

# **The Dissolution of Sectors: Do Politics and Sectors Still Go Together?**

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## Abstract

Technological change has altered firm behavior in ways that are rendering sectoral models of political economy inadequate for understanding the economic and political consequences of modern market evolution. I use cases from the computer and medical devices industries to demonstrate this process, its key variables, and consequences for firm preferences. Firms in both industries have moved into new sectors with integrated goods-services product strategies. In doing so, they have disrupted, or put into dispute, the political configurations that characterized those sectors in the past. I conclude with three suggestions on why the disintegration of sectors remains uneven across industries: that it may depend on the degree of information dependence in the industry; on the availability of suitable regulatory templates to guide firm action; or on the prior-existing role of services in the firm's home sector business

## 1 Introduction

The political economy literature has long used the concept of industrial sector as a way to aggregate business behavior, interests, and political preferences. The utility of sector as an analytic device depends on two implicit assumptions: first, that its aggregation of economic firms and workers captures a fairly homogeneous set of ways in which value is derived from economic activity; and second, that the boundaries of aggregation are reasonably stable under the forces whose effects the analyst is trying to understand. Together, these assumptions allow the analyst to consider how exogenous economic or political developments affect behaviors inside sectors, and how these effects may change the way a sector understands its political interests. Implicitly, then, these assumptions suggest limits to the usefulness of sectoral analysis. In conditions where the value creation mechanisms or the boundaries of the sector are in flux, a sectoral analysis that assumes their stability will find it difficult to understand some political or economic behaviors.

In this paper, I argue that many industries today are experiencing exactly this flux. The argument proceeds in five steps: first, that firms are increasingly crossing sectoral boundaries to deploy integrated product-service strategies; second, that these strategies tend to alter the value-creation mechanisms of the sectors they enter; third, that as firms do so, they adopt political preferences consistent with these value creation mechanisms; fourth, that these preferences may not correspond to the settled preferences of the sectors they have entered; and finally, that the ensuing competition between different strategies and business models with different embedded political

preferences disrupts the political bedrock on which old sectoral definitions rested, and in so doing reorders the political economy landscape. At the root of these evolving strategies is a series of general technological changes that are altering the value creation mechanisms of longstanding industries. Amidst these changes, a sectoral framework offers little purchase for understanding the resulting politics of economic value creation and competition. They can no longer aggregate a homogeneous set of economic actors within a set of stable boundaries. Rather, the political variable becomes the business models these strategies support. I argue that many industries today display the sectoral flux caused by this sequence of events, making sectoral analysis an imperfect tool for understanding the contemporary politics of economic and political change.

This paper proceeds as follows: I first describe how the model of sectoral boundaries emerges from the early writing on political economy. Case studies of Apple, Inc., Microsoft Corporation, Nokia, and Medtronic then demonstrate the limits of this model in an environment of sectoral flux. The music industry, and its late difficulties in adapting to digital content, shows sharp contrasts in the strategies pursued by Apple, Microsoft, Nokia, and the recording companies, each with different sets of political preferences even as they operate in the same sector. The entry of Medtronic, traditionally a medical devices firm, into the business of medical information collection, provides a study of a much different industry. There, Medtronic's preferences for regulation of private medical data contrast sharply with those of the other major gatherer of personal medical data - doctors, nurses, and clinical researchers. These case studies suggest that the disruption of sectoral politics is a general phenomenon, present in many different sectors throughout the economy.

## **2 Sectors in Political Economy**

First consider early notions of the structure of the political economy. Since the establishment of the field by the physiocrats, and then Smith, in the late 18th century, the concept of sector and its particular qualities has been an enduring topic of interest. Adam Smith's notion of sector emerged from his central principle of the division of labor. In the factory, productivity improved fastest when labor was divided into tasks and given out to specialist workmen. The workman enriched

himself fastest by becoming very good at one or two things and using his wages to buy from other specialists. By extension, firms, as collections of workers organized around a set of coordinated tasks, were domains of specialist knowledge. Smith's pin factory, subject of his famous example of the division of labor, was not a conglomerate. Other firms presumably made the metal that his pin factory required to supply the man who drew the wire; still others did the sewing which used pins as an input; still others operated the stores that made the pin factory's goods available to the consuming public. The firm owner saw fit to let other firms in the economy supply these services, as they could do it more efficiently than he could. The notion of sectors, if not explicitly stated, is there: one sector for metallurgy, another for pin manufacture, another for textiles, another for retail. As in the factory, so in the economy.

Ricardo (1996) also grounded his notion of sector on the basis of productivity. But where Smith saw only task specialization, Ricardo, writing a half-century later, also finds technology, such that advantages in trade and exchange derive from "the advantage of skill and machinery." Countries, it seems, are relatively more efficient at producing some goods than others. This "comparative advantage" creates the preconditions for trade. Comparative advantage applies to inter-firm trade as well as inter-country trade. If one nation trades with another in order to reap the benefits of superior relative productivity derived from national assets in technology, geography, and knowledge, then so too would firms wish to trade on the basis of their comparative advantages.

Later analysts took back for Smith what Ricardo had claimed for the domain of skill and technology. Baumol (1967) rejected the universality of the Ricardian idea of regular productivity growth through the application of machinery. Certain industries, he argued, were only domains of skill, and were less vulnerable to technology-led efficiency improvements. The reasons were easy to see: services were typically administered by individuals with specialized knowledge, whether in medicine or car repair or financial advising or Bach performance. Natural human and time limitations seemed to impose boundaries on how many heart surgeries or brake jobs or stock trades or concerto performances could be accomplished by one human being in a given period of time.

The resulting productivity differential between manufacturing and services contributed to the establishment of sectoral divisions. High-productivity manufacturing meant high profits, derived

from particular competencies in the deployment and organization of capital. Baumol and Ricardo are in agreement on this: profits derive from how much firms must pay workers relative to how much value they add. Manufacturing wages could rise while prices fell, as machinery made each worker ever more productive. Services wages rose inexorably even as their productivity remained largely stagnant. Following the logic of comparative advantage, with their productivity so much higher than the services sector, it made sense for manufacturing firms to keep services - including, at times, maintenance on or installation of their own products - and the wage costs they implied outside the firm, specialize in building physical goods, and buy the services they needed from other parties.

