The Changing Software Business: Moving from Products to Services

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A dramatic shift is under way in the enterprise-software industry as established vendors embrace services in the wake of declining product revenues. It remains to be seen whether life-cycle dynamics or business-model choices are behind the long-term trend.

The dramatic changes in the software business over the past few years have important implications for both users and producers of software products and services. Traditional product sales and license fees have declined, and product company revenues have shifted to services[1] such as annual maintenance payments that entitle users to patches, minor upgrades, and often technical support.

This shift has been especially pronounced among enterprise-software vendors. We can clearly see this in the case of Siebel, whose product sales fell dramatically before Oracle acquired the company in 2005. A decade ago, even Oracle experienced the *crisscross*—service and maintenance revenues crossing over to exceed product revenues. We couldn't tell if Oracle and Siebel's product sales were dropping or product prices were falling, as Figure 1 depicts, but the effect was the same: Services (including maintenance, which typically accounts for up to 60 percent of service revenues) became more important than product revenues.

There are some exceptions. Product sales continue to account for most of game-software revenues, although online-gaming service revenues are growing fast. Platform companies like Microsoft—which has a large ecosystem of PC manufacturers as well as enterprise and individual users driving sales of Windows and Office—continue to generate enormous revenues from products. But even Microsoft is encountering change. The company reported that services in the server and tools segment accounted for about 3 percent of its fiscal year 2007 revenues and online services (MSN) for 5 percent of its revenues. Just a few years ago, Microsoft derived all its revenues from product sales.

A LONG-TERM TREND

Services' growing importance for software product firms dates back to at least 1990. The advent of free and open source software (which drove down software prices), as well as Y2K and the Internet boom and bust, accelerated the trend. In general, since 2000 or so, we've seen many enterprises and individual customers rebel against paying a lot of money for standardized or commodity-type software products.

New pricing models

A complicating factor is the rise of new business and pricing models such as software as a service (SaaS) and "free, but not free" software. Companies like Google, Yahoo!, and even Microsoft (with Windows Live and Office Live) now deliver what used to be for-fee software products ranging from search and e-mail to basic desktop applications as a nominally free service. The user doesn't directly pay for the software (unless you count the time to watch advertisements), but advertisers pay the software service vendor.

SaaS vendors such as Salesforce.com still count SaaS as product revenues, and keep them separate from professional services. However, the SaaS pricing model actually eliminates maintenance payments—a major source of service revenues for software companies—and often includes some bundled technical support—a source of costs. So the SaaS model has confused the traditional

separation of product and service revenues as well as costs, and this should result in a decline in service revenues because of the elimination of maintenance payments.[2]

Life cycle or business choice?

What's happening to software product companies, especially those selling to enterprise customers, might be either a consequence of their life cycles or a business model choice to emphasize services more than product sales. The life-cycle idea suggests that software product companies start out generating most of their revenues from product license fees, but over time shift to a mixture of products and services and eventually to mostly services.

Firms might want to continue focusing on products because they can generate up to 99 percent gross margins, given that the marginal cost is zero to copy a piece of software or any other digital product. By contrast, margins for labor-intensive IT services can be 30 percent or lower.

As competitors appear, software product companies have trouble getting new customers, or are forced to lower prices due to competition from similar firms or free software. Then these companies are more subject to what I call the "99 percent of zero is zero" rule: The great profit opportunity from software products becomes theoretical and not practical. And, whether they like it or not, their revenues gradually shift to services.

There's more going on here than either an inevitable life-cycle effect or, in some cases, explicit managerial decisions to emphasize services more than products. On the one hand, if we look at other industries, usually in the beginning of their histories, we see a lot of attention paid to product innovation and design. Once companies get the product designs right or a dominant design emerges, they shift their emphasis to the process side, such as mass production, in a product-process life cycle.[3]

Striving for efficiency

Firms aim for production efficiencies. In the early 1900s, Ford introduced the Model T (which became the standard automobile design), then focused on standardizing components and automating mass production. In the software industry, there's been a shift from product design in the 1960s to software engineering in the 1970s and 1980s, culminating in "software factories" in Japan and India, as well as the Capability Maturity Model in the US.

