

## **BEWARE BUSINESS FADS: DISRUPTIVE INNOVATIONS AND COMPETITION POLICY**

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*Business has its fads. Most of the time these involve changes in management practices — re-engineering the corporation, total quality management and the like. But occasionally they move beyond firm boundaries. A couple of decades ago, it was all about outsourcing and supply chain management. But since the late 1990s, and especially alongside the evolution of the commercial internet, the fad de jour has been disruption.*

*Disruption is seemingly everywhere and happening to everything. And like all such things it is a coin with two sides. On one side is a notion that would warm a competition regulator's heart: disruptive entrepreneurs are all about unleashing new technologies to bring down sleepy incumbents. On the other side, are the incumbents themselves. Disruption holds that they have never been more vulnerable; just a few ounces of complacency away from doom.*

*Combine these two sides and competition regulators and the laws that house them are themselves argued to be disrupted. When entry is free, often and strong and incumbents are petrified, those promoting competition through regulation can go home. There is simply no more than they can do. At least, that is what the direct implication of the disruption notion would imply.*

*However, like all fads, while there is a grain of truth at their heart, I will argue here that, fundamentally, little has changed. Indeed, once we unpack what we know about disruption and combine it with some hard-headed economics, we see that the role for competition regulators is as strong as ever and, surprisingly, how they go about their business is as traditional as it has ever been. The plan for this paper is as follows. First, I outline the main theory of disruption as provided by Clay Christensen. Next, I relate it to what is traditionally known from economic theory before turning to look at the evidence for disruption. I then explain how the evidence suggests that not much has changed for competition authorities and they still have an important role. I conclude by mentioning some issues in relation to the nascent sharing economy.*

*Le monde des affaires n'échappe pas aux modes. Le plus souvent, elles prennent la forme d'un changement de style de gestion : réingénierie de l'entreprise, qualité totale, etc. Parfois, ces modes dépassent les frontières des entreprises. Il y a deux ou trois décennies, l'externalisation et la gestion de la chaîne d'approvisionnement étaient sur toutes les lèvres. Depuis la fin des années 1990, et particulièrement depuis l'arrivée de l'Internet marchand, c'est la théorie des innovations perturbatrices qui retient toute l'attention.*

*Il existe deux côtés à cette théorie, qui semble s'appliquer à tous les secteurs. Le premier est celui des entrepreneurs créatifs et des autorités de réglementation de la concurrence : les innovations perturbatrices permettent de remplacer des entreprises établies devenues nonchalantes. Le second est celui de ces mêmes entreprises. En théorie, ces victimes sont responsables de leur malheur, leur absence d'innovation les ayant rendues particulièrement vulnérables au changement.*

*Résultat : les autorités de réglementation et les lois qu'elles appliquent auraient elles aussi besoin d'innovation. Selon la théorie, on pourrait même croire qu'étant donné la facilité d'accès au marché et l'immobilisme des entreprises établies, les autorités chargées d'encourager la concurrence au moyen de règlements sont totalement dépassées et n'auraient qu'à aller se rhabiller.*

*Comme toutes les modes, celle-ci est partiellement fondée. Toutefois, dans cet article, je vais tenter de démontrer que bien peu de choses ont véritablement changé. En effet, en comparant ce que l'on sait des innovations perturbatrices à des données économiques, on constate que le rôle des autorités de réglementation est aussi important que jamais et, étonnamment, que leur façon de procéder est aussi traditionnelle que jamais. Dans cet article, j'aborde les points suivants. Je commence par un aperçu de la théorie des innovations perturbatrices de Clay Christensen, puis la compare à la théorie économique traditionnelle. J'examine ensuite les effets des innovations perturbatrices et explique pourquoi tout indique que les choses ont très peu changé pour les autorités de réglementation, et pourquoi leur rôle demeure important. Pour conclure, j'évoque certains points relatifs à l'économie du partage naissante.*

