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Developments in Practice V: IT Sourcing: Build, Buy, or Market

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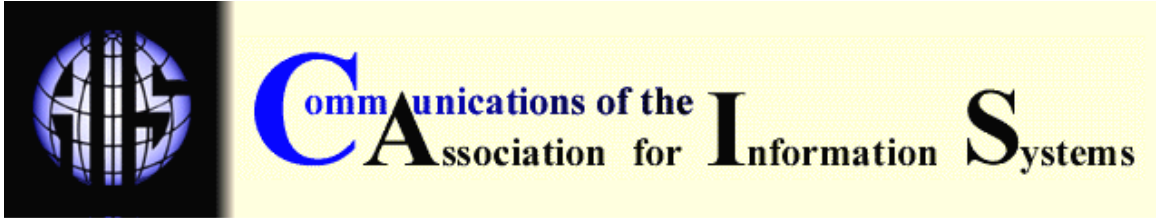
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DEVELOPMENTS IN PRACTICE V: IT SOURCING: BUILD, BUY, OR MARKET

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ABSTRACT

This paper describes the logical evolution of IT service provisioning through various delivery models over time concentrating on the “rent” era as well as the “market” era – an emerging external IT services marketplace that offers rich opportunities for IT organizations to become more cost-effective in the future. With the market era, IT organizations speculate that strategic business applications for mission-critical applications will remain in-house but delivery for standard and meta-industry applications, processes, and technology will be off-site. Thus, for most companies, it is likely that external IT providers will form part of their future service delivery package and that some IT departments will become both consumers and sellers of components. The implications of these developments for IT management are articulated and the elements of an IT sourcing strategy presented.

KEYWORDS: IT sourcing; IT outsourcing; IT insourcing; IT services markets; IT services development; IT services delivery.

I. INTRODUCTION

IT sourcing – that is, the locus of IT service provisioning – advanced through successive eras. In the beginning, IT sourcing was focused on the “build” versus “buy” decision. Over time, outsourcing gained currency as a means to “lease” IT services effectively from external providers. Soon thereafter came the “rent” era ushered in by the application service providers (ASPs). For the first time, it was possible to use only what was wanted and pay for only what was used. Today, we stand on the threshold of the “market” era where IT managers will buy and sell services on the open market as the distinction between buyer and seller disappears. Welcome to the “brave new world” of IT sourcing.

The motivation behind all IT sourcing decisions is the opportunity to save significant amounts of time and money by trading off the management of IT services – internally

Developments in Practice V: IT Sourcing: Build Buy or Market by J. McKeen, H.A. Smith, N. Joglekar, P.R. Balasubramanian

versus externally. The prospect of letting someone else take on the headaches of managing a large portion of traditional IT services is appealing to many established companies. Smaller and newer enterprises are attracted to renting because of the opportunity to access expensive software on a time-sharing basis and to deliver full service IT to their customers without the typical start up time and expenses. Regardless of the era, the driving factors behind IT sourcing decisions remain:

- time-to-market
- economies of scale
- competitive differentiation
- critical mass
- possession of expertise
- competitive necessity
- the “not-invented-here” syndrome
- technology itself

As the “market” era emerges, we are likely to deploy the same (or similar) decision factors but played out within the framework of a market strategy.

In 2002, a large number of service providers are taking positions in this rapidly evolving arena. Some are hardware/software vendors; others are integrated services providers (ISPs) and telecommunication providers; still others are web hosts, service aggregators, and full service providers. This provider diversity creates a considerable degree of confusion concerning

- the overall value model;
- the identity of key providers (not to mention their viability); and
- appropriate strategies for benefiting from a new provisioning model.

Some aspects, however, are certain.

- First, the service market is clearly immature and in a state of flux (facing numerous growing pains, shakeouts and takeovers). While still in their infancy, ASPs are already being supplanted by yet more expansive service offerings (e.g., business systems providers (BSPs)) that are becoming known as XSPs (i.e., generic service providers).
- Second, a value model is not yet articulated.
- Third, support is not reliable.

These aspects leave IT managers facing some key questions. Can they afford to ignore this emergent (and potentially disruptive) technology-driven opportunity? Should they make investments now as a hedging strategy? What are the key factors that will assist their decision-making? What steps should they take to best position their organizations for the future, when the market era becomes a reality?

This paper provides a review of the current literature to provide some perspectives on how various service provisioning models are changing the IT environment for organizations. Starting with the “rent” era (Section II), the paper provides an overview of the ASP phenomenon, explaining ASPs and how they work. Section III introduces the concept of an IT marketplace for services – that is, market-based sourcing. Then, the elements of a market-based sourcing strategy are outlined (Section IV). The paper concludes (Section V) by outlining some of the implications of the emerging marketplace of IT service provisioning for IT management.