Service innovation is an aspect of the life cycle that might affect software and some other industries. For example, if the product design has become a commodity—widely available and low-priced around the world
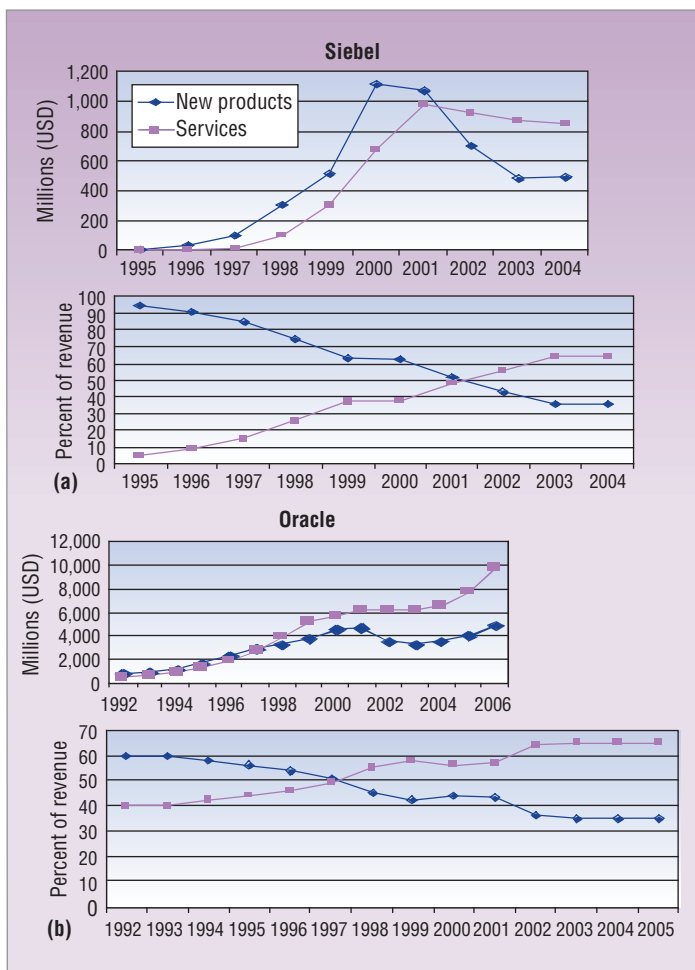

Figure 1. The crisscross. (a) Siebel's service revenue eclipsed products revenue in 2002. (b) Oracle's service revenue crisscrossed products revenue a decade ago.

with little differentiation—and after a company has wrung maximum efficiency out of process improvement—then management might turn its attention to services.

On the other hand, what we're seeing might be related to "S-curves" and "disruptive technologies."[4] In software, not only do we have maturity setting in for different product segments and companies shifting their emphasis to services, but some new technologies now support different kinds of business models, including different ways of pricing and delivering software, and reaching different kinds of customers.

