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ROUNDTABLE ON MERGER REVIEW IN EMERGING MARKETS

-- Note by the United States --

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1. Competition analysis in high innovation markets is an area of growing importance, as evidenced by the increasing predominance of “new economy” markets, the “knowledge economy,” and waves of mergers in industries characterised by high technology. The Secretariat’s Issues Paper on merger analysis in high innovation markets raises a number of important questions for discussion. We will address the issues raised in the Secretariat’s Paper from the perspective of our experience in analysing mergers in such markets.

Competition Policy in High Innovation Markets

2. As noted in the Secretariat’s Issues Paper, high innovation markets can have a number of characteristics that are not as prevalent in other industries, such as a high level of research and development (R&D) activity, the importance of intellectual property, rapid change, increasing returns to scale, network effects, standards issues, and a high degree of technical complexity.¹ These characteristics, in turn, can affect the nature of competition. Competition may focus on non-price attributes, such as performance characteristics, rather than price. Innovation itself may be an important form of competition, as firms strive to differentiate themselves or develop a new generation of products and services.

3. The implications of these characteristics for competition analysis do not all run in the same direction. Rapid change, for example, can increase the difficulty of predicting future market conditions and may make collusion less likely, as can non-price competition.² Factors such as standardisation and network effects, on the other hand, lend stability to the market and can contribute towards market dominance.³ In addition, non-price competition issues may not be as readily addressed by traditional models that focus on price and output.⁴

4. Further complicating the analysis is the possibility that rapid technological change does not necessarily translate into rapid change in the market. The PC microprocessor industry, for example, is characterised by rapid technological change, but change in market structure has been slower. Nor does a high level of R&D necessarily translate into short product cycles and rapid entry. Consider, for example, the pharmaceutical industry, where product development can take a long time, and the regulatory approval process can further delay commercialisation. Similarly, some aerospace and defense markets, while clearly characterised by high technology, involve long lead times to market.⁵

5. These examples serve to illustrate that assertions of antitrust irrelevance in high-tech markets – because change is too rapid, the markets are self-correcting, and, in any event, the markets are too complex and the technology too difficult to understand – sweep far too broadly.⁶ Investigations have found that market power can be illegally accumulated and abused in high tech industries as it can in more traditional industries. Even among products and industries where competition is based on innovation, dominance in one generation may enable a firm to gain exclusive control over critical inputs that would enable monopoly power to be carried over from generation to generation without regard to the relative merit of later generation products. Dominance may also persist due to large sunk costs, network effects, an installed base of customers, and other entry barriers.⁷ Antitrust, therefore, not only is relevant to high tech markets, it is essential to preventing abuses of market power. Further, competition spurs innovation.⁸ The characteristics of high-tech markets do suggest, however, that antitrust laws should be applied cautiously, informed by the facts of the specific situation. That is not unique to high innovation markets, however. Merger analysis in any market, whether or not high-tech, is highly fact-specific.

6. The Secretariat's Issues Paper asks about "the general advisability of working out special arrangements, published or not, for dealing with mergers in high innovation markets." While high innovation markets may have some characteristics that are not as prevalent in other industries, experience to date has not suggested a need for special rules or special arrangements.⁹ The analysis must take into account the particular characteristics of high innovation markets – just as it must in any other industry – but the analytical methodologies are essentially the same as they are for other markets.¹⁰ The U.S. antitrust agencies apply the analytical principles outlined in their Merger Guidelines.¹¹

7. In the mid-1990s, the U.S. antitrust agencies supplemented the Merger Guidelines in one significant way, however. They developed and applied an "innovation market" analysis specifically to address the possibility that some mergers may adversely affect innovation in ways that are not addressed by more traditional merger analysis.¹² In that context, an innovation market refers to one of several potentially relevant markets (along with "goods markets" and "technology markets") in which to analyse the likely competitive effects of a merger or acquisition.¹³ Certainly, the recognition that innovation may be important to understanding the competitive impact of particular mergers is an important insight. Moreover, the concept of an "innovation market" raises interesting and provocative questions for enforcers. Nevertheless, as discussed in Part III of this paper, the agencies' adoption of innovation market analysis has been the subject of some criticism.¹⁴

8. Mergers can also promote, rather than hinder, dynamic efficiencies, of course. In that context, the Secretariat's Issues Paper asks whether a trade-off should be allowed between static and dynamic efficiency effects – *i.e.*, whether potential dynamic efficiency benefits from a merger should be allowed to counterbalance adverse near-term price effects. There are no hard and fast rules for addressing a situation of that nature. It is a complicated issue, but one that is not unique to high-tech markets. The issue may be equally important, if not more so, when a proposed merger in an otherwise static industry promises to generate dynamic efficiency benefits, for the merger may induce beneficial industry-wide changes.

9. In many cases the issue can be resolved through the choice of remedy. Often, a partial divestiture or licensing arrangement will be sufficient to resolve a near-term competitive concern while permitting the remainder of the transaction, and attendant efficiencies, to go forward. It usually is not necessary to block the entire merger. Innovation market cases are not unique in this regard. Where such a remedy is not possible, of course, difficult issues arise. For example, the Secretariat's Issues Paper asks, "*If such tradeoffs are made, how certain and well defined should future innovations have to be, i.e., how close to being actual products?*" That is a critical question since, as a matter of logic, any such balancing would have to take into account the likelihood and magnitude of future benefits,¹⁵ the degree of certainty and magnitude of near-term consumer harm, and the difference in timing of the two events,¹⁶ and weigh effects that may be qualitatively different, such as near-term price increases and future quality improvements. The analysis is intrinsically difficult.¹⁷ Whether such a trade-off should be undertaken involves broader issues of public policy. Some FTC staff in the recent past have been unwilling to permit "competition in an existing market [to] be sacrificed so that the companies could more effectively compete in a different market several years in the future."¹⁸ They took the position that dynamic efficiencies must generate benefits in the present goods market, not some future market, within two years.¹⁹

Assessing Threats to Competition

Calculating Market Shares

10. The Secretariat's Issues Paper asks whether competition agencies modify traditional merger screens, such as calculation of pre- and post-merger concentration levels, in analysing transactions in high

innovation markets. It sometimes is appropriate to do so, but not always. In some cases, pre- and post-merger concentration levels are useful pre-merger indicators of a transaction's possible effect on competition, even in high innovation markets.

11. In other cases, where the focus of the competition analysis is on the firms' R&D positions, innovation, or future product development, market shares may not be the best predictors of the future. In such cases the agencies have looked at different factors to make preliminary assessments of a merger's impact on a highly innovative market. For example, in certain biotechnology or pharmaceutical cases where no product has yet reached the market, market share information is not likely to be very useful. Instead, FTC staff often looks to other indicators of future competitive significance, such as the companies' positions in the Food and Drug Administration (FDA) approval process. In matters involving next-generation defense or aerospace products, FTC staff may look at the companies' investment levels, R&D progress, experience in previous generation products, and success in related markets.

12. Determining market shares was a challenge in the 1998 DOJ and EU investigations of MCI/WorldCom (discussed below) involving the Internet because there was no commonly accepted method and there were legitimate questions about the accuracy of each method. The DOJ and EU examined market shares using a variety of methods: shares of overall Internet industry revenues generated by Internet Service Providers (ISPs) connected to a specific backbone; percentage of ISPs connected to a specific backbone versus the total number of ISPs connected to all of the backbones combined; Internet traffic originating, terminating, or otherwise traversing an Internet backbone's network (a measurement of size and significance of a backbone relative to other competitors); a revised revenue share that attempted to eliminate the double counting and irrelevant revenues; the number and type of Internet Points of Presence ("POPs") on a backbone's network; the number of circuits connecting customers to a backbone (which would correct for differences in customer size/significance); the number of "routes advertised" (or terminating IP addresses)--the density of a provider's network and web of customers; and, finally, the number, type, and significance of each network's customers. By any measure of market share, none of which was perfect, MCI/WorldCom would be the dominant player in the market, and substantially larger than any other player.

