

## **Interview with Joshua Gans on Interoperability, Disruption, and Antitrust**

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### **What is interoperability?**

Interoperability is similar to compatibility. Suppose there is an existing technology. When a company creates some new technology, it achieves interoperability by designing the new technology so that it can work together with the old one. The alternative is designing the new technology on its own, as if the old one did not exist.

### **What are the pros and cons of interoperability?**

From a social welfare perspective, interoperability is generally good, except when it is too expensive. Interoperability isn't free. It can be costly to provide, and the firm that is bearing the costs is the firm that is providing the interoperability. For example, integration costs, such as the cost to develop complex interfaces to merge different technologies, can be expensive. Because providing interoperability is costly, companies providing the new technology may need to be compensated to agree to make their products interoperable and prevent free-riding off their investments.

**Can you provide examples where the lack of interoperability was problematic?**

There have been occasions in which the competitive landscape justified mandating the provision of interoperability. Phone number portability is an example. Phone number portability is the ability to reassign a phone number to another device, location, and/or carrier.

Prior to 2003, wireless service providers could restrict consumers' ability to maintain their previous phone numbers. This changed when the Federal Communications Commission (FCC) and other foreign authorities mandated portability to increase competition among providers and improve the market for consumers.

The FCC had evidence from studies that showed an overwhelming percentage of business and residential consumers would be unlikely to change their wireless service provider if they had to also change their telephone numbers. On the other hand, the wireless service providers were concerned that portability could be very costly and strongly opposed the FCC's proposed regulations. Ultimately, the FCC was successful in requiring all wireless carriers to offer portability and the costs of portability were not prohibitively expensive for service providers. Afterwards, prices decreased and competition increased.

**Are there examples where the lack of interoperability had antitrust implications?**

Yes, sure, the *U.S v. Microsoft* antitrust suit is a good example.

In the mid-1990s, Microsoft's operating system, Windows, was not easily interoperable with competitive Internet browsers of the day, such as Netscape; Windows only easily supported Microsoft's own browser, Internet Explorer. Windows did not allow users to uninstall Internet Explorer, and Microsoft prevented Windows resellers from promoting competing web browsers, while pressuring them to promote Internet Explorer instead.

The courts ultimately found that Microsoft unlawfully abused its dominance in operating systems to drive competition out of the web browser market. In a sense, Microsoft used its market power in operating systems to prevent interoperability in the market for web browsers. This illustrates that when there is not sufficient competition, incumbent firms can use interoperability (or the lack thereof) to block competitors from entering a market.

**Should the provision of interoperability therefore be mandatory?**

No, not at all. Despite the benefits of interoperability in certain situations, it should not be forced if there is already enough competition in a particular market or if it is too expensive.

For example, recently, there was a dispute between Apple and the four leading

banks in Australia over the need for the interoperability of mobile payment systems on the iPhone. The banks<sup>56</sup> asked the Australian Competition and Consumer Commission (ACCC) for the right to collectively negotiate with Apple over mobile payment systems—under Australian law, bargaining cartels can be formed with the approval of authorities.

The banks desired for Apple to open its near field communication (“NFC”) chip inside its iPhones, which presently is only compatible with Apple Pay. The banks wanted iPhone users to be able to download their own banking apps and payment systems that utilize the NFC chip technology instead of connecting their payment systems using Apple’s digital wallet, and paying Apple a fee. Essentially, the banks wanted to negotiate with Apple in hopes of making its NFC chip interoperable. However, Apple argued that making the NFC chip interoperable with the banks’ payment apps would allow the banks to free-ride off its NFC chip technology.

The ACCC recently ruled that since these banks account for about two-thirds of household deposits and issued credit, it would not permit them to collectively negotiate with Apple, as there are sufficient competitive options for mobile payments. For example, the banks can offer digital wallets on iPhones through their own banking apps, without direct access to Apple’s NFC system. The banks also can offer their digital wallets on rival Android phones. Here, a key question for the ACCC is the extent to which lack of access to Apple’s NFC system would significantly hinder growth and development of payments competition.

**In reviewing the banks’ request to form a bargaining block, the chairman of the ACCC, Rod Sims, stated that “Apple Wallet and other nonbank digital wallets could represent a disruptive technology that may increase competition between the banks by making it easier for consumers to switch between card providers and limiting any ‘lock in’ effect bank digital wallets may cause.”<sup>57</sup> Do you think Apple is poised to disrupt the digital payments market?**

No. Disrupt means that Apple or other nonbank digital wallets can change everything that has gone before. There was a chance that would happen, but I think that ultimately there hasn’t been enough demand for the security features Apple and others offer (using fingerprint verification) and convenience (taking a phone out) to make a big difference relative to just tapping or swiping a card. That suggests there is more innovation to come before we see something radically upend traditional payments.