## I. The Original Christensen View

The disruption movement, if it can be called that, began with the work of Clay Christensen. The Harvard Business School professor wrote a book titled *The Innovator's Dilemma*, which tried to look at why great firms failed.<sup>2</sup> Of course, it was well known that firms that had been great could see their glory days over and then succumb to competitive pressures. But Christensen argued that instead what could cause great firms to fail was when they followed precisely the principles of good management that MBA professors would argue they should follow. Take, for instance, the notion that you should listen to your customers when deciding which new products to pursue and launch. Christensen argued that this was a good idea if the new product innovations built on or sustained what your customers' valued.<sup>3</sup> But what if this was not the case? When Blackberry's customers saw the iPhone in 2007, they did not push the company to produce a similar product. Why? Because it had no keyboard and if there was one thing that Blackberry users loved, at least at the time, was the Blackberry's keyboards. As it turned out, that never changed

but, in the process, Blackberry's maker, Research In Motion ("RIM") failed to move quickly enough on the real opportunity from iPhones and then Android smart phones—an operating system and ecosystem that generated large numbers of apps.<sup>4</sup>

In many ways the story of Blackberry is a poster child for the disruption movement—now worth less than a tenth of its market value from its peak in 2010. But there were others including Encyclopedia Britannica ("Britannica") and Blockbuster Video ("Blockbuster"). What was important was the message: even well-managed companies were not safe. There existed innovations that were disruptive in that they came at established firms seemingly out of nowhere. To be sure, RIM, Britannica and Blockbuster all knew, investigated, and considered the innovations that were later held to be their demise. Britannica, for instance, was a leader in online digital encyclopedias as early as 1996 while Blockbuster launched video-on-demand over the Internet as early as 2000. In each case, these moves undermined their existing business models and were quickly discarded. In the meantime, new entrants took the charge absent these internal conflicts. The end result was history.

The notion that incumbent firms might face weaknesses in the face of innovative entrants had been considered before Christensen. Joseph Schumpeter had famously identified the waves of creative destruction that drove capitalism although he was ultimately pessimistic and believed that powerful large firms would end up stifling that process and along with it, innovation.<sup>5</sup> What Christensen brought to the table was a more nuanced approach.<sup>6</sup> Not all innovations would be the death knell of incumbents—only ones that were disruptive. And those innovations had two characteristics. First, they tended to make design trade-offs that offered lower performance on key metrics incumbents and their customers valued. Thus, they appealed to niche or under-served consumers initially. Incumbents chose to ignore those because they tended to be at a lower end of the market.

But this was only the first element of a disruptive innovation. The second was that the innovations had a trajectory of improvement on precisely the metrics that mainstream customers valued. According to Christensen, incumbent firms who sensibly ignored those innovations when they first appeared found themselves facing entrants with more competitive products after just a short time. In his book, he argued that, by the time all that happened, it was too late for the incumbent firms. They would be disrupted.<sup>7</sup>

To support this theory, Christensen offered up numerous cases, the most famous of which was the hard disk drive industry. That industry

had its origins in the 1960s with pioneering efforts by IBM for its mainframe computers before smaller disk drives took off for mini-computers in the 1970s. Christensen's study began when Control Data Corporation ("CDC") was the largest independent maker of 14-inch drives for mini-computers. However, throughout the 1970s and 1980s there were several successive step changes in hard disk architecture. In each case, the physical size of the disks fell (to 8 inch, 5.25 inch, 3.5 inch, 2.5 inch, 1.8 inch, etc.) but at the cost of capacity. Not surprisingly, for incumbents at each stage, when they explored a smaller drive with their customers, those customers claimed they were not interested. However, as ultimate consumers moved from mini-computers to personal computers and then to laptops, smaller size had some obvious benefits. Christensen showed that, in most cases, newer sized disk drives were brought to market by new entrants rather than existing incumbent market leaders.<sup>8</sup>