Nature of threats to competition/Competitive Effects Theories

13. We discuss in this section certain of the competitive effects issues raised in the Secretariat's Issues paper – unilateral vs. co-ordinated effects, exclusionary effects, network effects, and competitive effects of non-horizontal mergers. We then discuss possible information sources for determining whether a high-innovation merger will result in harm to competition. Innovation market analysis – and whether the term "innovation markets" adds anything useful to merger analysis – are discussed in Part III of this paper.

Co-ordinated versus unilateral effects

14. The agencies' merger cases in innovation-intensive markets to date have principally focused on the likelihood of unilateral conduct and exclusionary effects. While we agree generally that collusion may be more difficult in high innovation markets, we do not rule out that theory of harm.²⁰

Exclusionary effects

15. Several FTC cases have alleged that the merger may facilitate the exclusion of competitors. This has occurred in both horizontal and vertical mergers. In *Ciba-Geigy*,²¹ for example, the merger with Sandoz Ltd. involved, in part, a consolidation of competing portfolios of intellectual property relating to gene therapy. Pre-merger, both firms stood as licensing opportunities for third parties wishing to engage in both the development and commercialisation of gene therapy products. The merger would have removed that option for third parties, leaving them to deal with a single licensing entity with changed incentives and thereby affecting the terms on which they could license intellectual property, if licenses were available at all.²² The merger also would have made it potentially more difficult to invent around the parties' patents.²³

Network effects

16. Network effects were important to the DOJ's analysis of the competitive effects of WorldCom Inc's acquisition of MCI Communications. The investigation focused on the Internet backbone market and on how the merger would affect the industry. The Internet, at its very core, is a way of interconnecting different computer networks; in other words, the Internet is a way of making different computer networks compatible. The key to the Internet is that any Internet Service Provider (ISP) supplies access to the entire Internet. Without this interconnection, the Internet would lose much of its value because the network effects would be lost.

17. The area of most significant competitive concern was the provision of Internet backbone services, or the provision of ubiquitous connectivity to the Internet. The merger would have combined two of the four leading nation-wide or world-wide Internet backbones; MCI and WorldCom were the leading providers of wholesale Internet transmission services to ISPs and of dedicated access services to large businesses. The investigation focused on what effect this combination, which would have created a dominant player in the provision of backbone services, would have had upon interconnection and access to the various networks that make up the Internet. The DOJ also examined whether the merger would give rise to market power through the powerful network effects that characterise the Internet.

18. While there have been changes in the Internet market since the investigation, at that time the providers of Internet connectivity could be classified as a loose hierarchy broken down into roughly four tiers.²⁴ At the top were nation-wide (or world-wide) Internet backbones, which provide nation-wide Internet services using extensive owned or leased fiber facilities. They generally have peering²⁵ arrangements or private peering connections with the other national backbone providers and are "transit-free," so they do not have to rely on transit agreements. UUNET (owned by WorldCom) and iMCI are examples of these large national backbone providers. The second group of providers are national Internet backbone networks that use facilities leased from underlying fiber telecommunications providers, but which pay transit fees to one or more national backbone providers. A third group comprises the Regional or local ISP Internet connectivity providers, which lease some regional or local network fiber facilities and equipment and interconnect with other small providers at the public Network Access Points. They typically purchase transit backbone services from any of the national backbone providers. The last group is made up of ISPs that do not have a network, but instead rely on others for wholesale Internet connectivity services.

19. Given this complex and highly technical web of relationships, and the highly dynamic nature of a market characterised by rapid technological change, defining a relevant product market was a challenge. Discussions with competitors, customers, industry experts, and the parties, revealed that there seemed to be a national backbone market.²⁶ This market was highly concentrated, with several significant competitors including UUNET, iMCI, and Sprint. The merger would have combined the facilities, personnel, and,

perhaps most importantly, the customer bases of iMCI and UUNET, the two top backbone providers. The combined entity would have been by far the largest single nation-wide backbone and Internet connectivity provider with an overall majority of customers (web sites, ISPs, and dedicated access corporate customers) connected to the Internet. Post-merger market shares for Internet connectivity ranged from 40-75%, depending on what measure of market share was used.²⁷

20. In addition to a concern that the merger would facilitate tacit collusion, the DOJ was concerned about what effect it would have on the existing network. Prior to the MCI/WorldCom merger, no single backbone provider reached a disproportionate amount of destinations on the Internet relative to other major players. There was a rough equality, with each backbone provider depending on the other. Each backbone provider, therefore, had an incentive to support efficient interconnections because its failure to do so would have caused such a degradation of quality that it risked losing customers to the other networks. That incentive would change, however, if the two largest backbone providers were combined. But the MCI/WorldCom merger threatened to create a very large network with a huge size disparity. By representing a majority of the Internet customers, MCI/WorldCom would have been more valuable and been more important as a point of interconnection for other Internet providers, which would otherwise lose access to a great deal of the Internet. MCI/WorldCom would have far less need to depend on the other backbones than those backbones would have to depend on it. By giving MCI/WorldCom a disproportionately large customer base, the merger would have changed MCI/WorldCom's incentives from favouring compatibility toward favouring incompatibility. Recognising this, there was widespread industry concern about the effects of the merger on peering arrangements and on interconnection prices.

21. MCI/WorldCom's changed incentives would have increased the likelihood that it would attempt to tip the market by charging existing peers for interconnection or by degrading the quality of interconnections. MCI/WorldCom would have been able to do this, either through unilateral action, or through collusion with the only remaining player with a significant market share. The disproportionate dependence that other backbones would have had on MCI/WorldCom would have given it bargaining leverage to dictate the pricing and terms of interconnection. MCI/WorldCom could have begun charging peers for interconnection to its network, either all at once or on an individual peer-by-peer basis (by picking off the smallest rivals first), raising the costs of its rivals. MCI/WorldCom then could have chosen either to raise its own prices with that of its rivals, or to keep its price lower and let the market tip towards it, possibly leading to monopoly control of the Internet. Or MCI/WorldCom could have degraded the quality of its competitor's interconnections to its network. It could have done this either actively or passively, by not investing in the interconnections needed to keep up with the massive growth, and it could have done this either to all competitors or on an individual basis. Interconnection points are constantly upgraded to keep up with the exponential growth of Internet traffic; any slowdown in the upgrading of these points would have serious effects on the quality of the connection. While this strategy would lower the quality of service for all networks, rivals' networks would suffer more degradation, allowing MCI/WorldCom either to increase its own prices, reflecting its better quality, or to gain market share. Again, with this strategy the market could have tipped to MCI/WorldCom, giving it monopoly control of the Internet. Under either scenario, WorldCom would have been able to purchase, through its acquisition of iMCI, market power and gain a monopoly, or at least a dominant, position in Internet backbone services.