II. ASPs: THE “RENT” ERA

Scholars in the strategy and the IT community have studied sourcing for some time [Lacity and Hirschheim, 1993, Hirschheim and Lacity, 2000, Lacity and Willcocks, 1998,

Venkatraman, Spring 1997]. One recent sourcing development that attracted considerable attention is the emergence of the Applications Service Provider (ASP) model. ASPs led to the “pay as you go” era. In its simplest form, an ASP is:

“a third party service firm, which deploys, manages and remotely hosts a pre-packaged software application through centrally located servers in a rental or lease arrangement” [Weller, 1999].

In concept, an ASP is similar to the service bureaus of the 1970s. Back then, however, there was no cheap, non-proprietary means for a desktop computer to communicate with an off-site application and no standard environment in which they could interact [McKie, 1999]. Today, the Internet enables services to be delivered to companies from a central site using network infrastructure. This advance in technology gave the shared-service concept a new lease on life.

The ASP business model differs from traditional outsourcing in a number of key ways:

- First, it offers shared operations and delivery over the network.
- Second, it provides full life cycle services for applications, rather than operations and maintenance only.
- Third, it is based on simplified pricing and billing and limited customization of applications.
- Finally, it offers rapid implementation of applications and attempts to hide some of the complexity of operations from the business [Terdiman and Berg, 2000].

ASPs offer their customers access to a complete application environment. They make the necessary investments in application licenses, servers, people, and other resources. Typically, an ASP either owns the software involved or has a contractual arrangement with one or more software vendors. The ASP performs the initial application implementation and integration, provides ongoing data center management, and continuous uninterrupted connectivity and support. It is also responsible for regular hardware and software upgrades. While more than one partner may be involved in delivering services, the ASP maintains the customer relationship and is responsible for ensuring that services are provided as promised. As shown in Figure 1, an ASP offers its customers a complete end-to-end solution for one or more applications [Gillan, et al., 1999].

In return for these services for one or more applications, customers pay a usage fee and forego software customization – in effect, trading customization for speed. Because customization is not offered, an ASP can provide the same services to many other customers and can therefore leverage its investments in hardware and software many times over [Leong, 2000]. Common applications offered by ASPs include:

- enterprise resource planning (ERP);
- customer relationship management (CRM);
- e-commerce;
- e-procurement;
- data warehousing; and
- email.

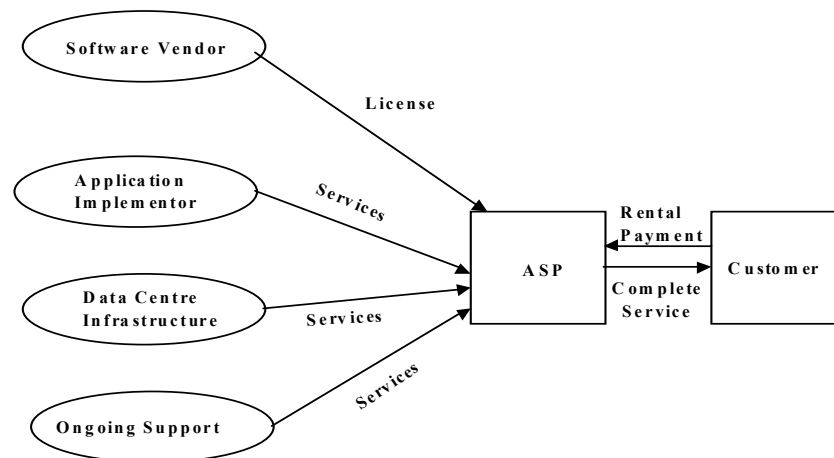


Figure 1. The ASP Business Model

(Adapted from Weller [1999])

These applications are considered to be ideal for the ASP model because they are enterprise-wide and require large capital outlays and technical resources to implement and manage. They also typically take a long time to implement.

Pricing of ASP services currently comes in two flavors:

- *Fixed pricing.* This model is dominant in 2002. Customers are charged a fixed fee per user per month based on the number of services required e.g., number of servers, number of applications.
- *Usage pricing.* Here, the customer pays for the actual time or resources used.

The pricing models are based on the premise that an ASP can offer a more predictable cost model and a faster return on investment [Leong, 2000]. However, it is also possible that an ASP's greater economies of scale will reduce the significant costs of implementing and operating enterprise-wide applications. One estimate suggests that ASPs can reduce project installation and set up costs and time by between 50 and 75% [Anonymous, 2000a]. Thus, while speed of procurement and style of cost management are seen as the major incentives for businesses to use ASPs, some experts suggest that the ability to lower the total cost of ownership is also becoming a significant driver [Terdiman, et al., 2000].

