole through the availability of innovative products at competitive prices and favourable impact on the environment.

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1. Introduction

Making markets fair and competitive is the ultimate goal of competition law enforcement by competition agencies the world over. The stated objective can be achieved, inter alia, through examination of ex-ante and ex-post conduct of enterprises in the market place. Ex-ante conduct examination aims to address competition concerns arising out of the mergers and acquisitions (M&As) of enterprises by preventing the emergence of entities that have the capacity and incentive to exercise market power or market control (UNCTAD, 2010), whereas the scope of ex-post conduct examination is broad-based, ranging from microeconomic analysis of specific interventions in a defined relevant market to macroeconomic assessment of the overall impact of competition law/policy enforcement (Ilzkovitz *et al.*, 2015). While examining the ex-post conduct of the entities with respect to their involvement in any horizontal or vertical anti-competitive agreement or abuse of dominant position, competition authorities may, inter alia, levy fines which, in turn, put a cost on such enterprises (OECD, 2016). Even though most competition law jurisdictions have provisions in their statutes/regulations to impose monetary penalties on the erring entities for violation of competition law, jurisdictions such as the UK and the US have provisions for criminal sanctions for involvement in some kind of horizontal anti-competitive conduct/cartelisation. It is a known fact that horizontal anti-competitive agreements/collusive conduct with respect to fixation of price, limitation of output, market allocation, etc., often come to the fore of competition agencies and therefore, frequently fall under antitrust scrutiny. However, the same is not the case for horizontal anti-competitive agreements/collusive conduct with respect to limitation of technical development or competition on innovation, limitation and control of quality of output, market manipulation through advertisement, unfair product differentiation, etc. (non-price collusion).

Limitation of technical or scientific development relating to the manufacture/production of any commodity to the prejudice of consumers by a dominant enterprise in a relevant market, and/or collusion between enterprises or person in the same level of production/supply chain with a view to limit or control technical development/competition on innovation has been considered one of the pernicious anti-competitive conducts

in competition regulation across the world. Most jurisdictions have the provision in their statutes/regulations that the practice of limiting technical and scientific development with respect to the production and distribution of goods and services or limiting competition on innovation is anti-competitive, and such practice on the part of any market participant is against the basic norms of free and fair competition in markets. Limitation/control of technical and scientific development or limiting competition on innovation may have a contractionary effect on the volume of output. In turn, it adversely affects output prices and causes harm to competition and consumers (Cellini *et al.*, 2009).

The Competition Act, 2002 ('Act') of India, under sub-section 3(b) of Section 3 and sub-section 2(b)(ii) of Section 4, prescribes the practice of limiting or controlling technical and scientific development by producers/manufacturers as anti-competitive. The former provision proscribes collusion amongst market participants operating at the horizontal level to limit and control technical development, whereas the latter prohibits a dominant enterprise in a relevant market to limit or restrict technical or scientific development relating to the production and distribution of goods or services (The Competition Act, 2002). There exists unanimity amongst antitrust scholars that meeting of minds amongst competitors to fix prices and/or outputs as well as to limit technological development or limit competition on innovation dampens social welfare through reduction in overall output and consequent enhancement in prices. Therefore, severe strictures of antitrust law have been directed against such activities (Baumal, 1992).

So far as enforcement of competition law in addressing the issue of collusion in technical development and competition on innovation is concerned, until recently, there were hardly any cases dealt by competition authorities the world over, including the Competition Commission of India (CCI). However, in July 2021, the Directorate General for Competition, European Commission (EC), decided a case (AT.40178 - Car Emissions) pertaining to collusion in technical development and competition on innovation in the area of emission cleaning technologies for passenger cars, relating to a proceeding under Article 101 of the Treaty on the Functioning of the European Union and Article 53 of the European Economic Area Agreement. Additionally, since the beginning of its antitrust enforcement

activities in 2010, as on 30 September 2022, CCI had examined 1,187 antitrust cases for various alleged anti-competitive practices but has not passed final orders in any matter against any entity involving horizontal non-price collusion for limiting and controlling technical or scientific development and competition on innovation, in contravention of the provisions of Section 3(3)(b) of the Act (Competition Commission of India, 2021). Thus, this area appears to be the least explored and was not on the radar of competition authorities till the aforesaid ruling by the EC. This implies that the said EC ruling may be an eye-opener for competition regulators, and the same may motivate them to look at this area of competition law enforcement.