22. Interconnection of multiple firms is not always the best or least costly way of achieving network efficiencies, but the history of interconnection in this industry suggests that it was in this case. Moreover, the parties failed to present any evidence suggesting that interconnection was inefficient or that it would be more efficient for MCI/WorldCom to be a monopoly provider. At this early, but critical stage where the development of cost-based pricing and other terms and conditions for interconnection are expected to be developed through bargaining among the industry's participants, allowing one player to achieve dominance through acquisition could have had an irreversible anticompetitive impact on this market. So the options were either to try to block the merger or find another way to address the competitive concerns.

23. Since entry was not going to constrain a dominant MCI/WorldCom, any remedy had to create a viable competitor that would replace iMCI as a principal player in the national backbone market. The only way this was possible was through the divestiture of MCI's entire Internet business. The relief was not intended to preclude MCI/WorldCom from eventually achieving a monopoly position. The DOJ believed it was possible that the market would tip in the future. However, if that happened, it wanted to be sure it was because the company out-competed the other networks, and not because it had purchased customers via merger.

Non-horizontal mergers

24. A number of vertical merger cases in the defense industry have raised anticompetitive concerns of a different nature. Firms in the industry historically have had complex horizontal and vertical relationships in numerous separate projects. The principal concerns have not been with total foreclosure or requiring two-level entry, but rather with strategic use of information gained in one project to obtain competitive leverage in other projects. As a result of a vertical acquisition, a firm may relate to a rival as both a horizontal competitor and a customer or supplier. In its position as customer or supplier, the merged firm may gain access to competitively sensitive information concerning its horizontal competitors. Competition may be affected in several ways. If, for example, the merged firm gains access to competitively sensitive information that reduces its uncertainty about a competitor's bids in a downstream market, the merged firm may be able to bid less aggressively in that market. In addition, by gaining access to its competitors' proprietary design information, long-run innovation may suffer as rivals would be less willing to invest in R&D because its vertically integrated rival could free-ride off its efforts.²⁸ Similarly, if the non-integrated firm believes that it faces exclusion or discrimination from the integrated firm, it may choose to withdraw from the market or compete less aggressively.²⁹

Information Sources

25. When we're determining if innovation competition will be harmed, we first attempt to understand what drives the innovation. Does it come from existing players? Customers? Component suppliers? Collaborators? How has the innovation occurred? Do each of the players have an equal role? Are some leaders and others followers? In other words, we look for the market-specific, firm-specific facts about innovation. To do that, we consider the current market structure; the pace, predictability, and history of innovation in the market, as well as the historical innovation role of each firm; the relative capabilities of the merging firms; and the effect of the loss of variety. We learn this through interviews with competitors, potential entrants, and other industry experts. We also look to see if innovation requires specific and unique assets that are not easily acquired, but can nonetheless be reliably identified. Specialised assets will vary across industries but can include key physical assets, experience, production ability, or even, as in many high-tech industries, intellectual property.

26. After determining the likely source of innovation, we then attempt to answer the following questions: Does the merger affect incentives to perform R&D? Will overall R&D spending decrease? What will happen to the efficiency of the R&D effort? Will the merger affect the diversity of likely innovations? Does the merger result in vertical integration giving the merged firm an incentive to exercise an in-house bias? In other words, we strive to define whether the merger changes the rate or type of innovation.

27. Many mergers that enhance efficiency can enhance innovation by creating a more effective innovator. There are some instances where R&D truly is redundant and, after a merger, some of those resources could be put to better use in other fields. It's also possible that other merger efficiencies could

free up resources to be used for R&D. Combining innovators also may be beneficial when either the different innovation strategies being pursued are complementary, so that a combination of the two would create a better final product, or when the firms have complementary core competencies, such as a merger between a company with strengths in marketing and distribution and a firm strong in innovative design. These pro-innovation mergers generally occur in situations where the innovation path is predictable, where the merging firms pursue similar strategies, and where there are few fringe players.

28. Other mergers that reduce duplication can diminish innovation and have social costs. By reducing the number of firms, you reduce the likelihood of achieving the most efficient outcome. The more attempts there are, the greater the chance that someone will get it right. Determining what the effect will be is the difficult and challenging task of the antitrust enforcer.

29. The Secretariat's Issues paper asks whether there are any important differences regarding the information resources agencies depend on when analysing the competitive effects of mergers in high innovation as contrasted with slower evolving markets – *e.g.*, do competitors play a larger or smaller role? Sources of information may vary to some extent depending on the nature of the investigation and the issues being investigated. For example, where the issue focuses on the R&D efforts of the merging companies and market-wide, the firms competing in the market likely would have more and better information than would customers, particularly as to relatively early stages of the development process. On the other hand, where the issue focuses on existing product competition or the potential entry of products in a regulatory approval pipeline, such as pharmaceuticals, customers also may be knowledgeable sources of information.

Innovation Markets

30. Traditionally, innovation has been viewed as a simple output of R&D spending; the more money that is invested in R&D, the greater the amount of innovation. Under the traditional view, all innovation is viewed as the same, no matter which firm engages in it or what the market structure is. Recent economic literature on innovation looks more closely at how innovation works, focusing on whether innovation is firm or market-specific. That is, different types of firms and different market structures create different types of innovation and at different paces. Even if two firms are attempting to achieve the same goal, they will approach this effort in different ways, making different choices along the way. Knowledge varies among firms in a market, and each firm has its own innovation strategy. Thus, the number of firms in a market will affect the number of judgements about promising innovation strategies, which in turn will affect the type and pace of innovation. Under this dynamic view, innovation is driven by the flow of ideas within a firm and between rivals, not simply by the amount of R&D spending.

31. Some may argue that the R&D efforts at multiple firms are redundant and inefficient. While this may be true in some circumstances, duplication often means pursuing different strategies to reach the same goal, and it can get you there sooner with greater certainty. Duplication is not necessarily or even inherently wasteful, and it can be especially useful in high-tech and emerging growth industries where the best innovation strategy is often unpredictable. Or in the words of one economist, "[g]iven uncertainty, multiple R&D efforts in competing firms may be the most effective way to explore the technology space."³⁰ It is a matter of judgement as to the extent that one R&D effort duplicates another, and even small differences can make one attempt successful and another a failure.

32. There is increasing evidence that a firm's size and position within the market affects the nature and the type of innovation it is engaged in.³¹ This is because firms are differentiated by their size, position in the market, and core competencies, and because each firm will innovate so as to capitalise on its strengths. A large firm's main strengths are that it has the scale economies in research or in complementary activities, like manufacturing and distribution, to enable it to bring an invention to the marketplace, as well

as having a greater ability to finance R&D. It is also more bureaucratic and stable. To utilise fully its strengths, it needs the path to innovation to be predictable. Innovation may be sweeping and fast, but it needs to be predictable.

33. Small firms, on the other hand, are more entrepreneurial and can respond more quickly to unexpected opportunities. At the same time, they have fewer resources to spend on R&D; are more likely to fail; and because of a lack of strong manufacturing and distribution channels are less likely to have the resources to bring the invention to the market.

34. There are also significant differences in the way established leaders in an industry innovate as compared to challengers. This is because leaders have different goals and strengths than challengers. Leaders tend to innovate to reinforce their positions or to enhance their core competencies. For example, they may attempt to use their innovations to maintain strict, possibly proprietary standards. Typically, market leaders focus on incremental innovation -- improving their current products in a "bells and whistles" fashion, making incremental improvements to their products to cement their market dominance. These improvements can be significant, but they are not likely to change the status quo.