**Thanks. Let’s step back a bit—you have discussed disruption at length, including in your book, *The Disruption Dilemma*—tell us, what is disruption?**

Disruption theory has been a fad among business leaders since the late 1990s. In 1997, Clay Christensen of Harvard Business School wrote a book called *The Innovator’s Dilemma*. He argued that large firms failed because they didn’t

<sup>56</sup> Commonwealth Bank of Australia, the National Australia Bank, Westpac Banking Corp., and Bendigo & Adelaide Bank Ltd.

<sup>57</sup> “Australian banks adjust strategy for collective bargaining on Apple Pay.” *Disruptive Asia*, Feb. 13, 2017.

embrace new technology, especially when those innovations conflicted with what current customers wanted.

Let's take the iPhone again and discuss an example with Blackberry. When the iPhone came out in 2007, Blackberry customers weren't pushing Blackberry to produce a similar product, because they loved Blackberry's keyboard. But as a result, Blackberry didn't move quickly enough to realize the opportunity that Apple's apps presented. In this way, the iPhone disrupted the mobile phone industry.

Christensen's message was that even well-managed firms weren't safe from disruptive innovation. Of course, economists like Joseph Schumpeter had long recognized the power of capitalism to weaken incumbent firms in the face of new, innovative entrants to the market—Schumpeter called it “creative destruction,” although he thought that large firms would be able to stifle those entrants.

### **What did Christensen add to the concept of “creative destruction”?**

What Christensen brought to the table was a sense of exactly which innovations would disrupt incumbents.

Christensen said that disruptive innovations had two key traits. First, products that disrupted would be ones that made design trade-offs which initially made them unattractive to incumbents and their customers. In other words, these innovations would initially appeal to niche or underserved consumers, ones incumbents tended to ignore.

Second, the disruptive innovations would quickly improve, so that they did appeal to mainstream customers. In a very short period of time, incumbents who sensibly ignored those innovations that didn't serve their customers would realize that new entrants had enhanced their products—but by that point, it would be too late for incumbent firms.

### **How does disruption intersect with antitrust?**

Disruption theory has obvious antitrust implications. If innovation in certain industries is likely to lead to the disruption of incumbent firms, then there is no need for extensive government intervention in those industries to promote competition. On the other hand, if disruptive innovation can be blocked or stymied by incumbents attempting to anticompetitively preserve or enhance their market power, then antitrust enforcement may be necessary when these roadblocks arise.

### **How should antitrust enforcers think about disruption?**

We can think of disruption as a four-step process. First, a new technology emerges, one that doesn't fit well with what the industry is already doing. Second, the industry incumbents decline to develop that technology due to internal conflicts, while entrants pursue it. Third, the entrants thrive and are now competing with incumbents. Fourth, the incumbents fail to catch up with the entrants.

Whether these last two stages are reached depends on whether incumbents decide to innovate and their competitive practices, as well other market characteristics. Economists have been studying incumbents' push to innovate for a long time. Kenneth Arrow, for instance, noted that incumbents and entrants have different incentives to innovate. When a new entrant brings a new product to market, that entrant receives that product's profit as a reward. But when an incumbent firm does the same thing, the rewards are the new product's profit *minus* lost profits from its own existing products. Both can offer the same innovative product, but the incumbent will get a lower reward for doing so because the new product will replace what the incumbent is already offering. This replacement effect suggests that entrants may be more likely to innovate than incumbents.

**Is your research consistent with the notion that entrants are more likely to innovate than incumbents?**

Like almost everything in economics, the answer is "it depends." Entrants will be more likely to innovate than incumbents if everything else is equal for incumbents and entrants, but that is often not the case. The incumbent has advantages—it has already created a product. We might expect that improving an existing product would be a lot cheaper than creating one from scratch. Disruption theory thus suggests that innovations will only be disruptive if incumbents can't make the new product more cheaply. That in turn will depend on whether incumbents have any technical advantage in developing a product and can therefore catch up to entrants.

**What factors play into whether incumbents can catch up with competing entrants in a market?**

Christensen and other business leaders in disruption theory thought that if the entrant were able to compete with the incumbent, then the incumbent would inevitably lose market position. But economists were more skeptical and thought that incumbents had ways to prevent those outcomes.