In the postwar era, industrial relations and politics appeared to converge around sectoral cleavages. Maier (1975) has documented how the class politics of the pre-1914 industrial revolution became, through the 1920s, the sectoral politics of corporatism as the bourgeoisie struggled to contain the revolutionary tendencies of labor. The successful completion of this process of containment and institutionalization of labor-capital disputes in the various forms of corporatism, co-determination, and unionization in the postwar advanced industrial democracies brought sector politics to the fore. (Maier, 1981) Disputes between workers and capital inside manufacturing were largely about the distribution of the wealth created by productivity gains; those within services about the problem of ever-rising wage pressures. As Swenson (1991*b*), Swenson (1991*a*), and Pontusson and Swenson (1996) have pointed out, these differences have led to cross-class coalitions of labor and capital in high-productivity industries opposing the preferences of lower-productivity sectors.

The goods / services distinction is also central to arguments about the political economy of trade (Hiscox, 2001; Frieden and Rogowski, 1996), the structure and function of training and apprenticeship programs (Hall and Soskice, 2001; Thelen, 2001), and the implications of the Belassa-Samuelson effects on wage politics and industrial relations. The politics of goods-services disputes extended beyond industrial relations as well. Iversen and Wren (1998) have pointed out the problems created by low services productivity growth for national economic policies.

Finally, Gourevitch (1987) has argued that these examples are but the most recent versions of

longstanding sectoral conflict. He contends that economic politics in times of crisis are largely a function of how state institutions mediate conflict among sectoral interests with different visions of how crises should be resolved. Thus conflicts between agriculture and industry in the 19th century, or importers and exporters in the 1970s, take similar form. The assertion of long-term validity of the salience of sectoral politics raises questions how durable these interests really are. Particularly at moments of technological change, we might expect that both firms and sectors are less confident about where their economic interests align with others.

This is especially visible in the distinction between goods and services sectors. Recent data has thrown doubt on the Baumol's assertion that services will perpetually experience low or zero productivity growth. The late 1990s in the United States saw a recovery from a 30-year bout of low productivity growth. Econometric studies have attributed much of this productivity growth to two services industries, retail and financial services, and the substantial investments in information technology that both made in the 1980s and early 1990s. Other countries also saw faster rates of productivity growth in services.(van Ark, Inklaar and McGuckin, 2002; Hempel, 2002; Pilat, 2004) Technology may be reclaiming for Ricardo what Baumol once reclaimed for Smith.

A narrowing of the productivity gap may provide incentives for firms to cross what formerly were seen as rigid sectoral boundaries. As firms cross these sectoral boundaries, three political possibilities emerge: they could adopt the preferences of the sector they are entering; they could bring with them the preferences of the sector from which they come; or they could adopt wholly new preferences. The standard definition of sectors - as firms who produce the same outputs and compete in the same markets - would suggest that the first would occur. If so, then blurring of sectoral boundaries within the firm will have little effect on the evolution of the political economy. If the last possibility pertains, however, the economy will see the weakening of established sectoral boundaries and their accompanying forms of contestation, replaced by new conflicts between new entrants and established players. The location and form of those conflicts will create new forms of political contestation.

Another, related, phenomenon deserves mention in this context. The disaggregation of production chains through the growing networks of international manufacturing, shipping, and expertise

has accelerated since 2000. Analysts have noted that it has created both new opportunities for development (Breznitz, 2006; Rodrik, 2007) and significant challenges for developed nations seeking to remain wealthy (Zysman, 2004). Here, I argue that a version of this process has played out in domestic political economies as well, as firms seek to claim from each other pieces of markets that in the past were difficult to dis-aggregate.

The following sections explore the breakdown of sectoral boundaries and the politics that typically accompanied them. I first use the recent dynamics of the music industry to argue that integrated goods-services product strategies are blurring both the traditional sectoral separation of device makers and content makers, and the politics of intellectual property protection that went with them. I then turn to a completely different industry, medical devices, to argue that these dynamics are not limited to the IT industry, but in fact are present in very different sectors across the economy.

### **3 Digital Music and the Politics of Copyright Protection**

#### **3.1 The Music Industry in an Analog Age**

The music industry before the advent of digital technology provides a good example of a sectorally-defined economic landscape. The modern industry consisted of two distinct but mutually dependent sectors: those who made and sold content, and those who made and sold devices for playing content. The recording sector was principally concerned with identifying, developing, and promoting musical talent and distributing its output. The devices sector was principally concerned with much more technical problems: sound quality, portability, aesthetic design, and compatibility with related systems like televisions or speakers. The need for one sector's output to cooperate with the other's created the need for inter-sectoral standards, as with those created for long-play records or cassette tapes or compact discs. But so long as those standards were stable and uncontested, neither sector had much reason to interfere with the other. Technological developments induced changes in the structure of the content industry, through changing the costs of entry. But

device manufacturers remained on the periphery of content production and distribution, and vice versa.(Alexander, 1994)

The political economy of the industry cleaved along these sectoral lines. Content was a product that depended on intellectual property rights for its value. The recording sector was thus a staunch protector of copyright legislation, and an aggressive prosecutor of copyright violations. In contrast, the devices sector built physical goods, whose value it protected through patent law, an entirely different intellectual property regime. The recording sector showed little concern for patent law. The devices sector limited its concern over copyright to the perpetuation of the Fair Use clause, codified in the 1976 Patent Act, which ensured that device makers could not be prosecuted if their customers used their devices for copyright violation.<sup>1</sup>

For this case, output-based sectoral distinctions make sense. Content and devices are obviously different finished products, require different skills to assemble and market, and display different factor intensities. Productivity of devices factories was subject to Ricardo's improvements in "skill and machinery." That of composers, performers, and producers fell under Baumol's purview. Likewise, sectors making content displayed different political priorities and interests than those making devices on which to play content. The requirements of production translated into different requirements of the legal and political system. Collaboration between the two took place in a contractual or standards-specification format, consistent with Coasean ideas of inter-firm contracting, and by extension sectoral boundaries. The patterns of economic behavior translated well into patterns of political behavior.