Christensen then went further and argued that those market leaders themselves failed as a result of this competitive pressure. However, while that certainly did happen on one occasion as Seagate Technology ("Seagate") managed to win against CDC, as we will see, the pattern of creative destruction did not appear as strong as Christensen had maintained. This is important because what made Christensen's book "scary" to people such as Intel's Andy Grove was the notion that incumbents were more vulnerable than they thought. Even with good management, Christensen had argued that they could be felled by disruptive innovation.<sup>9</sup> Moreover, from an antitrust perspective, innovation dynamics were spurring a high degree of competition in such industries and hence, antitrust authorities, so it was argued, should leave those industries be. However, if, instead, it was the case that all the innovation-based entry did not lead to a rapid change in market leadership of incumbents, the role of antitrust regulators could be much more important.

## II. What Does Economic Theory Say?

At its essence, disruption theory involves a simple set of relationships. First, a disruptive event occurs—which is usually the emergence of an innovation or technology that is, for want of a better term, a bad fit with what incumbents in the industry are doing. Second, incumbents pass on developing that new technology due to internal conflicts while entrants, who do not face such conflicts, take the charge. Third, the entrants do so well that they end up being a competitive threat to incumbents. Fourth, the incumbents fail to catch the entrants and so lose leadership and, ultimately, much more. From the perspective of the role of competition theory, it is this last stage where all of the action

is. If it is true that entrants can outpace incumbents to the latter's doom, then competition is working well without a regulatory hand. If that is not true, then we cannot presume that competition—which might translate technological leadership into market leadership—is working as it should.

It is worth noting that the first three stages of disruption theory have a long-standing basis in economics. Beginning with the work of Kenneth Arrow,<sup>10</sup> economists have long tried to understand the differing incentives of incumbents and entrants to innovate. Arrow noted something interesting in this regard. If a new entrant were to enter a market on the basis of a new innovative product, what it would receive as a reward were the profits from that product. By contrast, suppose an incumbent, already in the market, were to think of launching a new product. What it would receive would be the profits from that product but it would also lose profits from the previous generation of the product. Thus, what fundamentally distinguishes an incumbent and an entrant in thinking about whether to put forward effort to generate new and better products is a difference in their (net) rewards from that activity. For the exact same product, the incumbent's reward is lower than that of the entrant precisely because the product will replace what the incumbent already is earning. This replacement effect suggests that, to some extent, all new innovations do not "fit" with incumbents in the same way they do for new entrants. Thus, in the absence of other frictions, we may see entrants being more likely to bring innovations to market than incumbents.

This example presumes quite a bit of symmetry in the opportunities facing the incumbents and entrants. In reality, if you want to improve a product rather than, say, launch a new product completely, an incumbent has an advantage. This is because in order to get the new improvement to market, the incumbent already has an existing product to work with. By contrast, an entrant, to be an effective competitor, has to supply a product and in addition, improvements and all. Thus, we could presume that for many innovations, the costs to the incumbent of developing that product are lower than those of entrants.

Disruption theory emphasizes this type of thing by focusing on the notion that only certain types of innovations will be disruptive—in short, of the type that entrants do not have a big cost advantage relative to incumbents. To Christensen, coming up with an entirely new disk drive with a distinct physical size was an example of this. Similarly, coming up with a touch-based phone, a digital encyclopedia or streamed video would be something neither RIM, Britannica nor Blockbuster had a particular "technical" advantage in. Therefore, a more nuanced

approach to whether competition is working as it should, would be to consider whether the industry under study was more or less prone to the types of innovations that were disruptive as opposed to being merely sustaining. Importantly, two industries could see high levels of innovation but may be very different in terms of whether practices might be of concern to antitrust authorities.

Which brings us to step 4—the final step. Suppose that, in fact, a new disruptive innovation had emerged and it was brought to market by an entrant who then found itself able to compete with incumbents. Would that be the end for the incumbents? The picture painted by Christensen and the business leaders who subsequently carried the disruption movement was that the answer was yes. Incumbents would be unable to catch the entrants and would subsequently lose their market position. However, economic theory by contrast suggested that was not inevitable and, indeed, that incumbents had tools and incentives to prevent such outcomes.