Against the above backdrop, this paper explores the EC case under reference in detail with respect to antitrust issues that emerge due to collusion in technical development and competition on innovation, including learnings and takeaways for competition authorities. Given the pro-competitive effects of cooperation in technical development in terms of efficiency gain (Jorde & Teece, 1989), the paper analyses the implications of the aforementioned EC decision and explores the way ahead and challenges for competition authorities to regulate horizontal non-price collusion that limit technical or scientific development and competition on innovation so as to meet the end objective of achieving faster sustainable economic progress. The paper argues that the EC decision under reference may be considered a starting point for antitrust authorities to focus on this area of antitrust enforcement, as collusion in technical development or competition on innovation or other non-price dimensions such as quality, advertisement, and product differentiation may be present in any sector or market and yet, not explored for antitrust scrutiny. In addition, this paper establishes a link between technology lock-in and collusion in technical development and addresses its underlying cause, i.e., network externalities and the issue of market failure in case of technical collusion and consequent government intervention. Moreover, the paper supports and supplements the argument that the anti-competitive impacts of technology lock-in and collusion in technical development are similar and the market fails to adopt superior technology due to the lock-in effect of existing inferior technology, resulting in the necessity of competition law enforcement in case of technology lock-in and collusion in technical development. The applicable car emission norms in India and their

possible anti-competitive concerns have also been addressed in this paper to provide an Indian perspective on the issue.

To this end, in Section 2, this paper provides a description of the research methodology used by the authors to address the issues under question, as highlighted in the introductory section ante. Section 3 discusses the concepts of technology lock-in and its underlying causes, e.g., network effects as well as impacts of technology lock-in and collusion in technical development, have been attempted. In Section 4, the paper discusses the need for government intervention in case of technology lock-in as well as collusion in technical development and antitrust issues arising from technology collusion. Section 5 elaborates on the EC decision under reference, and Section 6 explores whether the anti-competitive concerns pertaining to emission cleaning technologies for passenger cars that were found in Europe also exist in India. This section also delves into the car emission norms in India, assesses the competitive health of the automotive sector with respect to car emission norms, and discusses the implications/learnings for competition authorities along with some suggestions thereof. The concluding remarks of the paper are presented in Section 7.

2. Data and Research Methodology

A doctrinal research methodology has been employed to meet the objective of the paper, as set out supra, which would exemplify existing knowledge in the common domain on the area under study. This is theoretical research aimed at locating and advancing a particular legal argument and legal study with more nuanced reasoning. Doctrinal research, often considered normal judicial research, inquires into the rules of a specific subject. This method is employed to find definite answers to legal questions through a thorough investigation of law books, statutes, legislation, commentaries, and other legal documents. Doctrinal research focuses on examining legal theory and how it has been formed and implemented. It may be defined as a means of research that has been carried out on a legal proposition by way of analysing existing statutory provisions and cases through reasoning (Hutch & Duncan, 2012). Dobinson and Johns (2007) defined doctrinal legal research as follows:

...the research which asks what the law is in a particular area. It is concerned with analysis of the legal doctrine and how it has been

developed and applied. This type of research is also known as pure theoretical research. It consists of either simple research directed at finding a specific statement of the law or a more complex and in-depth analysis of legal reasoning.

Pure legal research is different from empirical or non-doctrinal research. Rather than using secondary sources of information to arrive at a conclusion to a legal proposition in doctrinal research, in empirical/non-doctrinal research, the researcher uses primary information or data collected through field survey to draw an inference about the legal problem under question. However, a combination of both methods can be used in legal research, depending on the research question.

While adopting the doctrinal or theoretical research method, this paper uses information gathered from different secondary sources, such as statutes, decisions/judgements, books, research papers, journals, websites, and case laws on the area under study. This study uses analytical, critical, comparative, and other necessary methods to arrive at the conclusion and to understand the findings and provide suggestions. It also follows an interdisciplinary approach, focusing on the analysis of the aforesaid EC decision and inferences thereof, based on the application of competition law principles and how market failure contributes to technology lock-in and collusion in technical development, which involves the appreciation of some of the economic concepts, principles, and their interpretation/analysis.