Obviously the Internet and wireless technologies enable all sorts of on-demand or transaction-based pricing models or Google types of advertising-based revenue models. In addition, a platform transition seems to generate demand not only for buying new products but also for services. For example, a customer switching platforms from mainframe to client-server or from client-server to the Internet or from stationary to mobile probably needs a lot of services in terms of strategic assistance,
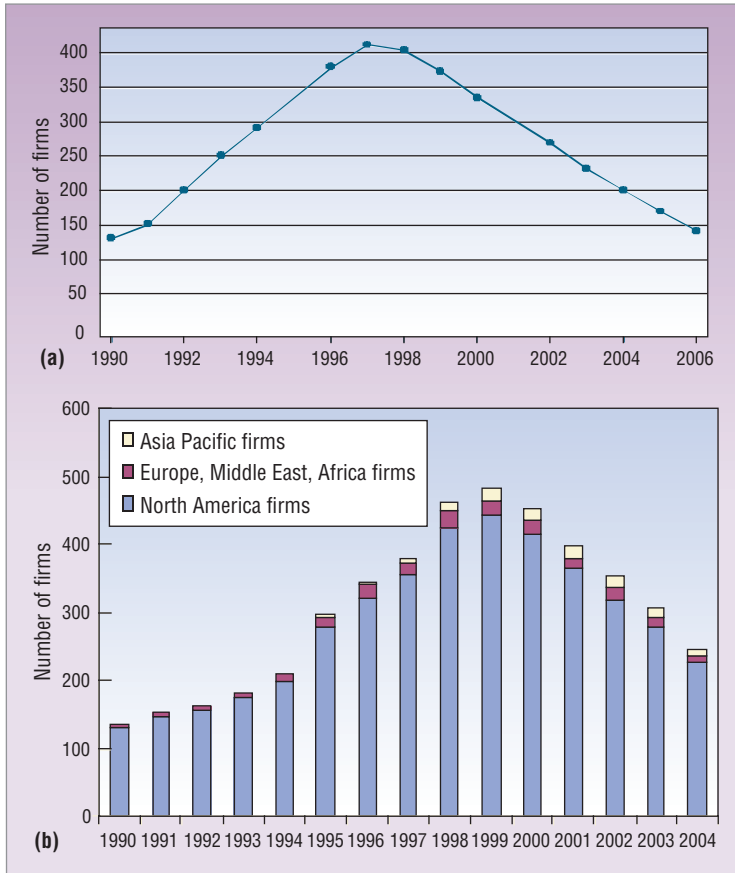
Figure 2. Industry growth. (a) The number of software product firms peaked in 1997 at about 400 before the industry underwent a rapid consolidation. (b) The number of IT services firms rose in the 1990s, peaking in 1999 at just below 500.
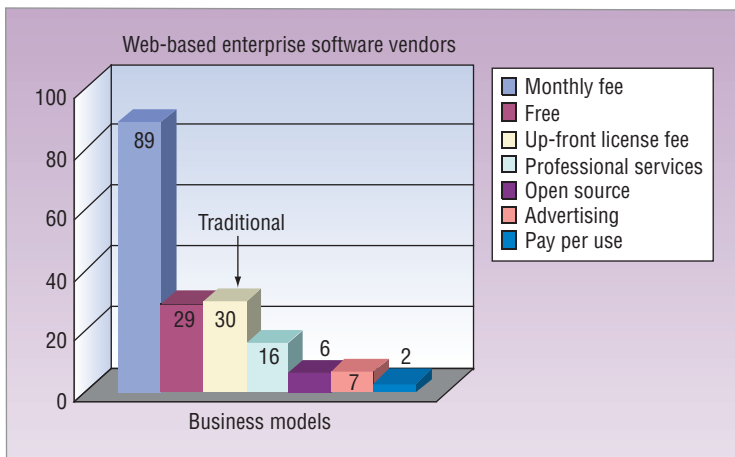

Figure 3. New business models. Web-based enterprise-software companies have adopted a variety of business models. Monthly subscription fees are the most popular pricing model.

rewriting applications and data, or retraining employees. In other words, platform transitions such as we've experienced over the past 15 years could also generate as much or more new revenue from services as from prod-

ucts, especially since many products are now free or low-priced.

SIMULTANEOUS MATURITY AND INNOVATION

To sort out what's happening in the software business, I launched a research project at MIT in 2003 to examine this shift from products to services for companies in software and other industries. My colleagues Fernando Suarez and Steven Kahl and I are still analyzing the data, but we have some preliminary findings and observations.

Peak and consolidation

The first database we created, covering 1990 through 2006, is a comprehensive list of firms that consider themselves software product companies selling "prepackaged software," listed under US Standard Industrial Classification (SIC) code 7372, as Figure 2a illustrates. This data includes foreign firms such as SAP and Business Objects that list on US stock exchanges, as well as game-software firms that sell products almost exclusively.

The data set contains about 500 distinct firms and peaked in 1997 at about 400 firms. By 2006, the list was down to fewer than 150 firms—indicating a dramatic consolidation of the software products business.

The second database, which covers 1990 through 2004, consists of firms that compete in IT services under several different SIC codes. This data, illustrated in Figure 2b, also shows listed companies peaking in 1999 at just below 500, and declining to less than 250 in 2004. The strong rise in IT services companies in the 1990s suggests that the transition from client-server to Internet platforms provided as many or more opportunities for services firms as it did for software product firms to become public companies, though both the services and products side of the business have experienced significant consolidation since that time.

The fact that the number of public software and IT services companies is consolidating suggests that the software business is maturing. However, other data collected at MIT suggests a strong rise in start-up enterprise-software companies, especially in 2005, using a variety of new business or pricing models (www.agoeldi.com/media/Thesis_AGoeldi_Final_09MAY07.pdf).

New business models

Figure 3 shows the business models of 108 companies

competing in Web-based enterprise software (about 20 percent of the companies are publicly listed), and indicates that monthly subscription fees are the most popular pricing model. A minority of companies also offered free software or advertising-based software (Google falls into this category), and others charged the traditional license fee.