The "rental" market is in a state of flux. As quickly as some players leave, others enter [Terdiman, 2000] and their presence further clouds the ASP marketplace. Players within this market include [Leong, 2000]:

- *Web Software Vendors.* Software companies (e.g., Oracle, Siebel) that are repositioning themselves to provide ASP capabilities. Typically, they partner with a data centre and network providers to handle the back end of their services. Through their ASP offering, they hope to provide an alternate distribution channel for their software.
- *Service Aggregators.* These firms aggregate the individual pieces of an ASP service (e.g., software, integration and data centre, and applications) from other companies. They usually provide a variety of applications (e.g., ERP, CRM, e-commerce). Systems integrators, consulting firms, and traditional outsourcers fit into this category (e.g., EDS).

- *Full Service Providers.* These companies make a significant investment in infrastructure. They run their own data centres with a high level of security and reliability. Typically, they have strong technical expertise. Hardware vendors fall into this category (e.g., IBM Global Services).
- *Telecommunication Providers.* These firms specialize in deploying and managing telecommunication and data centres. They may also offer strengths in web hosting. With large customer bases and a global reach, they are in a good position to become ASPs even though they do not have core competencies in application hosting and management. ISPs, telephone companies, and web hosting firms fall into this category (e.g., AT&T, Qwest).

In 2000, the ASP marketplace was at a crossroads. The good news was that the marketplace was experiencing significant growth. Estimates anticipated an industry of \$22.7 billion (US) by 2003 [Terdiman, 2000, Terdiman, et al., 2000]. GartnerGroup predicted that by 2003 over 30% of enterprise application software will be sold through ASP channels [Terdiman, et al., 2000]. The bad news was that the industry was clearly in the throes of turmoil. In 2000, GartnerGroup predicted that by the end of 2002, 50% of that year's ASPs would be out of business¹ "due to poorly thought-out business models, choice of partners, inability to execute and consolidation in the ASP marketplace" [Terdiman, et al., 2000]. Most ASPs, whose business models were based on economies of scale to be achieved through rapid growth, still had a negative cash flow leaving their long-term viability in question [Joglekar and Balasubramanian, 2001]. Mergers were also starting to occur and were predicted to continue through 2003 and perhaps 2005. [Terdiman, et al., 2000]. Given their unproven credibility, customers were expressing legitimate concerns about the reliability and quality of service, as well as security and vendor stability. As best we can tell, the assessment in 2000 still holds true.

At present, ASPs are attracting mainly small to medium-sized firms; rapidly growing companies who need to scale up their systems quickly without a huge up-front investment. For firms in this category, the benefits of ASPs can possibly outweigh the risks. However, for companies with substantial IT assets, there is little to lose and more to gain by waiting until the ASP market settles down or evolves. In most cases, ASPs fail to offer a compelling value proposition to their customers at present. Furthermore, while offering sourcing flexibility at the application level, the ASP model does not alleviate the critical issue of integrating solutions across different generations of technology based on disparate software. To address these issues, attention needs to be focused on the development of infrastructure, common platforms, and architectural standards. Furthermore, it requires universal access through Internet-based delivery. Collectively, solving these issues would permit a much more robust approach to IT service provisioning. Enter the next generation – the "market" era.

III. XSPS: THE "MARKET" ERA

This era rests upon the key assumption that companies will "buy their information technologies as services provided over the Internet rather than owning and maintaining all their own hardware and software" [Hagel_III and Brown, 2001]. Just as ASPs ushered in the "rent" era, XSPs pave the way for the "market" era. XSPs (where the "X" denotes a generic service) are in the business of providing technology, systems, and processes, not just applications. The key players this time are those with significant influence in the marketplace (e.g., Microsoft) who are willing to make (and capable of making) sizeable investments to create the infrastructure necessary to sustain a viable Internet-based services network. In this era, controlling and setting architectural standards is seen as more important than which application a firm uses.

¹For example, in July 2000, Pandesic (a relatively large ASP established by SAP and Intel) shut down its operations. The company cited "lower-than-expected demand in the B-C market and said that it could not foresee a timely road to profitability." [Kontzer, 2000].

Figure 2 shows how different types of XSPs could all work together within a services marketplace to provide a wide variety of technology services to customers. This particular rendering of XSP architecture is based on Microsoft's view of the market place [Cornfield, 2001]. Organizations such as Microsoft see their role as the application *infrastructure* providers (AIPs) – those who will build the large computing ecosystem within which other types of XSPs will operate. In this system, ASPs (that is, those that survive) play a key role but represent only one component within a much larger services market – a market which includes web services integrators, web services channel, and web services development.