3. Technology Lock-in, Network Externalities, and Collusion in Technical Development

Before delving into the analysis of the EC ruling under reference, this section aims to establish a link between the concepts of technology lock-in, network externalities, and collusion in technical development or competition on innovation. Technology lock-in refers to a situation wherein, the more an economy adopts a certain technology, the lesser the likelihood of users switching to other, superior technology (Spulber, 2008). In case of technology lock-in, markets may adopt inferior technology despite the availability of superior technology. To put it differently, in case of technology lock-in, the market fails to adopt superior technology due to the lock-in effect of existing inferior technology. Technology

lock-in often occurs when consumers choose between products that have network effects or network externalities. Network effects means a change in the benefits that a consumer receives from a product when there is an increase in the number of consumers of that product. That is, network externalities occur when the value of a product is dependent on the number of customers already owning that good. Technology lock-in is an unavoidable consequence of network externalities, as it is based on market failure assumption. If there is no market failure, there would be no further inefficiencies in the adoption of technology (Hinloopen *and competitive markets is.*, 2017). Thus, the underlying issue is network effects and not technology lock-in. The increase or decrease of technology lock-in depends on the existence or non-existence of network externalities, implying that a product/technology with more network effects has greater scope for technology lock-in and consequent market failure, and vice-versa.

As stated, in case of technology lock-in, markets fail to give an efficient/competitive outcome due to the adoption of inferior technology, even in the presence of superior technology. Thus, there is a case of market failure in such scenarios. It is similar when there is collusion amongst market participants for limiting technical development or competition on innovation. In case of collusion in technical development, in the absence of competitive market structure due to the meeting of minds, markets fail to operate efficiently and market participants do not allow superior technology to replace existing inferior technology. The difference between the two is that the former may happen when a free and competitive market fails to adopt a superior technology due to the presence of network externalities or the lock-in effect of existing inferior technology, whereas the latter is an outcome of collusive action or meeting of minds by market participants in order to gain extra-normal profits/benefits through employing inferior technology. However, both technology collusion and technology lock-in represent market failure and consequent inefficiency.

From the viewpoint of inefficiency and consequent welfare loss to society, as highlighted above, both may have similar effects. From the competition lens, collusion with a view to limit technological advancement is a pernicious anti-competitive conduct, whereas technology lock-in may not be due to any anti-competitive conduct of market participants. However, there could be an anti-competitive outcome to both collusion

in technical development and technology lock-in. There may also be a case when a dominant enterprise or group in a well-defined relevant market limits or controls technical or scientific development, which has similar anti-competitive effects and consequent harm to competition. Thus, the authors are of the view that limitation or control of technical development or limitation in competition on innovation through collusive conduct is akin to technology lock-in. When there is collusion to limit technical development or competition on innovation, it hinders technical development in that area of production and has a lock-in effect (Zhao, 2015).

4. Collusion in Technical Development and Market Failure: Competition Law Concerns

This section focuses on the need for intervention by the government/competition authority in the event of technology lock-in or collusion in technical development/competition on innovation. In continuation of section ante, an attempt has been made here to answer whether technology lock-in or collusion in technical development/competition on innovation can be described as a situation of market failure attracting intervention by the government or competition authority. It is a foregone conclusion that fair and competitive markets is sine qua non for faster economic development. Greater innovation and technological advancement through research and development drive economies to grow, and lack of competition may create hindrances on the path of economic acceleration. Further, technological advancement and innovation help drive rapid economic growth which, in turn, addresses socio-economic challenges such as poverty, unemployment, inequality, lack of education facilities/illiteracy, and lack of healthcare facilities within a nation. Many growth-enhancing innovations and technological advancement also address social challenges (OECD, 2012). Hence, it is in the interest of nations, and thereby, competition authorities, to make the technology and innovation markets fair and competitive.

There may be harm to competition due to collusion in technical development/competition on innovation or technology lock-in, and therefore, government interference is desirable for efficient market outcome. Economic theory states that government intervention is desirable

when the market fails to operate efficiently (NSW Government, 2017). Efficiency is an economic state wherein available resources are optimally allocated to serve each person or entity of a society in the best possible way while maintaining minimal waste and inefficiency (Boyle, n.d.).

