Orchestrating Business Processes – Harnessing the Value of Web Services Technology

By John Hagel III and John Seely Brown

The buzz is spreading. There's a new set of technologies on the horizon. Web services offer the potential of low cost, flexible connections across applications operating on diverse technology platforms. The pay-off: substantial, near-term reduction in operating costs and improvements in asset leverage for businesses.

Not so fast. True, businesses do have the potential for substantial savings in an increasingly demanding economic environment. But put the emphasis on "potential". Realizing these savings is not simply a question of injecting a new set of technologies. To fully realize the economic potential of Web services technology, senior managers will need to adopt very different approaches to managing business processes. This article describes why different management approaches are required.

IT managers have an opportunity to play a significant role in helping businesses to migrate towards these new process management approaches. We outline the role that IT managers can play and provide them with some specific tools to increase impact. But first, let's provide some context.

IT'S NOT JUST A RECESSION

We are all focused on the deepening recession and debating how long it will last. Implicitly, we believe that when the recovery arrives, the pressure will be off and we will once again be able to count on profitability and growth.

Recessions are cyclical events – they have a beginning and an end. Underneath this cyclical event, long-term trends are gathering momentum and converging in ways that suggest economic pressures may not go away as the recession comes to an end.

In particular, two fundamental forces are coming together to intensify competition. First, technology innovation continues to reduce interaction costs – the costs incurred in coordinating economic activity. At the foundations,

Moore's Law, Fiber Law and Storage Law offer business managers the assurance that the cost of the basic hardware required for processing, communicating and storing information will continue to decline by orders of magnitude for the foreseeable future. More recently, the advent of Web services technology provides a way to connect existing applications in much more flexible, low-cost ways.

These technology innovations will make markets even more dynamic as enterprises become able to move faster and at lower cost. They also will make customers more adept at extracting value from vendors as they are able to get more information about more options, negotiate more readily with more vendors and switch more easily to another vendor if they are not happy with the value received from the original vendor. Look at the impact of CNet in the consumer computer market or Freemarkets in a variety of industrial markets to get some idea of the role of technology in empowering customers.

The second force at work involves a continuing shift towards public policies designed to intensify competition across a broad range of global markets. Deregulation and trade liberalization in particular will intensify competition for customers. Continuing reform of securities laws tend to favor investors and have the overall effect of intensifying competition for funding.

These forces will have long-term impact. What kind of impact? To begin with, intensifying competition creates growing uncertainty. New entrants come in from unexpected angles and sleepy old competitors suddenly re-energize. In this environment, managers will need even more flexibility in business operations.

The prospects of long-term margin squeeze created by intensifying competition (and reinforced by current recessionary pressures) make additional cost reduction and greater asset leverage essential. Companies can continue to squeeze cost and assets out of their own businesses, but increasingly these efforts will require greater collaboration with other companies. One growth business in these recessionary times remains the outsourcing business. Why? Because outsourcing can often be a powerful way to cut costs, reduce asset exposure and increase return on assets. We're no longer just talking about outsourcing IT platforms. Now the move is to outsource entire business processes – human resource management, logistics, manufacturing, customer support and others.

Another way to get increased efficiency is to improve coordination across business partners – for example, developing greater visibility across partners in a supply chain or third party distribution channels that must collaborate to support a customer. A lot of the remaining inefficiencies in business are concentrated at the edge of the enterprise where it has been particularly challenging to coordinate activities across the firewall with other companies.

Becoming more efficient is necessary but not sufficient. Intensifying competition means managers need to do this just to stay in the game, but it also means that most of the cost savings will be competed away and captured by the customer. In this environment, the only way to continue to create economic value is to aggressively grow the business. The real win is to find ways to grow the business without adding a lot more assets.

This is not a pretty picture. It is not just about surviving the recession. It is about repositioning the business to succeed in a much more challenging long-term economic environment. How well positioned are companies to address these challenges?

THE FOUNDATIONS ARE SOLID – THAT'S THE BAD NEWS

Competition didn't just intensify overnight. It has been heating up over the past several decades. How have large enterprises responded? They got the wake-up call and began focusing on cost reduction in a serious way. In particular, they started to look at the business processes within the enterprise and found substantial inefficiencies. Business process redesign became the vogue. While it failed to live up to the full expectations created by its advocates, business process redesign did help to cut costs.

The focus on business process redesign quickly highlighted a major obstacle to increased efficiency. Over time, large enterprises had implemented incompatible technology platforms within various business functions. Business process redesign required much tighter integration of activities across business functions, but the incompatible technology platforms made this very difficult to achieve. Technology innovation responded to the challenge by creating broad suites of Enterprise Resource Planning (ERP) applications designed to more effectively integrate activities along business process lines, such as supply chain management, customer relationship management and human resource management.

By breaking down existing application stovepipes, ERP applications helped to support efforts to cut costs through business process redesign. These benefits came at a price. First, ERP implementations were not cheap or quick. Large enterprises often spent several hundred million dollars and supported 100+ member implementation teams for five or more years before seeing any significant cost savings.

Secondly, to achieve cost savings, ERP applications focused on "hard-wiring" business processes to make them more efficient, secure and predictable. This made it very expensive to tailor an ERP application to the unique characteristics

of each enterprise and even more difficult to modify an ERP application if business conditions changed.