Faced with existential threat, incumbents have two broad options. The first is, in fact, to meet the threat. One of the features of the disruption theory is that entrants enter but take some time to improve new products to be competitive with incumbents and compete for their primary customers. In other words, built into the theory is time. Moreover, this is not just simply a matter of waiting it out. Entrants have to invest to make their products better but incumbents can similarly divert resources to meet a competitive threat. No better example of this exists than when, in the mid-1990s, having ignored web browsers in a manner consistent with disruption theory, Microsoft realized the threat Netscape posed to its operating system dominance. Bill Gates penned an eight-page e-mail that announced a new division staffed with thousands of engineers that would be devoted to catching up and subsequently outperforming Netscape. It did just that becoming the dominant in browsers with Internet Explorer—at least for a time. Netscape, by contrast, fell out of the market entirely, albeit having led the way.

Why did Microsoft double up its investment in such way? Of course, one reason is that it could. An advantage incumbents have is the ability to marshal resources. But another reason is that it had a preservation incentive. While prior to something like Netscape coming along, Microsoft's incentives may have been muted due to the replacement effect, when such entry becomes inevitable and, by doubling up, the incumbent cannot just meet but neutralize a competitive threat, its incentives switch. In this situation, while Netscape's reward from continual innovation was a foothold in competition with Microsoft;

Microsoft's reward was to continue to hold on to its monopoly rather than face permanent competition. In this case, the difference in profits between monopoly and competition is greater than the profits in competition itself and so Microsoft's reward from innovation is relatively higher. The end result was that when a threat became existential while an entrant's entry is not permanent, incumbents had a stronger incentive to devote more resources to innovation to preserve their market dominance.

Doubling up in this way is not only a highly competitive response but is also a costly one to incumbent firms. That leads to the second option they may have—to acquire the entrant. To an antitrust lawyer that seems like a fairly obvious response. It is also obvious to an economist. After all, so long as it is permitted, a merger that can diminish competitive pressure is in the interest of both the incumbent and the entrant concerned.

Then why was it not given weight by the disruption movement? Christensen emphasized that by the time the incumbent realised that acquiring the entrant was a good move, it would be too late. The entrant would already have market leadership in its sights and so acquisition may be too costly for the incumbent—indeed, it may be unaffordable. In addition, Christensen argued that integration of the two firms would not get rid of the issues the incumbent had in promoting and developing the new disruptive technology. He argued something similar in relation to the incumbent's ability to catch up by doubling up investment.<sup>11</sup>

Thus, the question regarding the relevance of competition policy in the face of disruption can move up one level. It hinges not only on the incumbent's incentive and ability to respond to the entrant but also on whether it can do so either by doubling up on investment in response, or by undertaking an acquisition. If these are too costly or too late, as Christensen suggests, then the new entry will be successful in overturning incumbent leadership and competition authorities can relax. On the other hand, if they are neither costly nor late, and are viable options to protect incumbent leadership, competition authorities have a role to play. What role? That needs to be discussed. However, before considering that let me turn to the evidence on whether disruption really does leave incumbents flatfooted.

### **III. What Does the Evidence Say?**

While there are certainly examples where firms that seemed to have an unassailable market position, fell from grace, the question is whether an industry can be prone to disruption over the long-term

so that we can relax about competitive forces operating in a socially beneficial way. As already noted, Christensen identified that hard disk drive industry as an example of an industry prone to disruption. For that reason, it has received much attention from economic researchers over the last couple of decades. As I will highlight here, the picture painted is somewhat different from that of Christensen although it is consistent with the incumbent response to incumbent as highlighted by economic theory.