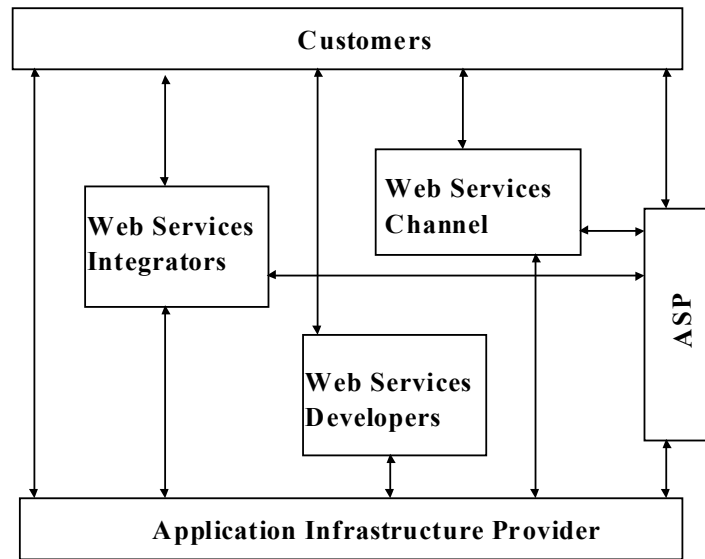


Figure 2. Market Based Architecture for XSP Services

Such an ecosystem requires an enabling architecture (Table 1). This proposed 3-layer technical architecture is constructed on the Internet and is an open rather than a closed (proprietary) architecture [Hagel_III and Brown, 2001]. As such, it permits various services to be freely exchanged among suppliers and providers. Furthermore, it allows for easy access to services, mobility among service providers, and a blurring of the distinction between suppliers and providers. In short, if and when this model reaches full maturity, it would provide a dynamic market for services much like the electricity industry where it is possible to buy from (as well as supply to) the grid.

This brave new world of IT market-based sourcing is being given significant credence as major players declare their interests. Results of a recent market research study (Table 2) identify the preferences of early adopters regarding key web services platforms (Gilpin, 2001). The commonality of these platforms is limited as the battle over architectural standards has yet to declare a victor. IBM launched "WebSphere" services that build on the MQSeries architecture, Microsoft unveiled the ".Net" strategy, and Sun advocates Java™ 2 Platform Enterprise Edition (J2EE) that defines the standard for developing multi-tier enterprise applications [Sun, 2002].

Table 1. Web Services Architecture

3-Layer Architecture	
Application Services (Top Layer)	Application services is the top layer of the architecture. It consists of a diverse array of application services, from credit card processing to production scheduling, that automate particular business functions. Some applications will be proprietary to a particular company or group of companies, while others will be shared among all companies. In some cases, companies may develop their own application services and then choose to sell them on a subscription basis to other enterprises, creating new and potentially lucrative sources of revenue.
Service Grid (Middle Layer)	The service grid is the middle layer of the architecture. It provides a set of shared utilities – from security to third party auditing to billing and payment – that makes it possible to carry out mission-critical business functions and transactions over the Internet. In addition, the service grid encompasses a set of utilities, also usually supplied and managed by their parties, that facilitates the transport of messages (such as routing and filtering), the identification of available services (such as directories and brokers), and the assurance of reliability and consistency (such as monitoring and conflict resolution). In short, the service grid plays two key roles: helping Web services users and providers find and connect with one another, and creating trusted environments essential for carrying out mission-critical business activities.
Standards and Protocols (Bottom Layer)	Standards and protocols, such as SOAP and XML, allow information to be exchanged easily among different applications. These tools provide the common languages for Web services, enabling applications to connect freely to other applications and to read electronic messages from them.

Adapted from [Hagel_III and Brown, 2001]

Table 2. Web Services Platforms Ranked by Early Adopter Preference

Platform	%
IBM WebSphere	33
Microsoft.NET	22
J2EE with Web Services add-ons	19
Oracle 9i Applications Server	7
BEA WebLogic	6
SunONE iPlanet	4
Other J2EE applications servers	9

N = 120 Responses

Source: Gilpin [2001]

It is interesting to speculate how such a services market will function. Each platform provider is gambling on the premise that most revenues will be generated from infrastructure services. It is unlikely that certain forms of software (e.g., personal productivity tools) will become

a service. Enterprise support, core processes, and distributed applications are also unlikely targets. In industries where there are shared standards (e.g., health care), however, shared applications services may be provided. The most probable targets for the market era are well-defined business processes (components of (rather than) whole applications) with universal appeal such as credit checking, reconciliation, customer validation, encryption and security, forecasting, materials planning, and accounting. Processes such as these provide basic building blocks that can be coupled together to form whole (and unique) applications. Given the highly decoupled computing environment made possible by the proposed 3-layer architecture, organizations can go to the services market for “best of breed” processes (i.e., components) that can then be cobbled together dynamically with others to collectively provide the necessary functionality – tailored to any degree desired. Because of this ability to provide a Lego™-like² variety of systems, organizations can avoid one of the major pitfalls of the ASP model – the limitations of generic software.