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<sup>1</sup>The history of a related industry turns on this distinction. The early years of home video recording systems witnessed an important lawsuit by Universal Studios against Sony Corporation over its Betamax product. Universal alleged that, since Betamax could be used to make high-quality copies of copyright-protected media, it was facilitating crime and should therefore be declared illegal. The court ruled against the motion picture industry on the grounds that illicit copying was only one of many possible uses, and that Sony was not liable for the behaviors of its customers after their purchase of its products. Since then, of course, home video rentals and sales have become a lucrative business for the motion picture industry, suggesting their initial paranoia was unjustified. For a discussion of the history of the jurisprudence of the case, see Lloyd and Mayeda (1986-1987)

### 3.2 The Digital Transformation of Firms and Product Strategies

Analog music is rapidly becoming a thing of the past. Three developments in digital technology drove its disappearance. The introduction of the compact disk meant that, by the mid-1990s, most popular music was distributed in digital form.<sup>2</sup> Then, when personal computers for the consumer market became sophisticated enough to read from and write to CDs, it was possible to reproduce the content of master copies like commercially-produced CDs rapidly and with little perceptible loss of quality. Finally, when online data transfer became commonplace, digital content that had been moved from one CD to another could now be made available online for instantaneous, cost-less reproduction.

These developments have thrown the traditional business model of the recording industry into doubt. In the old music industry, the main source of value lay in the ownership of monopoly rights to music. Recording companies secured preferential access to these rights by establishing elaborate and expensive production, marketing, distribution, and sales channels. Musicians wishing to access these channels faced a choice of either signing over the rights to their musical creations to the recording companies on very generous terms, or else being shut out of the most lucrative markets. In turn, the recording companies charged monopoly prices for the music they controlled, and are alleged to have colluded to keep these prices high. (Deutsch, 2002)

Digital technologies meant the end of monopoly restriction on music supply. The volume of music that became available quickly eroded a profit model based on its uniqueness. That volume simultaneously generated a consumer demand for products to help store, manage, and use this new oversupply of music. The devices sector was uniquely positioned to respond to this demand, with integrated hardware-software-content suites that seamlessly managed content across multiple platforms—computers, music players, and even phones. The digital revolution, then, shifted the central point of the music market away from the copyright owners that had dominated it, to the firms that could deliver means of organizing the vast quantity of content now freely (if perhaps

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<sup>2</sup>In 1990, the dollar value of shipped media was nearly equal for CDs and cassette tapes. Eight years later, the dollar value of shipped CDs was eight times that of cassettes. See "1999 Yearend Statistics"(Washington, DC: The Recording Industry Association of America, 1999), at <http://76.74.24.142/01F751EA-7C8C-5D03-E206-D26FEB360519.pdf>. Last accessed 12 May 2008.

illegally) available.

Responding to this shift meant that the devices firms had to choose business models and product strategies to deploy when entering the music storage and distribution market. New entrants appear to have pursued three different visions of these models. The first derives most of its profit from the device, treating content as a necessary but perhaps not money-making service. The second attempts to extract value from both devices and content services. The third is almost exclusively reliant on profits from content services, often in subscription form, and may only break even on the device. Apple, Microsoft, and Nokia represent each of these, respectively.

These models, in turn, embed very different preferences for copyright protection, with potentially very different effects for the viability of a recording industry business model based on the sanctity of copyright. Only one of these models is fully compatible with the legacy recording industry's set of preferences, even though all of the models put the companies in the role of music distributor. As I will show below, the ensuing competition for users became a competition over preferences, even as the firms offered similar products in the same market.

This development is difficult to understand under the old model of sectoral politics. Goods firms have decided to enter services markets; they have adopted preferences different from each other and from firms already present in those markets; and they have competed not just on the superficial qualities of their products, but also on the political preferences embedded in those products. None of these developments would be expected under sectoral models, either those of a productivity-driven or product-driven cleavage.

### **3.2.1 Apple**

In 2007, Apple, Inc. earned 42% of its revenue from computer sales, 35% from sales of a music device (the iPod), and 10% from various music-related services including music sales through its iTunes Music Store (iTMS). (Apple, Inc., 2007) Responding to the digital transformation discussed above, its product strategy emphasizes the seamless integration of several different products and services. Music bought on iTMS is loaded seamlessly into the iTunes music software provided with every computer Apple sells. These computers in turn integrate seamlessly with the music

libraries stored and played on the iPod music player. iPod ownership has become a point of entry for purchase of Macintosh computers and iTunes music, and vice versa.

These products are not, however, modular outside the Apple suite: iTunes will not integrate with most other competing music players. Likewise, much iTMS music cannot be played on any other music software than iTunes, due to proprietary copyright protection. Thus Apple's product strategy emphasizes the integration of content and hardware across multiple proprietary platforms, a services channel for content distribution, and a proprietary system of interlinkages. Value is created not just via any one element of this system, but from the system itself. This is fundamentally different from the pre-digital behavior of the music industry, where content and devices were linked through open standards and the value model for each was distinct. It is also highly successful: Apple commands 70% or so of the digital music player market.

The iPod / iTunes suite came embedded with a bifurcated set of copyright preferences. On the one hand, users could load anything they wished from their own collections; on the other, music purchased through iTMS came with heavy copyright restrictions. This inconsistency reflects the origins of the iPod's success and the market power that it gave Apple to establish a new model for digital music sales. The rapid expansion of illegal music piracy gave Apple a hook into establishing an online music distribution channel - something which the recording companies had been slow to do. In effect, the debut of the iPod and its open-format design helped cement the dominance of unsecured music formats, and supported the already large trade in illegally copied music. These twin developments helped create the willingness by the recording companies to try and capture some of that lost revenue via an more secure online distribution channel that Apple itself was well-positioned to create. That Apple held the power in this partnership is apparent in the technical details of the copyright protection mechanisms used by iTMS.<sup>3</sup>

In entering the music distribution and sales sector, then, Apple did not adopt the copyright preferences of the recording firms that traditionally dominated that sector. The iPod device has minimal copyright protection for content not obtained through iTMS. The success of the iPod, moreover, has been symbiotic with the rapid growth in music piracy, the cost of which the record-

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<sup>3</sup>The specifics of the copyright provisions are not public information. However, Steve Jobs alludes to them in his open letter on music. See Jobs (2008).

ing industry has estimated in the billions of dollars annually. Indeed, Apple estimates that only a tiny fraction of the capacity of the millions of iPods sold to date is taken up by legally acquired digital music.(Jobs, 2008) The company has done little to modify its devices to prevent their use with illegally copied content. Music sold through iTMS has stricter limits on copying and sharing, as required by the recording industry. But Apple CEO Steve Jobs as openly called these copyright protections bad for consumers, and indicated he would prefer to be rid of them. Finally, this open opposition to copyright protection has not prevented Apple from partnering with a recording industry heavily damaged by the piracy that the iTunes suite implicitly tolerates.