As a starting point, it bears repeating that, for the most part, Christensen was correct when he showed that for large step-size changes in hard disk drive configurations, it was entrants rather than incumbents who brought the new innovations to market first.<sup>12</sup> A recent study by Mitsuru Igami highlighted why.<sup>13</sup> He examined the move from 5.25 inch drives to 3.5 inch drives. The 3.5 inch drives would become the most popular drives ever for personal computers and laptops. But actually this drive took some years to be introduced. For a few years, it was exclusively supplied by new entrants before being successfully promoted by Conner Peripherals, another entrant, who came to dominate the 3.5 inch segment in its early years. Igami examined why it was that the market leader in 5.25 inch drives, Seagate, took so long to enter that segment. He found that, consistent with disruption, Seagate were concerned about the replacement effect explaining about two thirds of their delay. Interestingly, he also found that Seagate had a cost advantage that translated into the new segment—something that could have accelerated its entry but also gave it something more to protect in terms of existing margins. This serves to reinforce the role of entrants in bringing new innovations to market.

That said, apart from one instance—the move from 8 inch to 5.25 inch drives—in general, the incumbents ended up catching up by investing more heavily in the new designs when they found themselves under competitive pressure. In other words, the displacement predicted by step 4 of disruption theory did not come about. Instead, both doubling up on investment and acquisition were demonstrable incumbent responses in this industry.

On doubling up, incumbents generally caught up with entrants by investing more heavily than them in new designs after they entered the market. Josh Lerner found that the late-comers to a new segment (that is, the leaders in the previous segment) ended up being the market leaders again after a short time.<sup>14</sup>

Similarly, acquisition played an important role in the industry. Following its successful leadership in the 3.5 inch segment, Conner Peripherals was acquired by Seagate in 1993 during the period when



Seagate had finally started to catch them in that segment. That process was part of an ongoing consolidation that had seen Seagate purchase Control Data Corporation in 1989 (the incumbent it did displace when it introduced the 5.25 inch drive) and over the next two decades, acquisition was the main form of exit for new entrants in the industry. Later Seagate bought Maxtor in 2006, Samsung's drive division in 2011 and LaCie in 2012. Maxtor itself had been an acquirer of competitors including MiniScribe in 1990 and Quantum in 2000. All told, Seagate was responsible for the exits (directly or indirectly) of nine of its rivals by acquisition.

This is well-known in antitrust circles. It is only a few years ago that the industry went from 5 to 3 players in a short period of time due to the Seagate-Samsung and Toshiba-Hitachi set of mergers. In those cases, antitrust authorities were concerned about the reduction in competition but also on a potential reduction in Research & Development ("R&D") expenditures and so placed conditions on the mergers to ensure those reductions did not take place.

But our understanding of this industry has now been aided by a 2015 study conducted by Mitsuru Igami and Kosuke Uetake.<sup>15</sup> They took historical data from the industry to develop a model to see if permitting those final two mergers was a good idea or not. On the static side, what they found is that compared to mergers in the past, these mergers had relatively large effects. In particular, they likely led to a large reduction in consumer welfare while at the same time also generating substantial realized efficiencies. In the past, both of these effects had been dampened by smaller scale. Nonetheless, even though the effects became large, they balanced each other out. What was more interesting was what the likely impact of a long term merger policy would have been on the industry. For instance, suppose that antitrust authorities blocked mergers that reduced the number of competitors below 5. If this had been the policy 15 years ago, it would have reduced the rate of R&D because it would actually encourage some firms to exit the industry. Specifically, firms that might otherwise have stayed in longer to find a merger partner, leave and with them goes any innovations they may have produced. The end result of this is that while the R&D rate did not vary much when the industry moved from 5 to 3, had a 5 threshold been the policy, it would have slowed R&D earlier in the industry lifecycle.

#### **IV. How Should Competition Authorities Approach Disruption?**

What has been demonstrated is that disruption theory does not imply that competition authorities can be relaxed and presume that

industries will have a natural matching of technological leadership with market leadership. In fact, the two can be divorced and, in some cases, the instrument of that divorce can be practices that are often assessed by competition authorities. That said, like all innovation, because there are dynamic issues associated with an industry, the analysis of those practices requires care.