35. Market leaders are often constrained by institutional commitments to existing products or production methods that by necessity impact their innovation strategy. These commitments can be firm-specific skills, investments in complementary assets, customer expectations, patent holdings, or even a preference for an established way of doing business. They also have to be concerned about the possibility of cannibalising existing products. Having less to gain from a radical, new design than a challenger, they are less likely to pursue disruptive technologies or to embrace new innovations that would threaten their dominance.³²

36. New firms or challengers, on the other hand, are looking for opportunities to upset the leader's position and to change radically the competitive situation, eliminating or diminishing the leader's market dominance. What they strive to do is overthrow the status quo by destroying or undercutting the leader's competence. They do this by creating new fields of technology or new skills where the leader does not have expertise or an established position. They are more willing or able to venture into completely new and untested directions because they have less of a vested interest in the current technology and are not tied to sunk investments in obsolete technologies. While they are more likely to fail, they are also more likely to provide the great technological leap forward that the dominant firm is unwilling to embrace. It is through this "leap-frog" competition that they are able to establish themselves.³³

Criticism of Innovation Market Analysis

37. The Secretariat's Issues Paper asks whether application of the innovation market concept in merger review was "motivated by jurisprudential considerations or because the concept adds something that cannot be dealt with just as well using references to potential competition."³⁴

38. The adoption of innovation market analysis has been subject to considerable criticism. This criticism reflects the fact that there are no clean answers as to how market structure is related to innovation – or, for that matter, how R&D expenditures are related to innovation. For example, economist Richard Rapp takes issue with the premises that (1) an increase in R&D concentration is likely to reduce the amount of R&D undertaken, and (2) reducing the amount of R&D is likely to diminish innovation.³⁵ Rapp notes that "[t]he connection between market structure and innovation has been debated by economists for decades without resolution."³⁶ Rapp relies in part on a 1992 article by F.M. Scherer for the proposition that "the effects of firm size and concentration on innovation appear not to be important."³⁷ Rapp also argues that there is no clear connection between R&D inputs and innovation,³⁸ that it is difficult to

monopolize the capacity to innovate,³⁹ and that product and technology markets are sufficient to deal with concerns relating to loss of R&D competition.⁴⁰

39. Rapp correctly points out that a crucial aspect of innovation market analysis is the identification of the specialised assets or characteristics needed to compete successfully in the market, and the firms that possess them. His criticism is that the antitrust agencies have not articulated a “policy” to guide the analysis so that it is predictable.⁴¹ Specialised assets will vary across industries, of course, but the essential analytical criterion is that the specialised assets or characteristics be reliably identified. Examples include key physical assets, experience, production ability, and, as in many high-tech industries, intellectual property. Whether any such assets are needed in a particular market requires a case-specific analysis, but the inquiry is relatively straight-forward. That is not to suggest that the analysis is necessarily easy. It is difficult to predict, for example, whether innovative, market-transforming entry might come from firms currently engaged in a different market. That possibility counsels caution in applying innovation market analysis, and the inquiry may have to extend beyond current market participants.

40. Although there may be answers to particular questions raised by Rapp, Rapp is certainly correct in highlighting the lack of certainty in this area. This is not to say that we do not worry about R&D competition or competition to develop new products. It does suggest, however, that any merger-specific concerns we have should be narrowly focused on situations where there is enough development that we have some idea of what is likely to be produced from the R&D, who are likely to be the players competing to produce the future products, and that the merger is likely to reduce this future competition in a significant way. In such situations, the existing Merger Guidelines framework generally would appear to suffice, without frequent resort to the “innovation market” concept. Moreover, we believe that various merger enforcement actions of recent years that employed the “innovation market” term could in all likelihood legitimately have been brought using the tools of traditional analysis. (There may, nevertheless, be situations where insights drawn from “innovation market” analysis would prove helpful.)

Ciba-Geigy/Sandoz

41. Consider, for example, the FTC’s 1997 challenge of Ciba-Geigy’s proposed acquisition of Sandoz. This case marked new ground in alleging an innovation market for a new class of medical therapies – gene therapy products for the treatment of cancers and various other medical conditions.⁴² There were no such products licensed by the FDA at the time. The complaint noted that the first products would not be available until the year 2000, but that the market could grow to \$45 billion by the year 2010. The technology at issue involves the treatment of disease through manipulation of genetic material and insertion or reinsertion into a patient’s cells. Although there were many firms doing pioneering research into gene therapies for various disease states, the merging firms were two of only a few entities with the intellectual property rights and other assets necessary for commercialisation of such therapies. The firms’ combined position in gene therapy research was so dominant that other firms doing research in this area needed to enter into joint ventures or contract with either Ciba-Geigy or Sandoz in order to have any hope of commercialising their own research efforts. Competition between the two firms made possible such ventures or contracts on reasonable terms. Without competition, the combined entity could have appropriated much of the value of other firms’ research, leading to a substantial decrease in such research. The merger therefore would have diminished both the incentives and the ability of other firms to develop competing products. In addition, and very importantly, there was direct competition between the two companies with respect to specific therapeutic products.⁴³ Given this direct competition in particular product markets, and the specialised nature of the research involved, we believe that this case easily could have gone forward without reliance on an innovation market.

42. Consider as well other FTC pharmaceutical cases alleging an innovation market, including *Baxter Int'l, Inc.*, Dkt. C-3726, 123 F.T.C. 904 (1997) (consent order) (Baxter and Immuno were two of only a few companies seeking FDA approval for fibrin sealant, a product derived from blood plasma that controls bleeding in surgical procedures, in U.S. market with no current producers); *Upjohn Co.*, Dkt. C-3638, 121 F.T.C. 44 (Feb. 8, 1996) (consent order) (Upjohn and Pharmacia were two of only a few firms in advanced stages of developing topoisomerase I inhibitors, which are drugs used in conjunction with surgery to treat colorectal cancer); and *American Home Products*, 119 F.T.C 217 (Feb. 14, 1995) (consent order) (merger between two of three developers of rotavirus vaccines). Given the nature of the direct product market competition in these cases, they too likely could have proceeded without resort to innovation market terminology.

Digital Equipment/Intel

43. In the computer industry, an innovation market was one of three that was cited as raising concerns arising from a 1997 transaction between Digital Equipment Co. and Intel, involving Digital's Alpha microprocessor. The microprocessor market is another in which recent successful innovation had been limited to only a few firms, and Digital and Intel were aggressive rivals for next generation products. In addition, Digital's Alpha microprocessor was a significant competitor both to Intel's Pentium microprocessor and to Intel's next generation IA-64 microprocessor. In May of 1997, both firms sued each other for patent infringement by their respective products. In October of 1997, the companies settled the suits by agreeing to broad patent cross-licenses, the sale of Digital's microprocessor production facilities to Intel, and an agreement that Intel would produce Alpha microprocessors for Digital, which retained the intellectual property rights to Alpha.

44. The FTC was concerned that this agreement would have reduced competition in three separate markets: 1) the manufacture and sale of high-performance, general purpose microprocessors capable of running Windows NT in native mode; 2) the manufacture and sale of all general purpose microprocessors; and 3) the design and development of future generations of high-performance, general purpose microprocessors. In each of those markets, Digital's Alpha chips happened to be the highest performing and most technologically advanced threat facing Intel's own microprocessors. The Commission was concerned that Alpha would not remain competitively viable under the original terms of the agreement. Intel could have interfered with Digital's supply of Alpha chips and Digital might not have had the incentive to continue actively to develop and promote Alpha.

45. To resolve these concerns, the Commission entered into a consent order under which Digital would license the Alpha architecture to Samsung and AMD or other suitable partners so that they would be able to produce and develop Alpha chips.⁴⁴ Digital also agreed to begin the process of certifying IBM as a foundry for Alpha chips, thus establishing a manufacturing alternative to Intel. This relief preserved the Alpha chip as a viable product and a competitor to Intel's microprocessors.⁴⁵ Given the product specificity of the competitive concerns here, we believe, once again, that this case probably could have gone forward without resort to the innovation market concept.