Finally, these copyright preferences are also inconsistent with the industry Apple originates from. In its computer software and hardware business, Apple is notoriously protective of the proprietary nature of its software and hardware, to the point of refusing to license the designs to either and actively prosecuting firms that attempt to reverse-engineer core Apple products to run on non-Apple platforms. In the trifecta of possibilities for preference adoption, then, Apple neither adopted the old preferences of the sector it entered, nor brought its own preferences with it. Rather, wholly new preferences accompanied a wholly new product strategy.

Thus the sectoral analysis misses some key details for a company like Apple. It has entered the music distribution and sales sector, with products that compete with traditional physical means of distributing content. But it has not adopted the same preferences as other firms in that sector, or even of its partners on whom it depends for content. Classic sectoral boundaries fail to capture the dynamics of Apple's behavior in the modern music industry. Its output cannot easily be separated into content and devices. The copyright preferences embedded in that output do not correspond well with either its positions on copyright in its own sector or with those of the sector it has entered.

### **3.2.2 Microsoft**

In contrast to Apple, Microsoft's initial entry to the music distribution and sales market tracked much closer to the preferences of the sector it was entering. In 2006, it introduced a media player (the Zune), an online content distribution channel (Zune Marketplace), and a set of software for managing content on the user's personal computer. Zune Marketplace launched with 2 million

songs, from many of the same recording companies that supplied content to Apple's iTunes. The Zune product group had other features that Apple did not, including integration of Zune Marketplace with the pre-existing media marketplace supporting Microsoft's successful Xbox game console, the ability to share media wirelessly with other Zune users, a larger screen for viewing movies, and a music subscription alternative to per-song purchasing. Zune also took advantage of Microsoft's large installed Windows user base, which had traditionally been a source of strength for other Microsoft product lines. Early reviewers thought that this collection of advantages and additional features would make the Zune a formidable competitor to the iPod. (Elgan, 2006)

Unlike Apple's iPod, however, the Zune suite also embedded a set of preferences about copyright enforcement more closely resembling those of the recording industry. Zune's wireless song sharing capability was initially launched with a "three plays or three days" limitation: users could share music with other Zune owners, but only for three days of use or three plays. That limit applied not only to content purchased through the Zune marketplace, but in fact all content stored on the device. In fact, the Digital Rights Management (DRM) was built into hardware, not software, and thus treated all content as potentially suspect. Users saw this as an attempt to impose rigorous copy protection on a wide variety of content regardless of whether it was illegally obtained or not.<sup>4</sup>

The Zune Marketplace subscription service initially showed much closer attention to copyright concerns. Users could purchase flat-rate monthly subscriptions allowing unlimited media download. But that content remained useable so long as the user renewed their subscription. When the subscription lapsed, the user lost all use of the media they had downloaded. The reasons for such a design appear straightforward: it guaranteed an ongoing revenue stream for both Microsoft and the recording companies; it prevented consumers from using a one-month subscription to download massive amounts of material for perpetual use; and it protected the value of the recording industry's intellectual property. But users responded negatively to the idea that they would retain

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<sup>4</sup>Initial pre-launch publicity made it sound as if all songs transferred wirelessly between Zune devices would have their file contents altered to encode DRM in the song file itself. This turned out not to be true: DRM was managed by the device, not the software. Thus the song format went unmodified, but the device still treated all shared songs as valid for only 3 days or 3 plays. Microsoft later removed the "three plays" limitation. For the initial Microsoft clarification, see its public-relations weblog at <http://zuneinsider.com/archive/2006/09/19/980.aspx>. Accessed 11 July 2008.

absolutely no rights to music they viewed as paid for, should they ever decide to end their subscription. They also thought the DRM restrictions violated what they saw as legitimate Fair Use rights. Thus while users liked the idea of a subscription-based option, which iTunes did not offer, this emphasis on copyright enforcement over usability appears to have diluted the attractiveness of Microsoft's offering.

Finally, Microsoft revealed that a portion of revenue from each Zune sold was forwarded to Universal Studios, whose content was sold on Zune Marketplace. This "Zune Tax" appeared to assume that the devices would be used for illegal content, and that therefore users should pay an up-front cost to the recording companies to offset their losses. This presumption of guilt appears not to have been well-received by consumers.(Leeds, 2006)

This internal technical orientation towards greater embedded copy protection appeared to correspond with its public positions. While he was still involved in day-to-day operations, William H. Gates III made no public statement on par with that of Steve Jobs' open letter of 2007. Gates had apparently made statements in interviews to the effect that DRM as currently structured does not work, imposes too high a cost on users, and constrains Fair Use. But he followed these comments with indications that he envisioned a different kind of DRM, not the end of DRM altogether.<sup>5</sup>

In time, however, it appears that Microsoft has converged on a position closer to that of Apple.<sup>6</sup> To the extent that differences remain, such as the different DRM provisions in the Apple and Microsoft operating systems, these differences reflect different technology design decisions rather than different political orientations. For instance, Windows Vista deployed elaborate DRM protections largely in order to comply with the licensing requirements for supporting high-definition DVD content, a feature that Apple does not support in OS X. Meanwhile, the copyright terms offered by Apple and Microsoft for iTunes and Zune Store sales are broadly similar. Both remain quite different from the preferences of the recording industry, in large part because of differences

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<sup>5</sup>These comments were made in an interview with technology bloggers, for which transcripts are not available. For Gates' comments as paraphrased by one of the participants, see Michael Arrington, "Bill Gates on the Future of DRM", 14 December 2006, at <http://www.techcrunch.com/2006/12/14/bill-gates-on-the-future-of-drm>. For corroboration of these remarks, see Steve Rubel, "Our Sixty Minutes with Bill Gates", at [http://www.micropersuasion.com/2006/12/our\\_sixty\\_minut.html](http://www.micropersuasion.com/2006/12/our_sixty_minut.html). Both last accessed 10 July 2008.