Two possible responses for an incumbent facing a competitive entrant may be as follows. The first is to develop a competing product. Disruption theory suggests that it takes time for entrants to develop products that will be competitive not just with niche products, but also with incumbents' primary product offerings. In theory, incumbents can use this time to devote resources to meet the competitive threat.

Let's go back to what Microsoft did in the mid-1990s with web browsers. Bill Gates started to realize that, although Microsoft had pretty much ignored browsers, Netscape was enough of a threat that it might affect Microsoft's dominance in operating systems. Gates wrote a long memo announcing that Microsoft would create a new division with thousands of employees focusing on the Internet, and subsequently developed Internet Explorer, which became dominant in the browser market for a significant period. Microsoft threw resources into catching up, and Netscape eventually fell out of the market. This highlights an advantage incumbents have: they can marshal resources to double-up on investment.

But doubling up on investment is costly. An incumbent like Microsoft has to put a lot of money into catching up. So one question is why incumbents would make such costly investments. The answer is that an incumbent's incentives change once a new firm successfully enters the business. Ordinarily, an incumbent is facing the replacement effect—the fact that if the incumbent innovates, it reaps a reward that is the profit from selling its new product less the lost profit on the sales of its old product. But, in the case of something like Netscape, Microsoft was facing losing a monopoly on a market. So whereas Netscape's reward from competition was a toehold in the market, Microsoft's reward was retaining monopoly profits, so its incentive to respond to the threat from competition was relatively higher.

Of course, another option incumbents have when facing a competitive threat from entrants is to simply acquire them.

**Why didn't Christensen see these two options—doubling up on investment and acquiring a new entrant—as effective solutions to the incumbent's disruption problem?**

For one thing, he thought acquisition would be too costly for incumbents by the time they realized the extent of the competitive threat presented by the entrants. But he also thought that even if an incumbent tried to develop an innovating product by either doubling up or acquiring a competitor, the incumbent would still face its original difficulties in promoting and developing the new product.

If Christensen is right on this, antitrust authorities can relax. But if incumbent firms choose to acquire entrants or engage in other potential anticompetitive practices, then antitrust still has a role.

**What does economics say about the answer to that question?**

Ever since Christensen published his book, people have been looking into that question. A lot of attention has been focused on the hard disk industry, since that was a key example Christensen himself gave.

His example went like this: in the 1970s, as IBM and others were developing mini-computers, Control Data Corporation ("CDC") made most of the mini-computer disk drives, which were 14 inches. But in the 70s and 80s, changes in hard disk architecture meant that disk size fell—from 14 inch, to 8 inch, to 5.25 inch, then 3.5 inch, 2.5 inch, 1.8 inch, and so on. Customers kept telling incumbents that they didn't want smaller drives, because each smaller incarnation of the drives had less capacity. But the smaller drives had benefits as the industry moved from mini-computers to personal computers to laptops.

Christensen pointed out that the smaller drives were mostly brought to market by new entrants rather than by incumbents, and he further argued that this market pressure made CDC and other incumbents fail. More recent research, though, suggests the story is more complicated.

For instance, Mitsuru Igami studied the move from 5.25 inch drives, which were dominated by Seagate Technology ("Seagate"), to 3.5 inch drives. Igami

found that Seagate took a long time to enter the 3.5 inch drive market mostly because of concerns over the replacement effect. So this confirms Christensen's view about which firms were driving innovation.

But Igami also found that when incumbents entered, they did in fact double-up on investment, and they also at times acquired other firms. In fact, Josh Lerner found that late-comer incumbents were often able to reestablish their positions as market leaders after a short time by investing in new designs. Then, too, there were cases like Conner Peripherals, which had dominated the 3.5 inch market, but which was subsequently acquired by Seagate.

In fact, Seagate acquired a number of new entrants, including entrants who had themselves acquired competitors. As a result, the industry went from five to three firms in a short period of time, triggering investigations, and ultimately clearance, from antitrust authorities.

**Based on the Seagate example, it appears that leaders in technological innovation don't always become market leaders. Is that correct?**

Yes, exactly. What antitrust enforcers need to assess is whether or not mergers and acquisitions (or other actions taken by incumbent firms) are undermining innovation and disruption. Or, are these mergers and acquisitions enhancing technical competencies in a manner that future innovation is increased or innovative products are brought to the market sooner.

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