Halliburton/Dresser

46. The DOJ's complaint challenging the Halliburton/Dresser merger alleged that the merger would result in increased prices and decreased quality for logging-while-drilling ("LWD") tools and services for oil and natural gas drilling projects, as well as in decreased competition in the development and improvement of LWD tools. LWD services provide information to oil and gas companies about the formations through which the companies are drilling, whether there is oil in the formations, and the ease

with which oil can be extracted. Total world-wide revenues for LWD services in 1997 exceeded \$500 million.

47. The LWD market was characterised by a few dominant companies, known as the Big Four (Schlumberger, Halliburton, Dresser, and Baker Hughes), and a number of smaller fringe players. Historically, the pattern of innovation had been that one of the Big Four (or its predecessor) developed a new LWD tool, improvements for that tool, and then an even more advanced model. After these innovations, the smaller companies would either buy an older generation of the tool from one of the Big Four, or they would spend several years attempting to create their own versions of the tool. By the time the smaller companies had created their own versions, the Big Four had created something new. In the history of the LWD market, no firm outside the Big Four had entered the LWD market with a major innovation. Under these facts, it was clear that the Big Four had specialised innovation assets that no other firm possessed, and the merger would have combined two of the only four major innovators.

48. Even though the firms promised to increase R&D spending if allowed to merge, the DOJ believed there was a significant anticompetitive problem for two main reasons. First, there was no single innovator among the Big Four. The breakthrough innovations were spread out among the group, so that all four of the companies had recent significant innovations. Second, and more importantly, Dresser and Halliburton had two very different innovation strategies. They approached R&D in significantly different ways. Dresser did little or no pure research (in the sense of expending funds purely to gain knowledge and not to develop a commercial product) and was less concerned about being the first to market with a new innovation. It preferred to learn from the mistakes of others. Halliburton, on the other hand, did more pure research and was more concerned about being the first one in the market. The merger threatened to eliminate one of these approaches, decreasing the chance of successful innovation. It also would have reduced the incentive for the merged firm to innovate and to improve similar, competing tools that the merged firm might deem redundant since it owned both.

49. The consent decree addressed innovation. It required Halliburton to sell its entire LWD business, including its manufacturing, R&D, sales and service capabilities. The divestiture focused on the specialised assets that were required for innovation. By creating a company with these specialised assets--a wide scope of tools with the capability to operate on a world-wide scale--the divestiture allowed another firm to enter the competition for innovation in this particular sector, ensuring competition in this high-tech industry. Once again, product-specific concerns lay at the heart of this transaction, even where loss of R&D competition was an area of concern; indeed, the DOJ's complaint made no reference to an "innovation" market.

Lockheed Martin/Northrop Grumman

50. The DOJ's 1998 challenge to the \$11.6 billion proposed acquisition of Northrop Grumman by Lockheed Martin was at that time the largest merger ever challenged by the federal government, and was, to a large extent, an effort to preserve innovation competition. In the complaint, the DOJ alleged that the merger would have resulted in unprecedented vertical and horizontal concentration in the defense industry, which would have substantially lessened, and in several cases eliminated, competition in major product markets critical to the national defense. Lockheed and Northrop were two of the leading suppliers of military aircraft and electronic systems in the United States. The merger would have resulted in Lockheed's obtaining a monopoly in airborne early warning radar, electro-optical missile warning systems, directed infrared countermeasures systems, the SQQ-89 antisubmarine warfare combat system, and fiber-optic towed decoys. It would have reduced the number of competitors from three to two in high-performance fixed-wing military airplanes, on-board radio-frequency counter measures, stealth technology, and remote mine-hunting systems. And it would have had vertical effects in numerous projects, such as

the combination of Lockheed's airframe with Northrop's fire-control radar. While the complaint alleged significant price effects, the principal driver of the challenge was the merger's effect on innovation.

51. Innovation was the key for several reasons. First, due to the Pentagon's weapons acquisitions cycle, most of the critical competitive events occur at a very early stage, when costs and prices are extremely uncertain. What is competitively significant is the quality of the design (or the inventiveness of the idea) and the likely success of its implementation.⁴⁶ Second, innovation is often achieved in response to external military threats that change rapidly and are unpredictable, requiring the maintenance of a number of firms with the capability of innovating to meet future national security challenges.⁴⁷ Third, maintaining diversity of firms is also critical, since maintaining a strategically important technological lead requires, in part, cutting-edge innovations that incumbents are less likely to encourage.⁴⁸

52. In deciding whether to challenge a merger that would have led to only two competitors, the DOJ considered the amount of teaming in the military aircraft industry. Had this acquisition been consummated, the resulting firm would have been the prime contractor for thirteen aircraft platforms out of nineteen, and would have participated with its only competitor in virtually every aircraft in production. For example, on the F-22 Lockheed controls 67% of the platform, and Boeing the remaining 33%. On the F/A-18, Boeing controls 60% and, after the merger, Lockheed would have controlled the rest.

53. The complaint alleged one "technology market"⁴⁹ -- stealth. This merger would have combined the two stealth leaders and the only two companies to have produced stealth aircraft. Letting the merger go through would have resulted in a duopoly of two fairly equal firms which share a large numbers of joint projects, in contrast to maintaining three players with different strengths and capabilities. While there is obviously a high degree of uncertainty with any attempt to predict the future, the anticompetitive harm that would have resulted from the merger would have lasted for a very long time, perhaps indefinitely.

Remedies

54. The Secretariat's Issues paper asks for examples "tending to prove or disprove the proposition that if markets are sufficiently innovation intensive, there is no need to be concerned about mergers." In our view, that statement cannot be supported as a categorical proposition. The number of antitrust actions in high-innovation markets demonstrates that a high level of innovation intensity does not, in itself, obviate antitrust concerns.

55. The Secretariat's Issues Paper also asks for examples of "contingent remedies" adopted in relation to mergers in innovation-intensive markets. The agencies sometimes include a "crown jewel" provision that requires divestiture of a different package of assets from what a respondent was originally required to divest (and is typically to be divested by a trustee appointed by the agency), if the respondent fails to divest the original asset package on time or does so in a manner or condition that does not comply with the order (there may be other circumstances that can trigger possible trustee appointment in a given case).⁵⁰ A crown jewel is appropriate where there is a risk that, if the respondent fails to divest the original divestiture package on time or if the original divestiture falls through for some reason, a divestiture trustee may need an expanded or alternative package of assets to accomplish the divestiture remedy. This may be because another buyer may need a bigger (or different) package of assets to make the divestiture viable and competitive, or because it will likely be faster and easier for the trustee to sell a bigger, more complete package of assets later on. In several orders involving mergers in the pharmaceutical industry, the FTC has employed a crown jewel provision that required the divestiture of alternative or additional assets in the event that the acquirer of divested assets failed to bring a product to market by a certain date or discontinued its development.