<sup>6</sup>The public press obscures this point. Background interviews in late 2009 with Microsoft suggest that they see minimal differences between the two companies' orientation to the market.

in the mode of value creation.

Thus Microsoft, in its initial entry to the consumer digital media market, behaved much more like the firms in the sector it was entering than Apple did. Its product-services strategy attempted to maintain the value of copyrighted material. It thus paid attention to digital rights management and assigned a higher value to protecting media against copying than to deploying a seamless goods-services market strategy. It also took steps to tie its business model to that of the recording companies, via revenue-sharing from device sales. In time, however, the positions of the two firms appear to have converged around a business model that presents serious challenges to the copyright preferences of the recording firms.

### **3.2.3 Nokia**

Unlike Apple or Microsoft, Nokia comes to the digital music market via telecommunications. Starting in 2007, it began to introduce a new music subscription service in Europe called "Comes with Music." The service had a very different business model: purchase of a Comes with Music-enabled device gave the user 12 months of unlimited music downloads from Nokia's store. (Nokia, 2009) Once downloaded, music can be freely transferred to digital music players or computers. Users do not lose access to downloaded music if their subscription expires.

The revenue model for Nokia and the telecommunications firms is familiar. Nokia profits from device sales; the music service makes its devices more attractive to users who might otherwise choose an iTunes-enabled iPhone or other device. The telecommunications firms profit from bandwidth sales, which increase as the demand for network-provided services like streaming music increase. Both Nokia and its telecommunications collaborators benefit from the use of services to differentiate their product from competitors.

But the unlimited-use subscription model represents a radical break with the music industry's royalty-per-song compensation model. It also breaks the differential pricing for albums versus individual songs, and differential pricing for new or popular or niche music. In this model, all music is created equal. In contrast, even iTunes and the Zune Store continue to maintain differentiated pricing for new music sales based these and other factors. The commodification of content

represented by Nokia's generic subscription model, if it persists, will mark a sea change in the range of legitimate business models for music distribution, one which is much less reliant on the monopoly control of content.

It remains unclear how Nokia and the recording firms worked out compensation from device and bandwidth sales. (Lindvall, 2008) But clearly the intellectual property embedded in a single piece of music is, in this model, derivative of the device and the service itself, rather than of the recording-distribution framework traditionally provided by the recording companies. This represents the extreme extension of the logic of the iPod or Zune: commodified content, shorn of market power, becomes a loss-leader service for the sale of hardware devices.

### **3.3 Competition and its Consequences**

The ensuing competition between Microsoft, Apple, and Nokia thus was not merely among similar product suites (devices + content services) against a backdrop of stable preferences. Rather, it was a competition of product strategies and their embedded preferences about copyright protection and copyright enforcement. Apple and Microsoft converged on a model that embedded a very favorable reading of the Fair Use clause for third-party content, but which took pains to lock down content sold via their own online services. Nokia, in contrast, appears to have had little regard for the ongoing differentiation of music content, and instead treated it like a commodity whose presence was merely one factor in driving hardware sales and cell phone adoption. Market choices about product suite thus became choices about politics as well.

Moreover, these choices were made in a situation where all companies were in strict compliance with the law. Whatever Steve Jobs' statements on digital rights management, iTunes continues to either sell copy-protected content or, with the permission of content providers, to charge a premium for DRM-free content. Microsoft maintains that its copyright protection measures have little effect on legally obtained content. Neither company is breaking the law. Nokia's unlimited music service is not a Napster-like free-for-all. Rather, each has adopted different preferences that improvise on a set of legal and political outcomes of an earlier analog era. Up for grabs is the question of how those outcomes will be interpreted for the digital era of the future.

Attempts by the recording industry to direct this improvisation were largely unsuccessful. In 1998, 200 recording companies and device firms launched the Secure Digital Music Initiative (SDMI) to establish a competing format to the open, unsecured MP-3 format. By 2001, it was a defunct organization, and the SDMI format was nonexistent. Analyst Eric Schreier argued that the SDMI represented an attempt by the recording sector to align the interests of device makers with its own interests in rigid copyright protections. In exchange for building very secure devices, the device makers would get access to the recording sector firms' music libraries.(Schreier, 1999) But the market got away from the recording industry. By 2001, the success of Napster and other file-sharing services had made MP-3 the *de facto* standard. Device firms, seeing a huge market for integrated consumer electronics products, were loath to adopt a new format and configure their devices to gradually phase it in and exclude a large established base of content. Negotiations between the two sectors, who in the past had collaborated successfully on standards definition, fell apart.<sup>7</sup> Instead, these firms chose in favor of freedom in adopting product-service strategies, and in favor of market competition to work out the preferences landscape of the future.

The apparent victory of Apple's business model and its embedded copyright preferences has left the recording industry vulnerable. It has had no success building distribution channels on its own, and so must rely on the device makers and their integrated product strategies. Apple's integrated delivery chain has sold over 2 billion legal, copy-protected songs since its inception in 2003, generating approximately that much revenue in dollars, of which it appears the recording industry receives about 70%.(Leeds, 2005) But the industry continues to lose income from ongoing music piracy enabled in part by the work of those device firms, losses not made up by online distribution channels. It has not attempted to restrict device capabilities, possibly for fear of alienating the device firms that manage the only legitimate digital distribution channels.<sup>8</sup> Thus, despite its

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<sup>7</sup>Anecdotal evidence indicates that tensions continued even after the launch of iTunes. Recording industry firms attempted to pressure Apple into raising prices and introducing a more complex pricing model, apparently to little effect.(Leeds, 2005) This is yet another instance of the shifting locus of value creation. The recording firms' most important value stream came from music sales, hence their desire for a more profitable, differentiated pricing structure. Apple's revenue came from sales of all parts of its integrated system, hence its willingness to take lower profits on music sales in exchange for higher profits on the system as a whole. These incompatible positions on the correct pricing model for the same distribution channel appear to have been resolved in favor of Apple, reinforcing the argument that device firms have been empowered by digitalization.

<sup>8</sup>It has, though, attempted to use its control over content to change the iTunes pricing structure. In 2005, news reports indicated that the recording industry wished to raise per-song prices and introduce a more complex pricing structure.(Leeds,

slipping hold on the most lucrative part of the music business, the recording industry has decided to fight copyright protection only at the consumer level, not at the device level, a fight it appears to be losing.<sup>9</sup> The industry's discomfort with its position may explain why it felt it had to sign on to a distribution channel like Nokia's, despite the commodification of intellectual property that it implies.