Figure 4 shows a model my MIT students made that categorizes the variations now occurring in revenue or business models, delivery models, and target customers. A decade ago, nearly all software product companies sold software through the up-front license fee and did local installations on the customers' hardware. Now we have many different business models—subscription, advertising-based, transaction-based, and several kinds of "free, but not free."

Software delivery models can be remote and web-based or bundled as hardware products. This trend toward potentially cheaper software, combined with less costly ways of delivering software over the Web, has made it possible for firms to target not only mainstream customers but small businesses and leading-edge early adopters.

In addition, many software companies are now turning into hardware companies in what's sometimes called the "appliance model" (http://dspace.mit.edu/handle/1721.1/39504). If you put the software in a box, it's less likely that the price will fall to zero. People usually will pay more for a box, even though they might not want to pay much for software or digital media on its own.

Another element behind this entrepreneurial activity is that it might take less money to start a software company. Of course, it was always possible for "two guys in a garage" to launch a software or computer-hardware company, and many started that way. But today, many critical enterprise components—the operating system, database, and web applications server—are available as free and open source software. An entrepreneur can write some applications code and then hire another firm to host the software and, with relatively little expense, launch an enterprise-software company. Data from a recent survey suggests that entrepreneurs funded about 37 percent of the new web-based enterprise start-ups, and only 36 percent relied on venture capital (www.agoeldi.com/media/Thesis_AGoeldi_Final_09MAY07.pdf).

Temporary or permanent?

As we look back at these trends and new developments in the software products business, a question occurs: Is
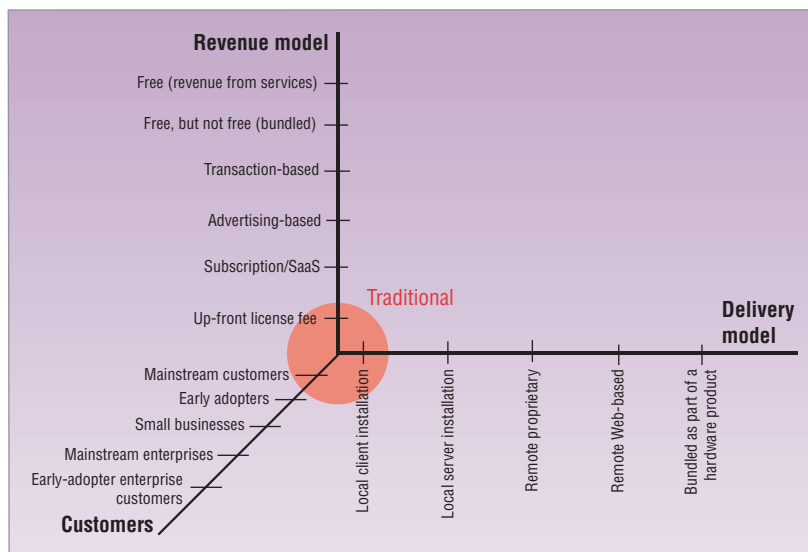

Figure 4. Business model dimensions. Companies have expanded their approaches in terms of customers and delivery and revenue models.

this increase in services and new business models temporary or permanent? Permanent in my mind refers not necessarily to "forever" but to a trend lasting decades rather than years.

One possibility is that we're now merely in between platform transitions and probably at a bit of a plateau in terms of product revenue growth. If some major innovation occurs, such as for a new computing platform, then individuals and enterprises will again start buying new products, both hardware and software, in large numbers.

By contrast, the permanent argument says that software might have experienced what computer hardware did in the past: Investments from Intel and other firms along the lines of Moore's law helped dramatically reduce the price of computing power and bring powerful computers down to the level of commodities.

In other words, the permanent argument suggests that much software now is also commoditized, just like hardware, and prices will fall to zero or near zero for any kind of standardized product. In this scenario, the future is really free software, inexpensive SaaS, or "free, but not free" software, with some kind of indirect pricing model, like advertising—a Google-type of model. And it's possible that other commoditized high-tech industries, especially those with significant value coming from software, are likely to follow.