Efficiency in resource allocation is vital for socially desirable outcomes, which is possible when economic agents such as the consumer, producer, and government make rational choices, and the market structure is free and competitive. In the absence of such conditions, markets fail to enact efficient resource allocation; this is called market failure. Thus, market failure refers to the inefficient distribution of output in a free market. It is a scenario where individual pursuits of self-interest lead to inefficient results, which can be improved upon from a societal point of view (MCRHRDI, n.d.). The sources of market failure include provision of public goods, market control/market power, externalities, and imperfect information/information asymmetry. For the purposes of competition law enforcement, the most relevant of these is the existence of market power or absence of the condition of perfect competition (OECD, n.d.).

Antitrust researchers who believe in technology lock-in are also supporters of intervention by the government. They are of the view that governments should step in to coordinate technology adoption decisions (Spulber, 2008), since consumers may fail to adopt the best technology available and its benefits due to the presence of network effects.

The unwillingness of enterprises to invest in innovation leading to superior technology or further development of the technology in use, along with positive network effect, gives rise to a situation wherein individual consumption benefit varies positively with the number of people that buy the same or compatible products (Jullien *et al.*, 2016). It is nothing but the mutual benefits that consumers derive from consuming the same commodity. Otherwise, consumers lose benefits, which gives rise to market failure. Further, different consumers may adopt different technologies, and such consumers may not gain the benefits of network effects. Because of producers' coordination in the market, consumers are not able to alleviate the effects of the choice of inferior technology. Therefore, bad or inferior technology would not be displaced by superior technology, in contrast to the general presumption of competitive markets,

which assumes that superior technology will displace inferior technology purely on the basis of its merits and natural shift in consumer behaviour.

In such a situation, government intervention is necessary to address market failure, which is based on the notion that the government can identify such market failure along with probable technology collusion and therefore, make the best choice among technology when the market is unwilling to do so. It is also important as systematic market failure in the area of technological advancement may hinder the economic progress of a nation through reduction in factor productivity and growth, given that modern economies are largely driven by technological development. Since, in case of collusion with respect to technical development, social benefits in terms of benefits to consumers and producers are compromised, intervention by the government to achieve efficiency and maximum social advantage is desirable.

Over and above disadvantages to the society in terms of welfare loss, as highlighted in the section ante, technology lock-in and collusion in technical development also adversely impact the market and therefore, are against the basic principles of competition. Technological advancement could make collusion among rival firms easier, especially when there is cooperation among rival firms for the purposes of research and development, leading to price fixing and other anti-competitive conduct that could further lead to higher prices and less competition, which is harder to trace (Labaton, 2000). The impact of competition law on technical advancement is indirect. Competition law has been framed in a manner as to discourage firms from indulging in anti-competitive practices which, in turn, encourage firms to undertake research and development to strive for productivity growth and bring new products into the market.

There are arguments in the literature that technology lock-in may give rise to competition law concerns. One can also find arguments to the contrary. Some scholars highlight a direct relationship between technology lock-in and antitrust concerns, whereas others have opinions to the contrary. The former argues that technology lock-in gives rise to antitrust concerns, whereas the latter is of the view that the free market is self-correcting and does not allow technology lock-in, and therefore, intervention of the government or enforcement intervention by the competition regulator is not desirable (Spulber, 2008).

These arguments could be advanced in furtherance of the view that technology lock-in has anti-competitive effects. Despite the availability of superior technology in the market, when manufacturers/producers of a product collude with each other to opt for inferior technology, there will be loss of total welfare in terms of sum of loss to consumers and producers. Superior technology is always the socially desirable option, as it could maximise total social welfare vis-à-vis inferior technology. There is no doubt that collusion in technical development or technology lock-in deprives consumers from deriving the benefits of availability of a superior technology in terms of better product and reasonable cost. It also deprives producers of the gains that may be accrued from efficiency and deprives society from achieving maximum social advantage out of technological advancement and innovation. This is the legal basis of the provisions of Sections 3(3)(b) and 4(2)(b)(ii) of the Act, which prohibits collusion in technical development or limitation of competition on innovation as anti-competitive.