56. The Secretariat's Issues Paper further asks for examples of remedies that were customised to deal with mergers in innovation-intensive markets. As a general matter, the remedy in every case is tailored to the particular fact situation. That said divestiture as a remedy in innovation markets requires special care because the success of R&D efforts often depends on a complex array of expertise and sustained knowledge. It may be necessary to require on-going obligations beyond divestiture to assure that the purchaser has some probability of successful completion of the research effort. In *MCI/WorldCom*, discussed above, various conditions were imposed to ensure that the new competitor after the divestiture would have the ability effectively to compete. In *Glaxo*, the order imposed significant obligations on Glaxo to assist the acquirer in its efforts to continue the R&D effort successfully. Glaxo had to provide information, technical assistance, and advice to the acquirer about the R&D efforts, including consultation with and training by Glaxo employees knowledgeable about the project. The divestiture was a success in this case since both Glaxo and the acquirer of its intellectual property now have oral migraine drugs on the market. With the required assistance from Glaxo, the acquiring firm, Zeneca, received complete FDA approval in only 15 months.

57. In addition, merger efficiencies may affect the choice of remedy. For example, in *Ciba-Geigy*, a licensing remedy was preferred over divestiture because of the problems of separating ongoing R&D projects that involved a number of joint efforts with third parties.⁵¹ Then-Commissioner Azcuenaga dissented as to the licensing aspect of this order, noting that divestiture would cure the anticompetitive problem in a "simple, complete, and easily reviewable" manner. The majority of the Commission determined that the gene therapy research efforts would be too difficult to disentangle from the merging firms, and divestiture would thus "not only ... hamper efficiency but also could be less effective in restoring competition if it led to co-ordinated interaction or left the divested business at the mercy of the merged firm."⁵² Thus, while divestiture is certainly an easier remedy to impose and monitor, it may not always be the most effective way of restoring competition.

58. Finally, the dynamic nature of high-innovation markets and the possible short duration of market power may counsel a shorter duration for some remedial orders.⁵³ For example, in the *AOL-Time Warner* merger, the negotiated decree lasts for only five years, while the typical decree lasts for ten.⁵⁴

NOTES

1. Issues Paper at 3-4.
2. See, e.g., David A. Balto, *Antitrust Enforcement in the Clinton Administration*, 9 Cornell J.L. & Pub. Pol'y 61 (1999) ("This increased emphasis on nonprice competition in high tech industries can be procompetitive. Because the range of nonprice attributes is infinite, competitors may find nonprice collusion more difficult than collusion over price.") Balto goes on to note that although nonprice collusion may be difficult, experience shows that it does occur and can have serious anticompetitive consequences, citing *United States v. Automobile Mfrs. Ass'n.*, 1969 Trade Case. (CCH) P72,907 (C.D. Cal. 1969) (consent decree). See also William E. Kovacic, *Merger Policy in a Declining Defense Industry*, 36 Antitrust Bull. 586-88 (1991) (describing how technological dynamism and rivalry to achieve qualitatively superior weapon systems reduces possibilities for successful co-ordination between defense suppliers); Dennis A. Yao & Susan S. DeSanti, *Innovation Issues Under the 1991 Merger Guidelines*, 61 Antitrust L.J. 505, 514-17 (1993).
3. See, e.g., Federal Trade Commission Staff Report, *Anticipating the 21st Century: Competition Policy in the New High-Tech, Global Marketplace*, Volume I, Ch. 9 at 3 (May 1996), available at <<http://www.ftc.gov/opp/global.htm>> ("the combination of demand-side scale economies and consumer switching costs may render dominance of a firm in control of an interface standard unusually enduring and give reason for more careful attention to anticompetitive practices."); but see Timothy J. Muris, *GTE Sylvania and the Empirical Foundations of Antitrust*, 68 Antitrust L.J. 899, 907-908 (2001) (noting lack of empirical evidence supporting strong version of network effects theory).
4. See Thomas B. Leary, Commissioner, Federal Trade Commission, *The Essential Stability of Merger Policy in the United States*, Prepared Remarks for Joint U.S./E.U. Conference on Guidelines for Merger Remedies (Paris, France, Jan. 17, 2002), available at <<http://www.ftc.gov/speeches/leary/learyuseu.htm>> ("for some products or services, competitive harm cannot be adequately captured by a traditional focus on price and output – issues of 'quality' or 'variety' are also significant."); Thomas B. Leary, *The Significance of Variety in Antitrust*, 68 Antitrust L.J. 1007 (2001); see also William E. Kovacic & Dennis E. Smallwood, *Competition Policy, Rivalries, and Defense Industry Consolidation*, 8 J. Econ. Perspectives 91, 99-100 (1994) (describing awkward fit between analytical methodology prescribed in federal horizontal merger guidelines and qualitative variables relevant to evaluating the capability of aerospace and defense firms).
5. See William B. Burnett & William E. Kovacic, *Reform of United States Weapons Acquisition Policy: Competition, Teaming Agreements, and Dual-Sourcing*, 6 Yale J. on Reg. 249, 268 (1989) (describing long development process for high technology weapon systems); See also Thomas B. Leary, Commissioner, Federal Trade Commission, *Antitrust Law as a Balancing Act*, Prepared Remarks for The Tenth Annual Seattle Computer Law Conference (Seattle, Washington, Dec. 17, 1999), available at <<http://www.ftc.gov/speeches/leary/leary991217.htm>> (noting that predictions of change do not always come true, and also that high-tech industries are not the only ones that can be characterised by easy entry and rapid change); Thomas B. Leary, Commissioner, Federal Trade Commission, *The Patent-Antitrust Interface*, available at <<http://www.ftc.gov/speeches/leary/ipspeech.htm>> ("It is not obvious . . . that high tech industries, thus defined [with network effects], will evolve more quickly than other industries.").
6. See *Allen-Mylan, Inc. v. IBM*, 33 F.3d 194, 211 (3d Cir. 1994) ("IBM also contends that price reduction and product improvement are inconsistent with the existence of monopoly power. But rapid technological progress may provide a climate favourable to increased concentration of market power rather than the opposite. Moreover, a decline in price does not necessarily imply an absence of monopoly power; a fair profit might have been made at even lower cost to users."); See also William E. Kovacic, *Competition Policy in the Postconsolidation Defense Industry*, 44 Antitrust Bull. 421, 432-34 (1999) (describing benefits of rivalry among defense contractors in promoting innovation to achieve superior weapons designs); Robert Pitofsky, *Challenges of the New Economy: Issues at the Intersection of Antitrust and Intellectual Property*, 68 Antitrust L.J. 913, 918-19 (2001) ("It is true that successful high-tech companies

are often aggressive in price and innovation, but competition is still important, if only because it is likely that consumers would be better off with two or three aggressive companies, assuming the market can support more than one, rather than a single dominant firm.”).

⁷. See, e.g., Robert Pitofsky, *Challenges of the New Economy: Issues at the Intersection of Antitrust and Intellectual Property*, 68 Antitrust L.J. 913, 916 (2001); David Balto & Robert Pitofsky, *Antitrust and High-Tech Industries: The New Challenge*, 606 PLI/Pat 513, 517 (2000).

⁸. See, e.g., William E. Kovacic, *Antitrust After Microsoft: Upgrading Public Competition Policy Institutions for the New Economy*, 32 U. West L.A. L. Rev. 51 (2001) (describing role of competition policy in technologically dynamic industries); Robert Pitofsky, *Challenges of the New Economy: Issues at the Intersection of Antitrust and Intellectual Property*, 68 Antitrust L.J. 913, 919 (2001) (“Competition may be especially important where innovation is concerned, in order to preserve a diversity of approaches which will often prove essential to advance knowledge and discovery. The history of innovation since the monolithic AT&T was broken up is some evidence that innovation is more likely to thrive in the presence of competition than in its absence.”).