Hagel_III and Brown [2001] assert that the XSP model promises significant benefits. As with “rental”, the XSP model allows IT managers to buy only the functionality that they need, when they need it. This characteristic substantially reduces investments in IT assets, thus freeing up significant capital resources. As responsibilities for maintaining systems shifts to outside providers, the argument for keeping IT specialists on payroll declines. Furthermore, the need to keep at or near the leading edge of technology is also transferred to the providers since they now “own” the requirement to provide up-to-date technology. Standard “plug-and-play” architecture makes it easy for companies to outsource activities and processes in response to changing economics. Outsourcing, in turn, makes it easier for companies to shift operations and partnerships in response to market conditions. Hagel_III and Brown [2001] claim that IT managers can “integrate the extraordinarily diverse set of applications and databases residing within most enterprises while at the same time making these resources available to business partners”.

With claimed benefits this substantial, one wonders about the downside. Certainly there are a host of questions concerning the security of a “utility-based” IT services market and its ability to protect sensitive customer data. Another question involves the ability to deliver mission-critical applications over the web in a guaranteed manner. Still other questions involve the portability of the software, the interoperability of its components, and the substitutability of competing providers. These concerns, and others, make decision-making regarding IT problematic. To alleviate this situation, the elements of a market-based sourcing strategy are developed in the next section.

IV. A MARKET-BASED SOURCING STRATEGY

The IT sourcing decision really comes down to *what* and *how*, that is, what services to provide internally versus externally and how to provide these services. The different eras (i.e., build, lease/rent, and market) provide options regarding *how* external services are provided. This section presents a decision framework to tackle the “what” question³. It views an XSP as an intermediary means of sourcing, lying between complete outsourcing to a single platform/infrastructure provider and complete in-sourcing [Joglekar and Balasubramanian, 2002]. It suggests that there will be times when companies need to reserve the right to bring outsourced capabilities in-house and vice versa, or to switch providers for the component services. Furthermore, with market-based sourcing, opportunities exist for “selling” as well as “buying”. Where organizations feel that they have a “best of breed” capability, they can explore the possibility of making it available to the market. This dual approach represents a significant

² All Lego™ building blocks conform to a set of standards that allows individuals to create unique structures from generic blocks where interoperability is guaranteed.

³ We build on earlier work by Lacity and Willcocks [1998] that addresses partial or selective outsourcing of IT services. However our focus is not on the degree of outsourcing. Regardless of the degree of outsourcing, market-based sourcing refers to a relatively long-term commitment to a particular platform architecture that allows switching components and/or integration suppliers on a more frequent basis.

change for IT managers. The other (perhaps even more) significant change is the focus (or granularity) of the sourcing decision, which involves components as opposed to whole applications or functions. In a very real sense, IT managers will be responsible for re-architecting the external boundaries of the firm, insofar as IT sourcing is concerned. They will need a structure, architecture, and contracts that will facilitate this flexibility.

The ease with which a particular company can adopt a market approach will depend on the industry and on the standards being used. The first step for a company is to design its technical platforms to enable flexible sourcing to occur. One initiative already underway in many organizations is enterprise application integration (EAI) [Bove, 2001, Linthicum, 2000, McKeen and Smith, 2002]. Within the EAI initiative, it is possible to “web-ify” the existing applications and deploy “hub and spoke” communication technology (e.g., middleware software) to manage the complexity of exchanges among the many applications within a portfolio. In addition, applications can be re-architected by modularizing them into functional components. The decoupling of these components, the adoption of standard communication protocols, and the application of interface (translation) mechanisms make it possible not only to integrate across these enterprise systems but also make them “XSP-ready”. When the IT services marketplace become a reality, an organization that is XSP-ready will be in a strategic position to reap significant benefits because its applications are IP-enabled. thus facilitating interconnection with other applications available on the web.

An IT sourcing strategy should be built on decision criteria established by identifying the factors that favour external sourcing as well as articulating the potential adverse affects. Senior IT managers can use this list of advantages/disadvantages as a starting point to assess external IT sourcing opportunities. For example, organizations could use the list of advantages as a checklist to help articulate their reasons (and justification) for investigating external providers as well as a means of establishing goals. The list of disadvantages provides the basis for establishing threshold conditions to be met (or overcome) for external provisioning to become an attractive (or viable) option. Because each organization has unique needs regarding IT, faces varying pressures, and starts with a different legacy platform, their sourcing strategy needs to be custom-tailored. At a minimum, IT managers must identify candidate services for external sourcing and set out a decision framework to guide the timing of their foray into external provisioning.