Of course, the market's reception of different devices may have little to do with their embedded copyright protections. Quality of services, quality of industrial design, usability, and myriad other factors no doubt influenced consumers' choice for the iPod over the Zune. But this is a separate issue from the main argument about the decomposition of sectoral preferences. If firms were competing on these factors alone, with devices that embedded identical copyright protection preferences, then the sectoral boundaries would be clearer. But this is clearly not what has occurred. Microsoft's preferences are not Apple's. Apple's are not those of the recording industry. All three are competing in the market, and the consequences of that competition will determine not only market share, but also the politics of copyright in the future. That market outcomes are shaped by factors besides copyright protection does not change the dynamics of shifting preferences, improvisation, and market competition over political outcomes.

Thus, in entering the music distribution sector, Apple, Microsoft, and Nokia all adopted product-service suites. But each represented different preferences on intellectual property and copyright law that were distinct from each other and from the sector they were entering. Common products offered in common markets—heretofore called a sector—did not imply common political preferences. As business models shifted the location of value creation away from copyrighted content and towards the seamless integration of content and devices, these firms adopted political preferences consistent with the business model, not the economic sector. Technological change drove business model changes that fragmented traditional sectors. In this context, the sector as a unit of

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2005) They apparently made little headway, as iTunes prices for copy-protected music have remained unchanged.

<sup>9</sup>Some attempts to penalize device makers and, by extension, consumers, have been made. At the firm level, the "Zune Tax" discussed above appears to be its only success. Apple, far and away the market leader, has no similar program. Political attempts to legislate such a tax industry-wide include Canada's proposed "iPod Tax", which would implement a sliding tax based on a device's storage capacity, the revenues of which would compensate artists. This tax was declared illegal by the Canadian courts in early 2008. (Schneider, 2008) The Japanese had implemented a similar tax on storage media for earlier technologies like cassette tapes and DVDs, but chose not to extend this to dynamic storage devices. (Mehra, 2008) A similar tax has been proposed by the United Kingdom's Music Business Group. (The Music Business Group, 2008)

analysis breaks down.

## 4 Beyond IT: Medical Devices and the Politics of Privacy

The case of the music industry suggests three things: first, that major firms are adopting integrated goods-services product strategies to pursue new markets; second, that such strategies aren't merely one-off curiosities but in fact are central to establishing and maintaining market position; and third, that these strategies may require the adoption of political preferences inconsistent with a sectoral model of political cleavages. Nevertheless, it could be argued that the information technology industry bears little resemblance to the rest of the economy. Its products are knowledge-rich, enjoy declining cost curves, can often be moved almost costlessly across large distances, and employ a common set of generic technological innovations (silicon chips, display screens, radio-frequency transmitters) to deliver a vast set of products.<sup>10</sup> Many industries don't enjoy these features. If these features are the determining factor for delivery of integrated product strategies, then the blurring of sectoral lines may be unique to those industries proximate to IT.

I argue that the blurring of sectoral distinctions is in fact a general phenomenon. To demonstrate this, the following section outlines the case of a medical devices company, Medtronic. Medical devices are very different from consumer software: they are physical goods which result from complex engineering; they often require labor-intensive final assembly; they face significant regulatory and compliance costs in major markets like the United States and Europe due to rigorous clinical testing and approval processes; they do not have zero-marginal-cost mass-production; and, as devices, face expensive and location-contingent installation costs, as with the surgical implantation of pacemakers. Despite these differences, device makers like Medtronic have begun to adopt integrated product-service strategies. With these strategies have come new political preferences that don't correspond well with those of the sectors they have entered.

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<sup>10</sup>For a discussion of what is and is not unique in information technology, see Shapiro and Varian (1999) and DeLong (1998)

## 4.1 Medtronic and Remote Delivery of Medical Services

Medtronic has long been a major player in the medical devices field. It presently markets many different varieties of pacemakers, blood sugar monitoring devices, ophthalmic surgery implements, remotely-controlled surgery robots, and neurostimulators. These devices have traditionally put Medtronic squarely in the goods-production sector of the medical devices delivery process. It designed, manufactured, and distributed devices, but the final installation of devices in patients and the monitoring of those patients was controlled by the medical profession. The responsibility for gathering data necessary for doctors and nurses to detect, diagnose, and treat the various ailments for which the devices were designed—for instance, heart arrhythmia—was collected by the medical personnel themselves. Medtronic’s responsibility for the device was limited to its mechanical functioning.

These distinctions fit well with the older sectoral divisions between goods and services. High-value manufacturing, amenable to mass production methods, occupied the attentions of one set of firms, Medtronic among them. Low-productivity services such as surgery or nursing care were taken care of by a different set of firms. Cooperation between the two sectors was of course necessary, both for the devices firms to receive feedback on their products and for the doctors and nurses to correctly install and administer them. But little crossover business existed between the two sectors.

In 2001, Medtronic launched the first version of a service known as Carelink.<sup>11</sup> It consisted of two parts: medical devices that, in addition to performing their primary function, could store and transmit data about the health of the patient they were implanted in or used by, and a service that aggregated that data and made it available remotely to that patient’s doctors and nurses. It was a move to an integrated product strategy: the device data was inaccessible without Carelink, and Carelink was useless unless patients were using Medtronic devices. As with Apple’s introduction of a platform that integrated content acquisition, storage, and use, Carelink was compatible with a diverse set of medical devices, and was in some cases retroactively compatible with earlier versions of Medtronic devices already in use. As an product, Carelink operated with one major goal

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<sup>11</sup>See <http://www.medtronic.com/Carelink/> for more detail from Medtronic.

in mind: to allow the regular remote monitoring of many patients by a few doctors, at costs much smaller than those of frequent office visits; and to thereby improve patient health via faster and more accurate diagnoses of adverse health events for patients suffering from chronic health problems like heart failure or diabetes. The ongoing provision of the data-gathering and distribution service constituted a new revenue stream for Medtronic.