⁹. Apart from not having been shown to be necessary, special rules would raise problems of application, such as the determination of whether a particular transaction or market qualifies for special treatment. Unpublished special arrangements, in particular, are inadvisable as a matter of policy. The U.S. antitrust agencies strive for a policy of transparency, to the extent permitted by constraints of maintaining confidentiality of competitively sensitive information.

¹⁰. See, e.g., Timothy J. Muris, Chairman, Federal Trade Commission, *Antitrust Enforcement at the Federal Trade Commission: In a Word – Continuity*, Prepared Remarks Before American Bar Association, Antitrust Section Annual Meeting (Chicago, Illinois, August 7, 2001) (“Merger analysis in “high tech” industries is not fundamentally different than in other industries. The basic Guidelines analysis can be applied. We should proceed, however, cognizant of our lesser experience in high tech industries.”); Thomas B. Leary, Commissioner, Federal Trade Commission, *Antitrust Law as a Balancing Act*, Prepared Remarks for The Tenth Annual Seattle Computer Law Conference (Seattle, Washington, Dec. 17, 1999) (“it is not necessary to develop new antitrust principles to deal with so-called “high tech” industries; what is required is a discriminating application of familiar principles to the special facts of a “high tech” environment”) (emphasis in original).

¹¹. United States Department of Justice and Federal Trade Commission, *Horizontal Merger Guidelines* (Rev. April 8, 1997) (hereafter “Merger Guidelines”).

¹². See Richard J. Gilbert and Steven C. Sunshine, *Incorporating Dynamic Efficiency concerns in Merger Analysis: The Use of Innovation Markets*, 63 Antitrust L.J. 569 (1995) (“A merger that has adverse effects on innovation could affect prices and products in markets where the merging firms do not compete premerger and even in markets where the merging firms are not likely potential competitors.”).

¹³. While the innovation market concept is not discussed in the Merger Guidelines, it is discussed in the Antitrust Guidelines for the Licensing of Intellectual Property, which post-date the Merger Guidelines. See United States Department of Justice and Federal Trade Commission, *Antitrust Guidelines for the Licensing of Intellectual Property* § 2.2 n.9 (April 6, 1995) (hereafter “Intellectual Property Guidelines”). The Intellectual Property Guidelines recognise that a number of different markets may be relevant in assessing the competitive effects of transactions involving intellectual property: goods markets, markets for technology, or markets for research and development, also referred to as “innovation markets.” Intellectual Property Guidelines § 3.2. See also Dennis A. Yao & Susan S. DeSanti, *Innovation Issues Under the 1991 Merger Guidelines*, 61 Antitrust L.J. 505, 510 (1993) (identifying three markets as relevant to innovation issues: today’s product market, the future product market, and the R&D market).

¹⁴. See, e.g., Richard T. Rapp, *The Misapplication of the Innovation Market Approach to Merger Analysis*, 64 Antitrust L.J. 19 (1995); George A. Hay, *Innovations in Antitrust Enforcement*, 64 Antitrust L.J. 7 (1995); see also Robert J. Hoerner, *Innovation Markets: New Wine in Old bottles?*, 64 Antitrust L.J. 49 (1995).

¹⁵. Claims of dynamic efficiencies, like any other, are evaluated under the standards set forth in section 4 of the agencies' Horizontal Merger Guidelines. Efficiencies must be *merger-specific* (i.e., not practicably obtainable absent the merger, through other means such as a licensing arrangement or a joint venture), *cognisable* (i.e., they may not arise from anticompetitive reductions in output), reasonably *verifiable*, and "must be of a character and magnitude such that the merger is not likely to be anticompetitive in any relevant market." Merger Guidelines § 4 (revised April 8, 1997).

¹⁶. It may be appropriate to apply a present value analysis to expected future outcomes.

¹⁷. See, e.g., 4A Areeda, *et al.*, Antitrust Law ¶ 975g (noting "truly formidable" proof problems in determining innovation economies).

¹⁸. See Richard G. Parker & David A. Balto, *The Merger Wave: Trends in Merger Enforcement and Litigation*, 55 Bus. Law. 351, 387 (1999). See also Robert Pitofsky, Then-Chairman, Federal Trade Commission, *The Nature and Limits of Restructuring in Merger Review*, Remarks before Cutting Edge Antitrust Conference (New York, N.Y., Feb. 17, 2000), available at <<http://www.ftc.gov/speeches/pitofsky/restruct.htm>> ("Where the claimed efficiencies relate to portions of the deal not affected by the restructuring, analysis becomes more complicated. First, the staff ordinarily would not have investigated the other efficiencies and will have little more than the parties' assertions that such efficiencies will occur and will produce pro-competitive results. As many have noted, efficiencies are much easier to assert than to prove. Second, in the market where the assets overlap, and where by definition the restructuring does not produce a fully adequate restoration of competition (if it did there would be no need to turn to the efficiencies issue), consumers will be deprived of the benefits of competition so that consumers in a different market, or the shareholders of the merging corporations, can profit. I would not say that efficiencies in these other markets would never be taken into account, but surely they should be viewed with a skeptical eye.").

¹⁹. See Parker & Balto, *supra*, at 387. Parker and Balto discuss a recent investigation in which the parties argued, in part, that the transaction would achieve significant efficiencies from more effective competition against alternative technologies that might eventually challenge the parties' products at both the low and high ends of the market. They state that the parties' argument was not acceptable to the staff, for the following reasons:

First, available evidence suggested that, while the alternative technologies represented plausible long-term competitive threats, they would not have attained a significant position in the market within two years. Under such circumstances, the parties' efficiencies claim was equivalent to a suggestion that competition in an existing market should be sacrificed so that the companies could more effectively compete in a different market several years in the future. Even if the parties were correct that their future competitiveness would have been enhanced, this argument was insufficient because the price was a sacrifice of competition in an existing market. The parties were also unable to show that continuing improvements on existing technology would not be sufficient to meet the competitive threat. In fact, the recent history of technological rivalry and innovation among the firms led the Commission staff to believe that a healthy market for products using their technology would persist for a significant period of time.

²⁰. Firms have been charged with collusion regarding R&D activity. See *United States v. Automobile Mfrs. Ass'n.*, 1969 Trade Case. (CCH) ¶ 72,907 (C.D. Cal. 1969) (consent decree).

21. *Ciba-Geigy Limited (sub nom. Novartis AG)*, Dkt. C-3725, 123 F.T.C. 842 (1997) (consent order) (Comm'r concurring in part and dissenting in part).

22. *See Ciba-Geigy Limited*, Dkt. C-3725, 123 F.T.C. 842 (1997), Separate Statement of Chairman Robert Pitofsky and Commissioners Janet Steiger, Roscoe B. Starek, III and Christine A. Varney; *see also Ciba-Geigy Limited*, 1966 WL 743359 (F.T.C.), Analysis of Proposed Consent Order to Aid Public Comment.

23. *Id.*

24. This method of describing the Internet industry is not uniformly accepted and it is certainly not perfect, but it does provide a useful conceptual framework in describing key differences between the major players and how the players are related. It is possible to describe the market in many different ways, but describing the market differently does not affect the competitive analysis.

25. A peering agreement is a bilateral agreement that allows two networks to exchange and terminate each other's traffic. It is a co-operation agreement where the two networks say, "I'll take your traffic if you take mine." It is important to note, however, that peering agreements refer only to traffic being delivered to an address on one of the two networks. The agreements do not allow one network to pass off traffic meant for a third network. For example, Network A peers with Network B and Network B peers with Network C, but Network A does not peer with Network C. Network A therefore cannot send traffic to Network C through its peering relationship with Network B.