Some of the potential advantages (and concerns) of external IT sourcing are described next.

ADVANTAGES OF (AND OPPORTUNITIES FOR) MARKET-BASED SOURCING

Options. External sourcing enables companies to take advantage of new technologies, for a minimal cost, at times when the business and technology environment are unclear. Companies can “buy time” while their in-house organizations do a more thorough assessment of the service and its long-term potential for their organization. External sourcing also provides an easy exit strategy. Companies can walk away from a technology or move successful applications in-house relatively easily. Due to the increased granularity of components as opposed to whole business functions (as with outsourcing in the past), the challenge and complications of insourcing (Hirschheim and Lacity [2000], Lacity and Willcocks [1998]) are greatly reduced.

Funding Flexibility. External sourcing, basically a rent-not-buy approach, avoids capital investments in favor of variable pricing. This choice frees financial assets to be directed into other areas. The advantages result in predictable monthly fees, lower capital costs, and improved total cost of ownership [Jaruzelski, et al., 2000]

Quick Starts. Several companies use external IT sourcing to address new business needs quickly in generic mode [Jaruzelski, et al., 2000]. Where external providers have strong application-specific expertise, they provide companies with a way to take advantage of new business opportunities very quickly. Businesses then have more time to evaluate a service’s value and decide on whether to bring the application in-house for more attention and customization.

Low Priority Applications. External sourcing is also a way for a business unit with low priority needs to gain advantages from technology. For example, if a business unit can live with a standard, non-customized application, an ASP's monthly fees and implementation expertise mean that the application can be installed with no capital costs. Typically, the business case for such a project is favored by management because of the decreased investment level, the reduction in time-to-market, and the desire to reduce multiple software platforms across the enterprise. Human resources systems are a typical candidate for scenarios where this strategy can be used effectively. British Petroleum's deal with Exult provides an example of this approach [Inc., 2002].

Revenue Generation. With the "market" era comes the opportunity for companies to become a source of business components – that is, to become a supplier as well as a buyer of external IT services. Where companies developed "best of breed" components, these components can be advertised and made available to other companies. To do so, of course, depends on the effective implementation of the "service grid" layer within the 3-layer model presented in Table 1. Best of breed components could be developed by a single company (e.g., an auto manufacturer), a consortium of companies within an industry (e.g., an airline alliance group), or by alliances of software vendors and companies (e.g., IBM plus a major financial organization). This is an age-old practice for vendors of whole systems.

Rollouts and Upgrades. Some external providers developed substantial expertise in particular types of complex applications (e.g., ERP, CRM). This expertise enables them to ensure that the latest versions of applications are always available to a business, wherever they are needed. Furthermore, because software is delivered via a browser, this service helps in-house IT staff avoid lengthy and expensive site-by-site implementations and management. Hiring this knowledge can be particularly attractive in geographically dispersed organizations.

POTENTIAL DANGERS ASSOCIATED WITH MARKET-BASED SOURCING

The potential dangers listed here work in two directions. We discuss the dangers from the point of view of a component buyer. However, if a firm also is a component seller, then its clients will expect the firm to mitigate the risks or at least be cognizant of the risks that the people that buy from them face.

Data Ownership. When an application is sourced externally, the question of who owns the data arises. This problem is especially acute if the company database is also located externally. Risks increase further when an external provider goes out of business. At that time, ownership of data may be unclear. "There is an urgent need for some ethical rules concerning the exchange of business critical IT information between the ASP and its customers [Slavid, 2000].

Service Delivery. It is unclear whether external IT providers can deliver services when and where they are needed with the reliability and quality businesses expect. When services are delivered over the Internet or when processors are shared, slow response time can occur that are beyond the control of the external provider. Furthermore, when providers themselves are composed of a network of third parties, the risk is even greater that all the components will not always operate seamlessly.

Security and Privacy. A company is dependent on its external IT provider to maintain back-ups, firewalls, data redundancy, disaster recovery, and quality assurance checks. The risks of a security breach increase when business services are delivered over the Internet. Regardless of who manages an external service, however, businesses are extremely vulnerable if problems occur because the credibility of their operations is at risk. These risks grow greater with an external provider since a company has even less control over how its services are managed.

Customization. When an entire application is being sourced externally, it is difficult for the provider to customize the application for specific needs. This problem is key with ASP providers whose model is based on a "one size fits all" version of software. Not all customers are willing or able to accept standard solutions. As one commentator points out [Anonymous, 2000b], most of the aggravation of implementing applications in-house revolves either around the

challenges of adapting the application to fit users' requirements or in converting the data, modifying the internal processes, training the users, and migrating to the new package. Even when the external IT service is able to deliver components (as opposed to complete applications), this problem will remain for any/all companies who need whole applications and are not interested in building applications themselves out of components.