The viewpoint that collusion in technical development has anti-competitive effects has been substantiated by the EC vide its recent ruling in the matter of emission cleaning for new diesel passenger cars, wherein the EC decided that five car manufacturers of Europe, viz., Daimler, BMW (Bayerische Motoren Werke AG), and Volkswagen Group (Volkswagen, Audi, and Porsche) have colluded to restrict technical development or eliminate competition on innovation in the area of nitrogen oxide (NOx) cleaning from June 2009 to October 2014, in contravention of EU antitrust rules (Haid *et al.*, 2022). The said conduct of the aforesaid five passenger car manufacturers has been held to be an infringement by object in the form of a limitation of technical development or competition on innovation, as per the provisions of Article 101(1)(b) of the Treaty and Article 53(1)(b) of the European Economic Area Agreement (European Commission, n.d.). This first ever ruling by a competition authority against collusion with a view to limit technical development or competition on innovation strengthens the viewpoint that such collusion has anti-competitive effects, and it is desirable for competition authorities/government to intervene in such events in the economy to ensure fair competition in technology innovation.

5. EC Ruling on Collusion in Technical Development – Case Analysis

The aforesaid ruling of the EC was delivered in July 2021. The decision is the first of its kind, wherein the EC held that collusion in technical development or limiting competition on innovation amounts to a cartel. The EC imposed a fine of EUR 875 million (USD 1 billion) on the aforesaid colluding parties. The penalty on VW Group (which owns Audi and Porsche) was approximately EUR 500 million and on BMW was approximately EUR 375 million. No penalty was imposed on Daimler as it revealed the existence of the said cartel to the EC under Leniency Notice (European Commission, Case of AT.40178, 2021). All the parties acknowledged their involvement in the cartel and agreed to settle the case.

Cars emit an exhaust stream of gases into the environment, some of which are harmful for the environment as well as public health. NOx is one such gas. If liquid urea, commonly called AdBlue or blue liquid, is added to the exhaust stream, NOx turns into harmless water and nitrogen in a process called the selective catalytic reduction (SCR) system of diesel cars. This happens only if enough AdBlue is added.

In 2007, European law introduced minimum standards for NOx emissions (Euro 5 and Euro 6 norms) which were to be implemented by 2009. For compliance with the law, Daimler, BMW, Volkswagen, Porsche, and Audi held regular technical meetings, internally referred to as the “circle of five,” and developed SCR systems to meet the prescribed Euro 5 and Euro 6 norms. The circle of five meetings enabled said car manufacturers to develop a technology to reduce NOx emissions and bring that technology to the market (European Commission, Case of AT.40178, Statement, 2021). This cooperation to bring an advanced technology to the market is as per the law of the land, as the same was done to enhance market efficiency and for the betterment of consumers. However, this legally permissible cooperation turned out to be anti-competitive and therefore illegal when the participating car manufacturers exploited the technology to the fullest extent by deciding not to compete. Thus, the common understanding to not compete on the technology they developed to reduce NOx emissions resulted in the five car manufacturers breaching the norms of competition. The said carmakers agreed on the size of the AdBlue tanks in the diesel cars and on the ranges until the next refill. They also exchanged sensitive information about prospective AdBlue tank sizes and ranges, as well

as average AdBlue consumption of future car models. They knew that injecting more AdBlue could lead to more effective NOx cleaning for many car models under certain driving conditions. Additionally, car manufacturers knew that there was a technical possibility to reduce NOx emissions more efficiently than required by EU regulation and that competing on this technology is relevant for consumers. Despite knowing this, the car manufacturers colluded by indicating to each other that none of them would aim to clean above the minimum standard required by law. Further, Daimler, BMW, and Volkswagen Group agreed on AdBlue tank sizes and ranges. Also, a common understanding was reached on average estimated AdBlue consumption. Besides, the said carmakers exchanged commercially sensitive information on these elements, thereby removing uncertainty about their future market conduct concerning cleaning NOx emissions above and beyond legal requirements (so called “over-fulfillment”) and AdBlue refill ranges.