WHAT THE DATA SAYS

Perhaps we've experienced changes that are long-term, rather than temporary. But what does the data say? Our database of 500 publicly listed software product companies contains an average of about 10 years of data for each firm (totaling over 3,200 annual observations). Excluding game-software firms and some other firms
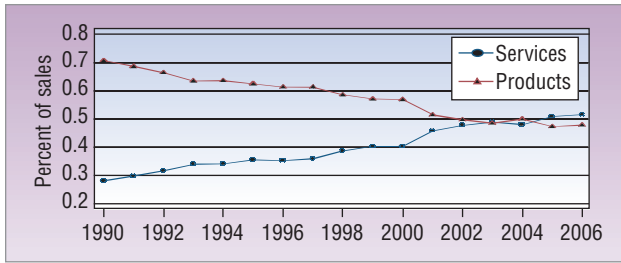
Figure 5. Industry crisscross. Software product firms overall saw product revenues decline from 70 percent in 1990 to less than 50 percent in 2003.

(mostly, they didn't break out products versus services and we couldn't confidently classify their revenues), the total number of firms peaked at 300 in 1997 and stood at merely 111 in 2006. As Figure 5 shows, software product firms in our sample had an average of 70 percent of their revenues coming from product sales in 1990 and less than 50 percent since around 2003, when the crisscross first happened for the industry as a whole. If we remove game-software companies from the sample, the crisscross happened in 2002 and is a bit more pronounced.

We didn't separate maintenance from other services because less than 10 percent of our sample broke this out. Firms treat maintenance as a type of service because, unlike with product sales, companies can recognize these revenues only as they deliver patches, upgrades, or technical support over time.

Some firms, such as SAP and Oracle, are now trying to relabel maintenance fees as product revenues in the sense that they represent product renewals. This makes some sense because maintenance has profit margins closer to product sales (though a bit lower because of the routine technical support costs usually included in the maintenance agreements), but maintenance revenues are still derived from the installed base of customers and recognized over time, like other services.

Reaching equilibrium

The data indicates that product revenues have dropped but haven't continued to fall to zero. Rather, they've stabilized at just under 50 percent of total revenues. So perhaps software product companies have reached a sort of equilibrium point as a business—more service (including maintenance) revenues from their existing customers than new-product revenues, but products are still holding significant value, at least for the publicly traded companies. Even without including game-software companies, we see this stabilization trend.

We can also look at how common it is for software product companies to sell only products as well as have different hybrid mixtures of products and services. In 1995, Richard Selby and I published a book that held Microsoft up as the ideal model for a software company—100 percent product revenues and those won-

derful gross margins.[5] But the data suggests that these kinds of companies are relatively rare historically and are becoming fewer over time.

Our preliminary analysis also indicates that, while the average level of product revenues has dropped to less than 50 percent for the software product companies, the optimum mix for operating profitability (again, excluding games and some other firms) seems to be at about 70 percent products and 30 percent services. There are also some companies in our database that have reported 100 percent service (including maintenance) revenues in a given year and no product sales, even though they're nominally software product companies. Companies in this category are likely to be weak performers and candidates for takeover or bankruptcy.

Reasons for the shift

Why the shift toward services? On the surface, primarily it's happening because software product firms are getting older. They creep toward that service crisscross at the rate of nearly 2 percent a year. The crisscross point by age is at 26 years for the whole sample and 22 years if we exclude game companies. In other words, if a software product company survives for more than 20 years (and doesn't sell software games), it's likely that service and maintenance revenues now equal or exceed product revenues.

When we probe more deeply, statistical regression analyses suggest that this transition is also related to lagging growth in product sales and total sales, as well as the recession that followed the Internet boom. The appearance of the Internet as a disruptive new platform also generated new service sales, especially for IT services companies. But this factor is statistically less important than firm-level factors for the product firms, such as age and the lag in sales.

In other words, the shift toward services for product firms appears to have happened for two reasons. One is that product sales might continue to grow, but services grow faster, perhaps because price levels or the number of new customers falls. This situation is still relatively healthy, and firms can easily survive as hybrid businesses. The other scenario is that the products business collapses, and that's why firms cross over to a majority of service revenues.

This second scenario is potentially disastrous because it often means the firm must reorganize radically and perhaps quickly, as in the case of Siebel or another firm I've written about, i2 Technologies.[6] The firm can no longer support large product R&D groups with large marketing and sales expenditures. It must transition from designing products for a largely abstract set of users to building and servicing products for individual customers. Many firms don't make this transition or make it poorly and reluctantly, missing the opportunity to manage services as a strategic area.

IMPLICATIONS FOR
PERFORMANCE AND STRATEGY

As we collected our data, my research colleagues and I thought the impact of rising services would have a negative impact on profitability and market value for a software product company because services tend to have lower profit margins and signal lower growth prospects. What we're seeing, however, is a more complex relationship.