Business Expertise. Many remain skeptical about the ability of external providers to deliver business expertise and processes to companies. Even within an industry, everyone is different enough to make standardized processes unlikely. Furthermore, the difficulty of providing business expertise in combination with technical expertise makes business service provisioning difficult in the near term. The "componentization" of IT services, however, promises to alleviate much of this problem.

UNANSWERED QUESTIONS

Beyond these advantages/disadvantages, a significant number of unanswered questions remain. At the beginning of 2002, much of the promise of the "market era" of IT sourcing is just that – a promise. Until the infrastructure is further advanced, it is difficult to respond to these questions with any authority. With huge investments being made in the infrastructure by players with demonstrated staying power, it is safe to assume that the "market" era of IT sourcing will be fully funded and exercised thoroughly. It is also likely that the computing environment will be changed forever because of this development. In the next section, we explore some of the implications of the "market era" for today's technology managers.

V. IMPLICATIONS FOR IT MANAGEMENT

The developments that are underway within the external services marketplace undoubtedly will impact the internal functioning of IT departments. We can expect that, with a growth in external provisioning, the organization of the IT department will change to become much more "market-facing". New roles are likely to emerge as different skill sets become important. The number of people within a firm's IT organization may decline over time, as delivery of IT capability becomes more "assembly" and less "development". It is also apparent that in-house IT skills, albeit altered, will remain critically important because the use of an external provider does not absolve IT of any responsibility whatsoever! IT managers will be called upon to revisit their IT strategy to determine when (and how) it should be recast to take advantage of the market era. At the very least, internal capabilities will be developed for dealing with a dynamic services marketplace.

IT managers will continue to be responsible for understanding the implications of changing delivery models and for identifying the opportunities that they represent. They will be expected to develop a "plug and play" architecture that crosses the boundaries of the firm to facilitate the flexibility of the business model. As the IT function begins to play a much more active role within the services market, it will need to enhance its resident IT skills base in a number of key areas including the following:

- Identifying candidate capabilities (i.e., applications, processes, and/or technologies) to be market sourced
- The evaluation/selection of service providers
- Crafting service level agreements (SLAs) and other contractual terms
- Contract monitoring and management
- Environmental scanning

The evolution of the external IT services market provides many more provisioning possibilities for IT managers. In the past, applications tended to be developed in-house, operated on resident computers, linked over dedicated leased lines, and updated on company databases. This relatively self-contained environment involved few transactions with the external market. Even if the application were purchased/leased/outsourced, it resulted in a limited number of

interactions with the market (likely single purchase/lease/outsourcing agreements) that typically were in force over extended periods of time. As the possibility of web delivery approaches operability, this same “application” might consist of a loosely coupled set of disjoint processes provided by separate vendors that collectively yielded the identical functionality as the previous in-house application. Given a standard infrastructure platform, processes within the overall application (i.e., “components”) would be easily (and readily) replaced by superior components as they became available on the market. Thus, market transactions will occur at the component level rather than at the application level and these transactions can be expected to occur with much greater frequency. Furthermore, the incentive to play the market actively would be significant, as anyone not doing so could subject their firm to sub-optimal delivery of IT solutions.

This scenario, assuming that the appropriate infrastructure and guarantees are established, demonstrates the dynamic characteristics of such a services market (Figure 3).