For example, when we look at mergers we tend to consider them one case at a time. However, when dynamics and innovation play a role, the case by case approach may not be appropriate.<sup>16</sup> This is because the strength or tenor of the merger policy will have an impact not just on the present case at hand but also on the prospects for future mergers.<sup>17</sup>

To see why this matters, suppose that in an industry two firms wish to merge. Using static analysis, we can assess the likely impact on prices and hence, consumer welfare. We can also examine whether there may be any efficiencies from the merger. But the impact on innovation is more subtle. To be sure, competitive pressure to innovate will disappear between the merging parties but may also change for others from that.

That, however, is not all that will happen. This is because the prospects for future mergers being permitted or not will also have changed. That will impact on their likelihood and also have an impact on what determines innovation prizes into the future. The hard issue is: in what way?

As it turns out there are competing effects and no amount of introspection can resolve them. A more permissive merger policy will make mergers more likely. On the one hand, when mergers are more likely, that may reduce innovation competition and so cause innovation rates to fall. On the other hand, mergers may themselves be part of the prize—for instance, you are going to be a more attractive merger partner if you have innovated more and so you can expect to get more of the share of gains from mergers. This effect may mean that more permissive merger policy may spur innovation. Which effect dominates is hard to say.

These sorts of issues tax competition authorities and make analysis difficult. This is especially the case when industries are undergoing disruptive change. In that situation, regulators may be concerned that inaction today may, rightfully, lead to problems later on. Hence, increasingly, there is earlier investigation and advice to government in general coming from competition authorities.

## V. Conclusion

A good example of this is in relation to what is currently termed “the sharing economy.” These are the new entry into industries such as hotels and taxi/limo services that have been facilitated by digital technology that can match under-utilized resources with consumers. Indeed, this highlights a two-element definition of the sharing economy: (i) that there are individuals who own key assets (such as cars or dwellings) and (ii) that there exists a market platform to match those individuals with consumers. Element (i) isn’t something that is new but element (ii) is which is what makes all this currently relevant. Basically, mobile technologies allowed temporal agglomeration issues for suppliers to be overcome so that, for instance, a supplier could signal their availability and location in real time. In many respects, this is a business fad all on its own.

Regulators, competition and beyond, are concerned about these new developments. The first concern is consumer safety. There are existing regulations concerning the ability of individuals to make available their assets due to concerns about consumer safety (at least that is how they are posited these days). Those concerns have not gone away. But the very fact that new markets have arisen without such regulations gives us pause to wonder whether they are necessary. Uber, AirBnB all should have failed if the regulations were making transactions safe. They did not fail because those platforms substituted public regulation for private regulation. Uber and AirBnB are some of the most regulated eco-systems in the world. The problem we have is compatibility between the public and private regulations not any fundamental disagreement that they should exist *for their intended purpose*.

The second concern is with respect to market power or dominance, should the private platforms emerge into a dominant platform in the future. To be sure, that is exactly what happened under the system of public regulation. Because of that only large scale entry could overturn the existing system. Like George Orwell’s novel *Animal Farm* portrays, the danger is that we turn one monopoly into another. If the new platforms write the public regulatory rules, there is a concern that we could have that situation.

In this situation to foretell a danger competition authorities need the equivalent of canaries in a coal mine. One reason to be optimistic is that a certain form of competition is baked into the system. For instance, if Uber and Lyft drivers are *not* employees, they cannot be compelled to work. A feature of Uber is that drivers are free to come in and out of the system. Alongside that, they are currently free to come into and out

of the Uber platform. Their ability to “platform shop” disciplines the power of platforms.