For the EC, the issue was not whether the carmakers complied with the legally prescribed emission norms or adopted a higher standard; rather, the EC decided on the issue of collusion in technical development amounting to a cartel. In view of this, the Commission provided the parties with guidance on SCR system related cooperation which raises no competition concerns, such as standardisation of the AdBlue filler neck, discussion of quality standards for AdBlue, or the joint development of an AdBlue dosing software platform. In April 2019, the EC adopted a Statement of Objections in the ordinary procedure against Daimler, BMW, and Volkswagen Group concerning their technical cooperation on the development of SCR systems for new diesel passenger cars and concerning Otto particle filters (OPF) to reduce harmful particle emissions from the exhaust gases of new petrol passenger cars with direct injection. However, in February 2021, the case switched from ordinary procedure to settlement procedure. The EC decided not to further pursue the OPF aspect of the case as it considered that there was insufficient evidence to prove infringement of the OPF aspect. It was observed that all citizens, and not just users of diesel cars, must be able to trust car manufacturers to compete with one another to reduce harmful emissions from their vehicles. However, carmakers did not meet these expectations. For over 5 years, car manufacturers deliberately avoided competing on better cleaning than that required by EU emission standards, despite the relevant

technology being available. The law fixes minimum cleaning standards, which all producers have to respect. However, it leaves ample room for manufacturers to compete on doing better than the minimum.

Reduced pollution is an important characteristic for any car, and this cartel aimed at restricting competition on this key competition parameter. Through this conduct, the carmakers eliminated the inherent threat that their competitor would do better, and this threat is a key driver of innovation. It is the essence of a well-functioning market and a guarantee of best possible outcomes, including in terms of quality and product development. Competition and innovation in this space are also essential for Europe to meet its ambitious Green Deal objectives. Any attempt to restrict competition to the detriment of innovation will make it more difficult to meet these targets. The decision in this case is an example of the EC's determination to pursue any anti-competitive conduct in this space (European Commission, Case AT.40178, 2021).

The fines were imposed on the basis of the EC's 2006 Guidelines (European Commission, 2006b). In setting the level of fines, the EC considered the sale value of diesel passenger cars of the parties equipped with SCR systems in the EEA Agreement in 2013, the gravity of the infringement, and the geographic scope. An additional reduction was applied for all parties, given that it was the first cartel prohibition decision based solely on a restriction of technical development and not on price fixing, market sharing, or customer allocation. Under the 2006 Leniency Notice (European Commission, 2006a), Daimler received full immunity, and Volkswagen Group also benefited from a reduction of the fine under the 2006 Leniency Notice. Additionally, the EC applied a reduction of 10% of the fines for all parties under the 2008 Settlement Notice in view of the acknowledgment of their participation in the cartel and of their liability in this infringement.

6. Emission Norms in India and the Implications of EC's Judgement for Competition Authorities

Multiple agencies are responsible for regulating car emission norms in India. The Ministry of Road Transport, Highways & Shipping (MoRTH&S) is the nodal agency, and the Central Motor Vehicles Rules-Technical Standing Committee (CMVR-TSC), Standing Committee on Implementation of Emission Legislation (SCOE), and Automotive Industry Standards Committee (AISC) advise MoRTH&S on emission regulation issues. Moreover, the Ministry of Petroleum and Natural Gas, Ministry of Environment & Forest, etc., help MoRTH&S prepare roadmaps for emission cleaning (Society of Indian Automobile Manufacturers, n.d.). The task of making the emission technology market fair and competitive rests with CCI.

Prior to 2016, BS-IV emission norms were prevalent in India. India directly shifted to the environment-friendly BS-VI emission norms, skipping BS-V norms, in 2020, in the midst of the COVID-19 lockdown. The sale and registration of BS-IV vehicles ended in April 2020; however, the deadline was later extended for the registration of already-sold BS-IV vehicles due to the pandemic lockdown. The roll out of BS-VI reflects India's dedication towards achieving its international commitments for environment health. The BS-VI emission norms have required petrol vehicles to reduce NO_x emissions by 25%, whereas diesel engines have had to reduce their hydrocarbon + nitrogen oxides (HC + NO_x) by 43%, NO_x levels by 68%, and particulate matter levels by 82%.