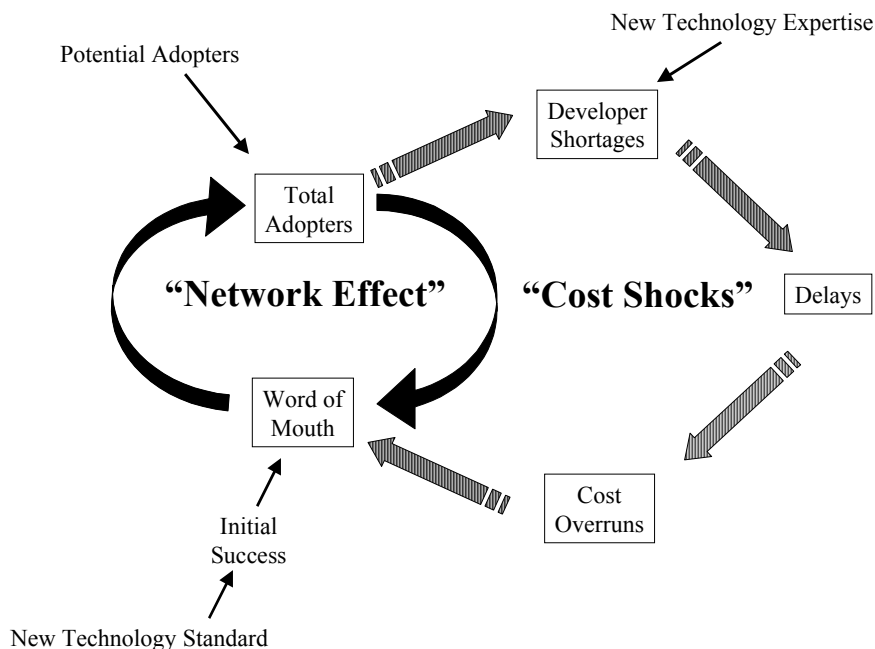


Figure 3. Cost Shocks Develop as Network Effects Grow

Furthermore, the implications for IT departments enmeshed within such a market are significant because of network effects⁴ and cost shocks⁵. IT services would be subject to any (and all) network effects present within the market. Disruption could come at any point and new service providers could be added into (or removed from) the market with little warning. Wherever disruptions and integration gaps arise, shocks will occur – such as higher costs and labor shortages. These shocks will likely lead to delays and interruptions of service. In a network

⁴ “Network effects” allude to markets when the value of a product to one user depends on the number of other users [Shapiro and Varian, 1999]. Dutta [2001] provides a useful discussion of network effects in an IS context.

⁵ “Cost shock” is a term coined to capture the steep increase in the wages/expenses associated with the labor pool due the shortage in the supply for their particular skill set.

economy, cost shocks occur when more and more firms begin to use a particular technology (e.g., client server, ERP) causing developer shortages to occur and prices to rise. The size of the shock is dependent on the size of the network involved (Figure 3). However, it is also possible that an accelerator effect⁶ could occur if a service provider invests in this technology. In this case, the cost shocks could be even greater. Further shocks in the marketplace could come from the increasing functionality (and hence the capability to compete) of small and medium sized enterprises (SMEs) as a result of their use of XSPs.

To anticipate cost shocks and accelerator effects, IT managers will need to model the dynamics of the markets involved, much as they already model such factors as capacity and job flow. Modeling is essential because the non-linearity of the marketplace prevents extrapolation from the past. Managers must learn to recognize where the key decision points are in this model, where to put their money and time, and what the risks are. In short, companies will need to model the whole market to understand who the players are and what the likelihood of cost shocks and accelerator effects will be. For example, if cost shocks are anticipated prior to an ERP decision, an XSP contract can be written as a hedge against developer shortages. The specific model depends on the category of technology to be delivered through the XSP market environment. To be useful, these models should provide insights that help managers develop robust strategies for dealing with the tensions created by this marketplace. They should try to document what the costs of service will be in both the near and long term and how contracts should be written to cover the risks involved. Modeling represents no small challenge but the rewards are substantial for those IT managers that outperform the competition.

VI. CONCLUSION

The emerging external IT services marketplace offers rich opportunities and many possibilities for IT organizations to become more cost-effective. This paper presents a picture of how IT services may be delivered in the future. We believe that strategic business applications development and management for mission-critical applications will be in-house but delivery for standard and meta-industry applications, processes, and technology will be off-site. Thus, for most companies, it is likely that external IT providers will form part of their future service delivery package and that some will become both consumers and sellers of components.

However, as is so often the case in the IT industry, today's reality falls far short of what the industry promises. Companies wishing to take advantage now of what the external IT services marketplace can offer must evaluate the market carefully and must proceed in full awareness of the risks involved. It is recommended that organizations articulate a sourcing strategy which balances internal versus external capabilities to take advantage of the IT services marketplace.

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⁶The multiplier and acceleration effects allude to concepts from classical economics theory [Harrod, 1961]. The following explanation is available [HET, 2001]: "if investment increases, there will be an increase in output as a result of a 'multiplier' relationship between equilibrium output and the autonomous components of spending". The principle of accelerator suggests that investment decisions on the part of firms are at least in part dependent upon expectations of future increases in demand, which may, in turn, be extrapolated from any current or past increases in aggregate demand or output. Thus, the multiplier principle implies that investment increases output whereas the acceleration principle implies that increases in output will themselves induce increases in investment.

Editor's note: This article was received on February 16, 2002. It was published on September 18, 2002. This article is the fifth in a series on new developments in practice coordinated by James McKeen of Queen's University. The present article was originally prepared by the authors for discussion by the IT management forum, a group of senior IT managers from 14 Canadian firms that meets regularly to examine advances in the state of the art. The previous articles in this series dealt with risk management in information systems (CAIS Vol. 7, article 13), enterprise application integration (Vol. 8, article 29), extracting value from mobile technology (Vol. 8, article 32) and managing the technology portfolio (Vol. 9, article 5). Additional articles in this series will appear in CAIS from time to time.

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