There are also risks. Consider a situation where drivers must be licensed but that Uber, for example, takes on the costs of licensing the drivers and ensuring the cars are serviced. In return, they require exclusivity to Uber. Then we potentially have the seeds of a problem. Instead, we want to ensure that drivers can fulfill these requirements in an independent way to avoid such tying. It should not matter as, one way or another, the market will compensate them for the costs. The sharing economy is important. It could re-write how we, for instance, deal with transportation. But it needs a competitive foundation.

### Endnotes

<sup>1</sup> Thanks to Thomas Ross and participants at the Canadian Bar Association Workshop in September 2015. All views remain my own. Correspondence: joshua.gans@gmail.com.

<sup>2</sup> Clayton M Christensen, *The Innovator’s Dilemma* (Harper Business: New York, (1997)).

<sup>3</sup> *Ibid* at xv.

<sup>4</sup> For more information on the precise story, see *The Disruption Dilemma*, MIT PRESS [forthcoming in 2016] [Gans (2016)].

<sup>5</sup> Joseph A Schumpeter, *Capitalism, Socialism and Democracy* (New York: Harper, 1942).

<sup>6</sup> In fact, Christensen was, not the only one. Rebecca Henderson and Kim Clark posited a supply-side theory that focused on innovations that would be hard for incumbents to develop and sustain. See *ibid* for more details.

<sup>7</sup> Christensen, *supra* note 2 at xi.

<sup>8</sup> Christensen, *supra* note 2 at 23.

<sup>9</sup> Christensen, *supra* note 2 at xviii.

<sup>10</sup> Kenneth J Arrow, “Economic Welfare and the Allocation of Resources for Invention,” in Harold M Groves, ed, *The Rate and Direction of Inventive Activity: Economic and Social Factors* (Cambridge: National Bureau of Economic Research, 1962) 609–26.

<sup>11</sup> Christensen, *supra* note 2 at 77.

<sup>12</sup> The exception was the 2.5 inch drive.

<sup>13</sup> Mitsuru Igami, “Estimating the Innovator’s Dilemma: Structural Analysis of Creative Destruction in the Hard Disk Drive Industry, 1981-1988” J Pol Econ, (forthcoming, 2015).

<sup>14</sup> Josh Lerner, “An Empirical Exploration of a Technology Race” (1997) 28:2 The RAND J Econ 228.

<sup>15</sup> Mitsuru Igami & Kosuke Uetake, “Mergers, Innovation and Entry-Exit Dynamics: The Consolidation of the Hard Disk Drive Industry (1996-2005),” Yale University (SSRN), (15 October 2015) online: <[http://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=2585840](http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2585840)>.

<sup>16</sup> See Ilya Segal & Michael D Whinston, “Antitrust in Innovative Industries,” (2007) Am Econ Rev, 97: 1703-30; Joshua S Gans, “When is Static Analysis a Sufficient Proxy for Dynamic Considerations?: Reconsidering Innovation

and Antitrust,” (2010), in J Lerner and S Stern (eds), 11 *Innovation Policy and the Economy* 1703; and Joshua S Gans & Lars Persson, “Entrepreneurial Commercialization Choices and the Interaction between IPR and Competition Policy” (2013) 22:1 *Ind Corp Change*, 131-151 for more discussion.

<sup>17</sup> For an interesting perspective on disruption and competition policy enforcement see Alexandre de Stree & Pierre Larouche, “Disruptive Innovation and Competition Policy Enforcement”, Note, Organisation for Economic Cooperation and Development (OECD), DAF/COMP/GF(2015)7 (20 October 2015), online: <[http://www.oecd.org/officialdocuments/publicdisplaydocumentpdf/?cote=DAF/COMP/GF\(2015\)7&docLanguage=En](http://www.oecd.org/officialdocuments/publicdisplaydocumentpdf/?cote=DAF/COMP/GF(2015)7&docLanguage=En)>. Their paper views mergers as a potential hindrance to disruptive processes and argues that competition authorities need to be vigilant. As will be argued here, the dynamic trade-offs are somewhat more subtle.