The emission norms of these new vehicles are now on par with Europe. The emission norms of all models of two-wheelers in India are ahead of Europe (2021) and Japan (2022), which makes India the first country to adopt this level of emission norms (The Hindu, 2021). For compliance with BS-VI emission norms, more than 1,000 vehicle models and variants of BS-VI were developed in 3 years, and INR 70,000 crores were invested. Additionally, INR 60,000 crores were spent on the switch to BS-VI compliant fuels.

Given the high volume of investments made by the automobile industry and the fuel industry in shifting to the BS-VI standard, the possibility that car manufacturers may indulge in anti-competitive practices of collusion

with respect to technical development in emission technology seems remote. However, this does not take away from the fact that the EC case under reference establishes that car manufacturing companies possess the emission technology to achieve emission levels lower than the standard required by law. It is expected that car manufacturers in India may now compete to the optimum so that cars launched in the Indian market will be greener and help India achieve its Clean India Green India goal.

The issue of collusion in technical development and its anti-competitive aspects has been addressed for the first time by a competition authority. Penalties imposed on the colluding parties while weighing the pro-competitive effects of cooperation in the area of technological advancement may lead to innovation. Considering that this area of competition law enforcement has not been on the radar of competition authorities until recently and none of the competition authorities the world over has ever passed such a ruling declaring the meeting of minds/collusive action by competitors to limit technical development or competition on innovation, the EC decision will set a precedent not only for future technological fines in the EU but also for other competition jurisdictions to reflect on the issue. Even though limitation of technology and competition on emission cleaning innovation for new diesel passenger cars was the issue under consideration before the EC while pronouncing the aforementioned ruling, there could be similar conduct in other areas/sectors, wherein competitors might indulge in collusive conduct to limit technical development and innovation. The possibility of the presence of such conduct in other sectors involving technology cannot be ruled out. Therefore, competition authorities may take note of the aforesaid ruling of the EC and remain alert in order to burst such collusive conduct. Considering the role and significance of technological advancement in the economic development of a country and its positive effects on the environment, it is incumbent upon competition authorities to ensure that market participants do not indulge in practices with a view to control/limit technical and scientific development. Competition authorities may take a cue from the said EC judgement and focus on this unexplored area of competition law enforcement, reflecting on the possible scope of regulation so as to optimise their contribution for sustainable economic progress. However, the question remains as to what extent competition authorities have to ignore the pro-competitive effects of innovation,

particularly at a time when there are growing challenges within digital economy as well as concerns for environmental protection, in order to strike a balance between the goal of making markets competitive and achieving efficiency, which is permissible under competition law.

In this regard, the observation of the EC antitrust chief Margrethe Vestager is noteworthy:

The five car manufacturers Daimler, BMW, Volkswagen, Audi and Porsche possessed the technology to reduce harmful emissions beyond what was legally required under EU emission standards. But they avoided to compete on using this technology's full potential to clean better than what is required by law. So today's decision is about how legitimate technical cooperation went wrong. (European Commission, Case AT.40178, 2021)

Even though technical development cooperation can be pro-competitive and permitted under EU competition law, in this case, the parties overstepped permissible boundaries. Thus, the rationale, as may be deduced from this case, is that entities engaged in identical or similar trade of goods/provision of services must always compete to the optimum, even if they satisfy the standardised criteria as required by law, in order to maximise consumer benefit. Any agreement between entities requiring them to deviate from the best possible conduct would contravene the antitrust law as made on that behalf.

This case has provided food for thought to competition authorities around the world, as cartels on technical development and other non-price dimensions, such as quality, advertisement, and product differentiation, may be present in any industry and may not have been considered, as they are difficult to identify compared to price-based cartels. The present case will motivate competition agencies and industry stakeholders to start thinking in this direction. Competition authorities may keep an eye on this new area of antitrust enforcement, since it has a larger impact not only on the concerned economy, but on the environment. Thus, forbidding such conduct can be beneficial for the environment, and thus, the world.