26. The EU and the FCC both determined that there was a national backbone market. The parties, on the other hand, argued that the market was considerably broader and included all participants in the provision of Internet access and, since the underlying fiber facilities are the same, all voice telecommunications.

27. The parties, of course, disputed that estimate, claiming that they had only 20% of the Internet backbone market. They calculated market share based on a percentage of revenue. They included all revenues related to the Internet which means that they included revenue from sources other than their backbone services and double counted other revenue, such as revenues for ISPs who buy connectivity from others, thereby increasing the significance of their competitors' market share and diluting MCI/WorldCom's.

28. *See* Richard G. Parker & David A. Balto, *The Merger Wave: Trends in Merger Enforcement and Litigation*, 55 Bus. Law. 351, 394 (1999) ("Commentators have observed that where a firm knows that its competitors can 'free-ride' on its innovations, the incentive to innovate may be seriously dampened.").

29. *Id.*

30. Stan Metcalf, "The Economic Foundations of Technology Policy: Equilibrium and Evolutionary Perspectives," in *Handbook of the Economics of Innovation and Technological Change* 446 (P. Stoneman ed. 1995); *see also* William E. Kovacic, *Transatlantic Turbulence: The Boeing-McDonnell Douglas Merger and International Competition Policy*, 68 Antitrust L.J. 805, 821 (2001) (describing benefits of maintaining a diversified base of weapons suppliers amid conditions of extreme technological uncertainty).

31. *See* Michael L. Bushman & Philip Anderson, "Technological Discontinuities and Organisational Environments," 31 *Administrative Science Quarterly* 439 (1986), reprinted in Robert A. Burgelman & Modesto A. Maidique, *Strategic Management of Technology and Innovation* (2d ed. 1996); James M. Utterback, *Mastering the Dynamics of Innovation* (1994); F.M. Scherer & David Ross, *Industrial Market Structure and Economic Performance* (3rd ed. 1990).

32. Pierre Dussauge, Stuart Hart & Bernard Ramanantsoa, *Strategic Technology Management* 14 (1992); Bushman & Anderson, *supra* note 6 (distinguishing competence-destroying and competence-enhancing innovations); Peter Swann & Jas Gill, *Corporate Vision and Rapid Technological Change: The Evolution of Market Structure* 15 (1993) (explaining that "[c]ompetence-enhancing innovations need not be minor, and indeed can represent 'order of magnitude' improvements in technology, but the key is that they do not

render obsolete those skills that were used to develop the previous generation of technology"); Clayton M. Christensen, *The Innovator's Dilemma: When New Technologies Cause Great Firms to Fail* (1997) (asserting that established firms find it extremely difficult to pursue a rapidly evolving "disruptive technology" that is not yet mature enough to serve current customers).

33. Numerous economic studies document that leap-frog innovations are most often created by niche players or by firms attempting to upset the dominant firms. In an analysis of 46 case studies in industries with shattering innovations, James M. Utterback found that most of the leap-frog innovations came from new firms. See Utterback, *supra* note 2; see also Scherer & Ross, *supra* note 2 (listing historical examples where new challengers, without ties to old or accepted technology, were responsible for revolutionary products/processes).

34. The first case involving the current innovation market approach was the 1993 U.S. Department of Justice challenge of the merger of the Allison Transmission Division of General Motors and ZF Friedrichshafen, AG, essentially the world's only manufacturers and innovators of medium and heavy automatic transmissions for trucks, buses, and other commercial and military vehicles. The complaint alleged that the GM-ZF combination would diminish competition not only in the production and sale of current products but also in a world-wide innovation market for the technological design, development and production of automatic transmissions for heavy vehicles. *United States v. General Motors Corp.*, No. 93-530 (D. Del filed Nov. 16, 1993) (consent judgement).

35. Richard T. Rapp, *The Misapplication of the Innovation Market Approach to Merger Analysis*, 64 *Antitrust L.J.* 19, 27-37. (1995).

36. *Id.* at 27.

37. *Id.* at 28, citing F.M. Scherer, *Schumpeter and Plausible Capitalism*, 30 *J. of Economic Literature* 1416, 1421 (1992).

38. Rapp, *supra*, at 33-36.

39. *Id.* at 36-37.

40. *Id.* at 37-46.

41. See *id.* at 36-37.

42. *Ciba-Geigy Ltd.*, Dkt. C-3725, 123 F.T.C. 842 (1997) (consent order). *Business Week* reported that the FTC's enforcement action "shows a new savvy among trustbusters about high-tech competition." *A Booster Shot for Gene Therapy*, *Bus. Wk.*, Jan. 20, 1997, at 92.

43. The remedy in this case was designed to protect competition both in the particular products in which the two firms competed and the broader market for gene therapy research and development. For the specific therapeutic products of the two firms, the order required the licensing of certain key intellectual property rights held by the combined firm, and also required that an acceptable buyer be identified "up front." Rhone Poulenc Rorer was identified as the licensee before the order was accepted by the Commission. For the broader gene therapy research and development market, the order required the companies to grant gene therapy researchers non-exclusive licenses to certain essential gene therapy technologies that would otherwise have provided a bottleneck to the research of others.

44. *Digital Equipment Corp.*, Dkt. C-3818 (July 14, 1998) (consent order).

45. In other electronic products, *Sensormatic Electronics Corp.*, 119 F.T.C. 520 (1995) (consent order), alleged reduction of competition in research and development of disposable source labels to be used with electronic article surveillance systems installed in retail stores as theft prevention devices. Knogo, the

acquired firm, had been developing its SuperStrip technology for possible use as a disposable source label would be imbedded in goods or packaging at the manufacturing or distribution level, thereby obviating the need for retailers to install labels themselves. Sensormatic has been developing one of its proprietary technologies for potential use as a source label.

⁴⁶. Office of the Under Secretary of Defense for Acquisition & Technology, U.S. Department of Defense, "Report of the Defense Science Board Task Force on Antitrust Aspects of the Defense Industry Consolidation," at 28 (Apr. 1994);

⁴⁷. See Kovacic, *Competition Policy*, *supra* note 6, at 434-35 (describing benefits to defense purchasing agencies of maintaining rivalry between at least two suppliers in environment characterised by "often unpredictable shifts in global political conditions and changing technology").

⁴⁸. See *id.* at 433-34 (discussing "the value of maintaining a three-firm configuration in individual weapons industry segments, particularly where one firm has a reputation for pursuing novel approaches to solving specific problems").

⁴⁹. "Technology markets consist of the intellectual property that is licensed ... and its close substitutes -- that is, the technologies or goods that are close enough substitutes significantly to constrain the exercise of market power with respect to the intellectual property that is licensed."

⁵⁰. The use of "crown jewel" provisions is not unique to high-innovation mergers.

⁵¹. See *Ciba-Geigy Limited*, Dkt. C-3725, 123 F.T.C. 842 (1997), Separate Statement of Chairman Robert Pitofsky and Commissioners Janet Steiger, Roscoe B. Starek, III and Christine A. Varney.

⁵². *Id.*

⁵³. See Thomas B. Leary, Commissioner, Federal Trade Commission, *The Patent-Antitrust Interface*, available at <<http://www.ftc.gov/speeches/leary/ipspeech.htm>> ("This is an issue that clearly needs to be addressed when considering remedies.")

⁵⁴. See Federal Trade Comm'n, Statement of Policy with Respect to Duration of Competition and Consumer Protection Orders, (Aug. 9, 1995), reprinted in 4 Trade Reg. Rep. (CCH) ¶ 13,320.