As with Apple and iTunes, Carelink marked Medtronic's move into a different sector. Now it overlapped with the traditional medical information gathering role of the medical profession. What doctors and nurses traditionally had read off of charts and monitors in a hospital, Medtronic could now read remotely via wire leads and telecommunications. A sectoral model might suggest that political interests would track with these similar economic processes. But in fact that is not the case.

One issue in particular stands out. Carelink made Medtronic the middleman in the handling of vast amounts of patient medical information, just as such information was coming under heavy regulation to protect patient privacy. At Carelink's 2001 launch, the United States Department of Health and Human Services was in the final stages of issuing the medical privacy regulations mandated by the 1996 Health Insurance Portability and Accountability Act (HIPAA). Compliance with other aspects of HIPAA had generated substantial compliance costs for health insurers, healthcare providers, and clinical researchers, mostly around major changes needed in patient identification and data protection. Compliance with the privacy regulations was expected to generate similar costs. All three groups, while agreeing in concept to the idea that patient privacy should be protected, objected to what they viewed as excessive compliance costs.<sup>12</sup>

Medtronic, in contrast, appears to have little objection to the HIPAA privacy regulations that govern the use of the data it collects via Carelink. In fact, Medtronic cites its compliance with these

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<sup>12</sup>For the concerns of the research community see, for example, Melton (1997), McCarthy et al. (1999), and O'Herrin, Fost and Kudsk (2004). The American Hospital Association issued a report in 2000 on the pending regulatory implementation citing compliance costs as high as \$22.5 billion. The AHA president at the time noted that "this sweeping proposal goes beyond what Congress had intended and has the potential to interfere with the treatment we provide patients." See Tieman (2000). For post-passage disputes over the complexity and cost of regulations, see McGinley (2001). This included both the direct cost, and the opportunity cost of increased barriers to collaboration between doctors or researchers, less effective or accurate insurance underwriting, and potentially higher rates of patient lawsuits over alleged violations of privacy statutes.

regulations as a selling point for its devices and services.<sup>13</sup> In an environment where patients have become concerned about improper or unauthorized use of personal medical information, Medtronic has adopted HIPAA compliance as proof of its reliability and trustworthiness as a data handler.

Thus, just as Apple entered the music content distribution sector but adopted political positions opposed to established players in that sector, so it appears that Medtronic has adopted positions at odds with other groups that collect, analyze, and use health data. That said, there may be many reasons for this that have little to do with sectoral decomposition. First, Carelink was not launched until 2001, five years after the authorizing HIPAA legislation passed. Medtronic thus may have faced a settled regulatory landscape that it had little chance of changing. Second, Medtronic was building Carelink as a new service, and thus could build in HIPAA compliance from the foundations up; its counterparts faced the onerous task of retrofitting existing systems and business processes. Thus Medtronic's compliance costs may have been far lower. Finally, Medtronic's exposure to patient health data is limited: it collects data, processes it, and transmits it. The number of human beings interacting with the data along the way is limited. Thus very few unique business processes or systems interfaces had to be built. It was instead a problem of bulk data privacy protection. Most of the compliance issues for the Carelink system remained with the health care providers who interacted with individual patient files.

These concerns can be only partly accounted for. While Carelink was launched in 2001, the final HIPAA privacy regulations were not issued until 2003, leaving Medtronic ample time to object to anything in the rule-making process. Furthermore, Medtronic would have had Carelink in development for several years prior to 2001, which would have made it sensitive to the cost and uncertainty of a large new rulemaking process. Finally, though Medtronic's exposure to the details of patient data was limited compared to that of a doctor or nurse, that exposure was much broader. Carelink currently processes data for at least 225,000 patients, far more than any doctor would see in a year. Mishandling patient data could expose Medtronic to large class-action lawsuits, as has

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<sup>13</sup>See, for instance, "Medtronic Carelink Network Reaches Significant Patient Milestones", News Release, Medtronic Corporation, November 14 2005. Online at [http://www.medtronic.com/Newsroom/NewsReleaseDetails.do?itemId=1131743209106&lang=en\\_US](http://www.medtronic.com/Newsroom/NewsReleaseDetails.do?itemId=1131743209106&lang=en_US). Accessed 11 July 2008.

occurred with other cases of loss or inadvertent release of confidential information.

With these caveats, however, the value-creation paradigm, invoked to explain the conflicting preferences of Apple and the rest of the music industry, fits the politics of medical devices as well. For medical professionals, patient data has no intrinsic value of its own. Doctors aren't paid to collect data. Rather, the medical profession creates value by using its specialized knowledge to turn data into diagnoses and treatments. Regulation of that data, to the extent that it complicates or makes more expensive the process of diagnosis and treatment, runs contrary to their interests as both stewards of patient health and economic actors. In comparison, all of the value of Medtronic's Carelink system is contained in the data itself. Medtronic's supply of data is predicated on patients' confidence that it will be handled well. Where the medical profession treats the HIPAA data privacy regulations as an interference in its value-creating process, Medtronic sees a regulatory framework that will help guarantee it a supply of valuable data. As with the music industry, an integrated product-service strategy has changed the location of value in a given business process. In doing so, it has created political interests that do not follow sectoral boundaries.

## **5 Broader Implications**

I've argued that a sectoral model's utility for understanding changing political preferences has weakened. Both its foundational elements are eroding: a heterogeneous set of firms now deliver goods and services in a diverse set of ways, within a constantly shifting set of boundaries. Firm competition increasingly occurs on the basis of integrated product-service strategies embedding both differences in product design and political preferences. The competition between Apple and Microsoft for market share in the digital music market is a competition not just over the merits of the iPod or the Zune, but over the copyright protection preferences embedded in each. The case of Medtronic suggests that these phenomena aren't limited to the IT industry alone.

Amidst such change, sector, defined as distinctions in final firm output, no longer accurately aggregates modes of value economic value creation. The boundaries of aggregation are unstable, and the aggregated firms are not homogeneous. By extension, it also no longer suffices as an an-

alytic device to identify and aggregate coherent interest groups. Both the recording companies and the devices firms maintain music distribution and sales channels. But as I've shown, intersection of output - in this case music distribution and sales services - no longer means intersection of political interests. One group of firms remains wholly dependent on value derived from monopoly pricing of copyrighted material. The other uses the sales and distribution channel as one part of an integrated product strategy that relies in large part on openness to a large variety of content, copyrighted and otherwise. Despite common output, the first group remains dedicated to copyright protections while the second is at best ambivalent. Common output is thus no longer a sufficient classificatory variable, as it ignores where the value in that output lies. Likewise, Medtronic has deployed a goods-services strategy that attaches real value to the process of medical data collection. Regulation that protects that value is acceptable, even as it is unacceptable to the traditional data gatherers in the medical profession.