The principle set and defined by this case may be further propounded and applied to regulations of combinations as a lens for identifying probable anti-competitive effects. In recent years, digital titans in

particular markets have acquired a large number of startups. For example, in the US, within the span of a few years, Google has acquired over 270 businesses, including both startups and mature businesses, the biggest names being YouTube, Android, and Waze; Facebook has acquired over 90 businesses; Microsoft, in a similar time period, has acquired over 100 companies, including GitHub, Skype, LinkedIn, and Nokia (Fletcher et al., n.d.); and Amazon has acquired a comparable number of companies. This is a trade practice which has also begun arriving in India; recently, BYJU'S, a digital teaching platform, acquired nine businesses, including its rival Toppr and Aakash Educational Services, within a span of 1 year (The Indian Express, 2021). Most of these acquisitions have been competitors of the digital titan in its main or interrelated business segments. The concern raised by these transactions is that they are a way to strangle competition before it has a chance to bring in new technology and compete with digital titans. Such acquisitions, known as “killer acquisitions” and “reverse killer acquisitions”, are becoming increasingly common these days (OECD, 2020). It becomes important to recognise that, even when such an acquisition does not completely eliminate competition from a certain market, a pattern of such acquisitions works to concentrate and strengthen the market position of digital titans while inculcating an environment where the innovation of technology becomes extremely difficult without support or inputs of the leading digital firms. There also exists a possibility that a merger is presented as a vertical merger, but it may have the impact of a horizontal merger in the market in the sense of removal of a potential competitor (Motta & Peitz, 2020). This makes it imperative that, when an acquisition of a disruptive technology is involved, it should be analysed through the lens of competition harm due to collusion in technical development.

7. Conclusion

Before the EC decision of July 2021 related to limiting technical development and competition on innovation in the area of emission cleaning technologies for passenger cars, none of the global competition authorities, including CCI, had passed any order/ruling declaring collusion in technical development or limitation of technological development by a dominant enterprise in a relevant market to be anti-competitive. However, there are explicit provisions in their statutes/

regulations that collusion/cartelisation with a view to limit technical development is anti-competitive and a pernicious offence. This paper establishes that collusion in technical development and technology lock-in are akin to each other and, in both situations, markets fail to produce efficient/competitive outcomes which, in turn, dampens innovation and faster economic progress, thus affecting the welfare of society. The case law under reference, wherein the EC imposed a fine of EUR 875 million on five car manufacturers for collusion in car emission cleaning technologies, establishes that collusion in technical development and technology lock-in have anti-competitive effects, and therefore, are not efficient and desirable in society. The EC ruling substantiates the views expressed in this paper that, even though cooperation in technology has some efficiency gains, the loss due to market distortion would outweigh the gain. It is coming to the fore that the car emission norms followed in India are on par with Europe and, given the market dynamics and regulatory norms currently in place, collusive conduct on the part of market participants on this aspect seems remote.

In supporting and supplementing the existing economic theory, this paper advocates for intervention by the competition authority in order to correct any market aberrations so as to bring efficiency to the system. To achieve the greater good, prompt action on the part of competition authorities is desirable in case of collusive conduct by market participants with a view to limit technical development or competition on innovation. Prompt government intervention is also desirable in case of technology lock-in. The EC decision under reference may be an eye-opener for competition regulators, presenting a new avenue for antitrust enforcement in an unexplored area of competition law. Further, it is desirable for competition authorities to factor in technology disruption while examining ex-ante conduct. Additionally, while this is a new area of antitrust enforcement with respect to market correction, it is significant due to the fact that the regulation of collusion in technical development has considerable favourable impact on the environment, whereby all of humanity could benefit. It is imperative to refocus on this aspect of antitrust enforcement as every country and the world as a whole are increasingly becoming technology-reliant; technology has the potential to enhance human welfare, over and above the economic welfare that

may be accrued by ensuring fair competition and consequential economic development.

Irrespective of the arguments advanced in the paper to make the technology and innovation market competitive and the necessity of the proactive approach of competition authorities and the government to achieve greater good, the other aspect – that the free market mechanism auto-corrects the technology lock-in scenario – cannot be undermined. The paper also asks whether it is sufficient for market participants to adhere to the prescribed regulatory norms based on existing technology or to look for better technology that may be the outcome of a free market. It relates to the question of regulation versus free market in the field of technology and innovation. Moreover, sustainability vis-à-vis technological advancement remains an issue.

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