For most software product companies, services generally contribute positively to their profits, but not in the linear manner we'd expected. More specifically, there seem to be "sweet spots" at the low and high ends of the spectrum. We can roughly say that, for the average software product company (excluding game software), services contribute positively to profits until they account for about 20 percent of total revenues.

After that point, services become a drag on profitability until they reach about 60 percent of revenues. Then services begin again to have a positive impact. One possible explanation for this curvilinear effect is that product companies might sign most of their customers to simple maintenance contracts for up to 20 percent or so of the retail price of their products, and these kinds of services are very profitable for them as long as technical support costs are minimal.

But as the product companies get deeper into labor-intensive services, such as product customization and complex integration work, or strategic consulting and training, services can become a drain on profits until the product companies gain enough scale and experience to perform these services efficiently. Then they begin again to make money from services, much like dedicated IT services companies do. SAP and Oracle would fit this model. Both are very profitable and have only about one-third of their revenues coming from new product license sales.

Market value, which generally tracks growth rates as well as profitability, follows a similar nonlinear curve. It seems to be positive until about 20 percent, then negative until about 80 percent, and then positive again. However, our data also indicates that, even in years when services positively contribute to profitability, market cap can drop as services rise. This suggests that investors still don't understand how important services have become to the revenues and profitability of software product companies.

Services as a strategic area

The positive impact of services on profitability and market value differs somewhat by product category, and we're still in the process of sorting out these differences. But the general conclusion seems to be that many or most software product firms can and should take advantage of services, especially maintenance, and not just let services "happen" because their product business declines.
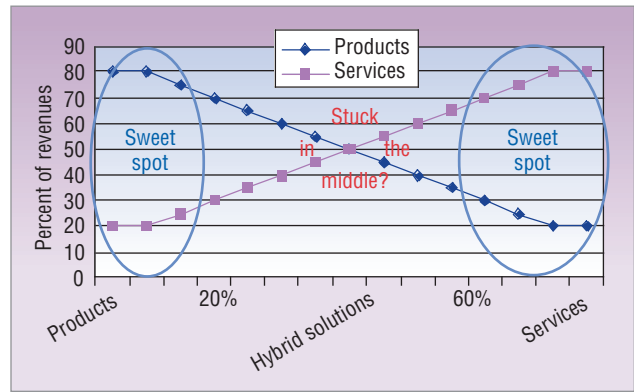

Figure 6. Sweet spots. Services contribute positively to profits at the low and high ends of the spectrum.

This means that software product firms—and probably many other high-technology firms—should treat services as a strategic area and a target of opportunity to increase revenues and profits—especially when the product business is suffering. We can see this in another preliminary analysis which suggests that, for every 10 percent increase in maintenance as a percentage of total services, service gross margins rise about 5 percent. In other words, if the products business is declining and shifting to services, companies should try to sign every customer to a maintenance agreement to minimize the impact on profitability.

By contrast, too many product firms seem to treat services as a necessary evil and manage them as a cost center, without much creativity or effort to grow that part of the business. In fact, though, most firms can look at their past trends and predict when they'll hit the crisscross and take some strategic responses, such as trying to rejuvenate the product lineup or launching a major campaign to sell more maintenance and other services, as firms such as SAP and Oracle have done over the past decade.

We also found that this trend toward services isn't limited to the software business, though it seems to be less of a life-cycle phenomenon and more a strategic move in other closely related industries, such as computer and telecommunications hardware and equipment. For example, as Figure 7 shows, IBM's service revenues have grown from less than 30 percent of revenues to more than 50 percent over the past decade. Sun Microsystems, Hewlett-Packard, Cisco, and even Dell have shown major increases in services and this seems to correspond to the commoditization trend in hardware.