These cases are not unique. In fact, it is part of a larger transformation of political economy, what Zysman (2004) and Kushida and Zysman (2008) have called the "Fourth Services Transformation". Similar arguments between content producers and content organizers over issues of reproduction and distribution can be seen in the print industry (between Google Books and the publishing industry), and in the news industry (between online news search engines and the individual publishers). (Helm, 2005; The New York Times Staff, 2007) Other forms of innovation—such as the synthesis of third-world human capital development, managerial improvement, and communications technology that culminated in the outsourcing phenomenon—have done the same, by separating the production of goods (whether shoes or computer hardware) from value-added services (engineering or design or marketing), thus changing the structure of value-generating economic activity and associated interest in national economies. (Kaplinsky, 2004; Schulze-Cleven, Watson and Zysman, 2007)

Nevertheless, the phenomena observed in the cases explored here clearly don't appear everywhere. The American auto industry, or the global steel industry, show few signs of the kinds of transformation overtaking the music or medical industries. What determines whether a sector is experiencing this flux? The examples here were all susceptible to the application of IT services to

tasks typically performed by humans - music retail and collection of patient medical information. Digitization of these services created substantial value-added for first-mover companies and became part of integrated strategies. But other industries appear less vulnerable. Steelmaking would seem mostly to still concentrate on physical goods. The auto industry has experimented with add-ons like navigation services, and cars today are more computerized than ever before, but what services have been built on these platforms appear to be largely optional rather than integrated in the fashion of the iTunes-iPod suite, or Carelink.

The character of these cases suggests several possible explanations for their different susceptibility to digital services-led change. First, those industries that deal most closely with information appear most open to infiltration by digital services. The music industry had used encoded information since Thomas Edison invented the record player. Digital services required developments in technology but not in concept. Medical devices had long transmitted data to various monitors in the exam room. Lengthening the cable connecting patient to monitor was a problem of aggregation and transmission. In contrast, cars or steel beams are less obviously data devices.

Second, since digital services typically involve large amounts of protected data—copy protected music, personal medical information—the existence of a regulatory regime for that information (even one that, as in the music case, is under dispute) may provide sufficient protection for companies entering new sectors, and the consumers affected by those moves. The automobile industry may wish to record detailed information on individuals' driving patterns. It could provide a range of services to help them drive more safely, maintain their cars better, or entertain their children on road trips. But what regulatory regime could Ford or its customers refer to that would provide guidance on what either party might do with that data? Medtronic could refer to HIPAA for proof of its privacy *bona fides*; Ford has no such option. Concerns on privacy abound. Could, for instance, owners be cited or fined for neglecting their brakes? Should Ford detect when an owner needs new tires, and have Goodyear contact them? What of actual traffic violations? Without the regime to delineate the responsibilities of both companies and consumers, companies may be reluctant to deploy services even when they could.

Finally, it may be the case that industries currently deploying integrated strategies are those

which already have a higher services content in their home sector. The advent of East Asian computer plants and microprocessor fabs means that Apple today is mostly an engineering and industrial design company. Much the same is true of Medtronic. Firms in which services already form a great part of the core competency - even if in service of the creation of a physical product - may find the managerial transition to supporting pure services easier than firms like Ford that still focus on physical manufacturing plants.

These limits may, in time, be pushed. When this happens, the same kinds of forces presently affecting the music and medical sectors may come into play in autos or steelmaking. There's no reason to expect the effects to be any less disruptive. To return to where this paper started, it should by now be clear that integrated product-service strategies, often based on digital technology, are reclaiming for Ricardo what Baumol took away. Apple's iTunes retail establishment is vastly more efficient in selling inventory than a record store. Medtronic's Carelink data service collects, aggregates, and summarizes data from thousands of patients much faster than a team of medical professionals could, and without the added costs and potential complications of hospital visits. These are real productivity gains that couple skill with machinery for the improved efficiency of services.

These productivity gains, however, have come with costs. The recording industry has found that producers and composers work only so fast, even with new technology, and that protecting their wages (and, perhaps more importantly, the wages of the agents and producers) requires some kind of monopoly rents that digital technology has put under assault. Doctors and nurses may soon find that the introduction of services like Carelink has unpleasant effects on their own wages. If one nurse can, with the aid of Carelink, monitor the health of several times as many patients as he or she could otherwise, presumably the demand for nurses will slacken, and wages with it. Or perhaps the hospitals will simply offshore the entire operation, as they have begun to do with radiology. As Ricardo noted, "I am convinced that the substitution of machinery for human labor is often very injurious to the interest of the class of laborers." (Ricardo, 1996, 270) Not all services appear equally subject to the productivity gains possible through the application of digital technology to services. The boundaries of the gains mark new boundaries of political

contestation, even if they no longer delineate industrial sectors with unique outputs.<sup>14</sup>

## 6 Conclusions

We thus have a different industrial landscape before us. Technological change has enabled a wide range of companies in different sectors to deploy integrated goods-services product strategies and business models. Those strategies embed particular political preferences that are tightly linked to the firms' conceptions of how value is best created in the market. The ensuing competition between firms thus also becomes a competition between preferences. In this situation, sectors as an analytical unit fail to give much purchase on the political economy of industrial competition and change. They neither represent a stable set of market boundaries, nor aggregate firms with homogenous interests and preferences. The decomposition of economic sectors amidst this competition between business models therefore suggests that political economy pay closer attention to the dynamics of competition between firms rather than sectors, to better understand where the new boundaries of sector and political cleavage will emerge. I have suggested in this paper that it is possible to do so, to make reasonable predictions about how these competitive processes play out, and to see the consequences for the political and regulatory system. More work to establish how this process affects a broader set of industries will add to our understanding of where and how technological change and sectoral decomposition go together, and with what effects.

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<sup>14</sup>The dimensions of political contestation resulting from the expansion of digital services, such as those discussed here, are developed in greater detail in Kushida and Zysman (2008).

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