Effect on IT services firms

The shift toward services for the product companies might be bad news for the dedicated IT services companies. Firms such as Accenture and Infosys are historically partners of enterprise-software product companies like SAP and Oracle, and they gain significant revenue by
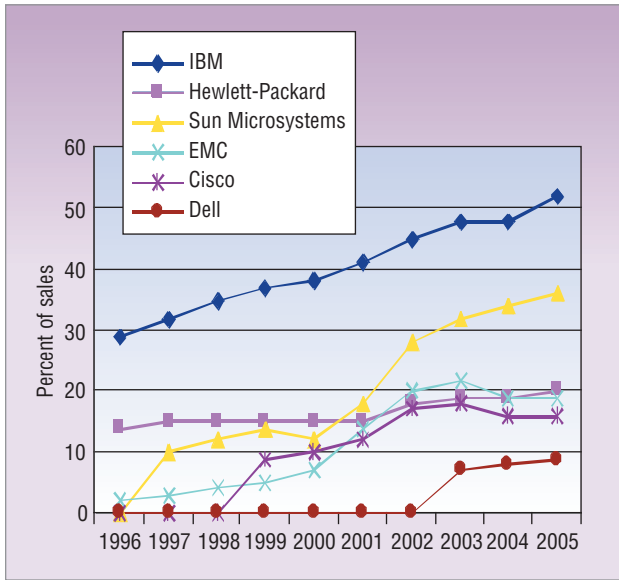
Figure 7. Hardware-company trends. Major hardware players have experienced varying increases in service revenues over the past decade.

installing, integrating, and customizing enterprise systems. But services are really money that product companies "left on the table" in the hope that services partners can help them sell more products. If the product revenues disappear, however, then former partners must compete for the same money.

THE THREEFOLD CHALLENGE

There's a threefold challenge for managers of software product companies and other firms experiencing this shift toward services.

Managing the crisscross

First, how can you manage this crisscross? Managers need to identify the best mix of product revenues (hardware and software, if appropriate) for their particular business segments along with service and maintenance revenues and determine how to impact these percentages. Services seem especially complementary in some business segments, like enterprise applications, while they're potentially more of a drag on other segments, although recurring maintenance payments are probably good for every product company.

Another point we tend to forget is that, for most product companies, products are the engine that drives service and maintenance revenues. Products and services are coupled for most firms, even though IBM and a few other companies such as General Electric have managed to become relatively neutral vendors of services. Most product firms need to maintain strong product lineups that keep customers paying for implementation or strategic services as well as long-term maintenance contracts or subscriptions.

'Servitizing' products

Second, managers need to think about how they can "servitize" their products—that is, create service offerings that add value and distinctiveness to their products. Services wrapped around products can make the products less commodity-like as well as generate new revenues and profits, even as the product business declines. In some industries, there's evidence that services over the lifetime of the product can generate several times the initial profits on the sale.[6]

Some day soon, for example, companies will give away various devices for free and just sell services or some kind of subscription contract. The cell-phone industry is well on the way toward this path. The automobile industry might follow as well. Even today, General Motors and Ford make little or no money from their products business while nearly all their revenue comes from financial services such as loans and leasing.

In the automobile industry, other ecosystem players make even more money from insurance and other services. What GM and other distressed automobile companies should do is give away their products at cost and sign customers to all-inclusive lifetime services contracts—not only loans or leases, but also insurance, maintenance and repair, and telematics services like GM's OnStar.

'Productizing' services

Third, managers need to think about how to "productize" their services so they can deliver them more efficiently. Productization of services can come from component or design reuse, computer-aided tools, and standardized process frameworks and training, as seen in past Japanese software factories such as at Hitachi or Toshiba, or in present Indian IT services companies such as Tata Consulting Services, Wipro, and Infosys. But productization can also come through automating services, such as the way eBay, eTrade, Expedia, Google, Lending Tree, and other Internet companies deliver their software-driven products or services.

In fact, fully automated services should be able to generate the same level of gross margins as a traditional software product company. That's why web-based delivery of software that different business models support is such an intriguing change for how producers distribute, deploy, and receive payment (or don't receive payment) for their software products and services. It's also why Google now rivals Microsoft in profitability, market value, and leadership in the software business.

In the future, as my colleagues, students, and I continue to do these kinds of analyses, we probably will change the way we think about the software business and some other high-tech sectors like Internet services, telecommunications, and digital media. There will probably always be some traditional product companies like

Microsoft that package technology and sell thousands or even millions of copies of their products. But our data suggests that not only are the numbers of these companies dwindling, the survivors also have to spend a fortune on sales and advertising as well as product development. As a result, most traditional software product companies make little or no money for their investors, and that's another reason why the smaller firms are disappearing. We would get a different picture, however, if we included companies like Google (whose SIC code lists it as an Internet services company) and perhaps some of the new SaaS start-up companies in the ranks of software product companies. Combining this data would give us a better idea of how much money customers are actually spending (directly or indirectly) on software-*based* products and services rather than just traditional software products—that is, including automated, standardized services and digital content delivered over the Web. ■

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