Finally, ERP applications concentrated on integrating activities within the enterprise. They assumed that connections with other enterprises would be limited and would need to be "hard-wired" just like business processes within the enterprise. It also made M&A more challenging as companies wrestled with integrating different ERP platforms.

In effect, business managers made a Faustian bargain. They implemented ERP applications and business process redesign in an effort to obtain a single large reduction in operating expense (in the apparent belief that no further major reductions would be required over time). The price they paid for these cost savings (in addition to the large implementation expense) was lack of flexibility and limited ability to collaborate with other enterprises. At the time, this bargain appeared quite reasonable. Companies were under competitive attack. They needed to get substantial costs out of the business. Technologies were available to support this business objective and there weren't a lot of technologies readily available to enhance flexibility and collaboration.

Now, conditions are different. Competition continues to intensify, uncertainty becomes an even more dominant reality and collaboration becomes more essential to continue the march towards ever lower operating costs and asset investments. These trends were already visible before September 11 but, after that date, it became even clearer that management needed more flexibility to deal with major discontinuities. More importantly, a new set of technologies known as Web services technologies have emerged to support lower cost and more flexible connections across applications.

Can corporations simply move to this new set of technologies and reap the business benefits? In much the same way that ERP applications alone would not yield much business benefit without accompanying business process redesign, Web services technologies alone will yield little business impact.

The answer is not to launch another round of business process redesign. Traditional approaches to business process redesign suffer from the same limitations as ERP applications. They seek to tightly integrate business activities within the enterprise. As a result, they do not address the growing need for more flexibility and collaboration across enterprises. What is needed is a different approach to designing and managing business processes.

TOWARDS MORE LOOSELY COUPLED BUSINESS PROCESSES

Flexibility, collaboration and leverage are becoming more important business objectives. These business objectives remain relatively meaningless unless

anchored in the reality of core business processes which are increasingly extending beyond the boundaries of an individual enterprise. As long as business processes remain hard-wired and constrained by the boundaries of the firm, these business objectives will make for good presentations but have little impact on the performance of the enterprise. Yet, to implement these business objectives at the level of business processes requires adopting a very different approach to managing these processes. Few companies have made much progress in moving in this direction, but the outline of what it would take to implement loosely coupled business processes is beginning to emerge.

Different design principles

Traditional business processes tend to be defined by the boundaries of the enterprise. They focus on managing detailed activities within the enterprise with the help of detailed information available in real-time.

In contrast, loosely coupled business processes tend to span across multiple enterprises – for example, supply chain management extending across several layers of an industry or customer relationship management mobilizing a broad range of specialized third parties to support the customer. These business processes require more flexibility to achieve their potential. Managers seek to extend business processes beyond the enterprise to access more specialized capability. More specialization creates more diversity. In turn, this increases the need for flexibility, especially if managers want to access the specialized resources dynamically to tailor the business process.

As a result, loosely coupled business processes tend to be defined in terms of entities (which companies will participate and what roles will they play?) and milestone-driven deliverables (what are the specific outcomes that must be delivered in what time frame?). These business processes operate with much more selective information access to provide early warnings regarding performance shortfalls. Given these characteristics, loosely coupled business processes require different roles, rules and renewal approaches relative to traditional business processes.

Contrasting Approaches to Business Process Management

	Hard wired business processes From	Loosely coupled business processes To
Roles	Controller Limited, all-purpose service providers	Orchestrator Increasingly specialized service providers
Rules	Management of micro-activities Instructions (push) Full information transparency	Management of macro-entities Incentives (pull) Selective information visibility
Renewal	Infrequent benchmarking Infrequent reengineering (every 5-10 years)	Continuous benchmarking Dynamic reconfiguration
Rewards	Experience effects Diminishing returns	Growing and continuous specialization Increasing returns

Business process roles. Managers who sought to implement business process redesign soon learned that it was hard to make much headway without designating a specific business process "owner" – a senior level executive who had the authority and accountability necessary to deliver anticipated business benefits. The challenge of coordinating business activities that span across multiple enterprises is even more severe. Authority becomes even more dispersed.

As the scope of business processes becomes broader and encompasses not only more enterprises, but more different types of enterprises, effective coordination requires a specialized role. Imagine the challenge of coordinating business activities on a global scale across the supply chain of the apparel industry. Raw material providers, specialized weavers and knitters, cut and sew operations, packaging facilities and logistics providers must all come together in flexible combinations tailored to the needs of specific designers and merchandisers. In this context, a company by the name of Li & Fung (see side bar) has emerged as a specialized business process orchestrator, working with designers and merchandisers to configure exactly the right combination of entities for each line of clothes. In collaborating with Li & Fung, all the other enterprises become service providers, offering specialized business capabilities to support different elements of the supply chain business process.

Business process rules. Enterprises manage business processes by specifying in detail the activities that must be performed and then providing managers with as much transparency as possible regarding the activities in the process. This "hard-wiring" of business processes ensures efficiency, security and predictability.

It does not deal well with flexibility or collaboration. Process manuals can accommodate some flexibility by defining optional process paths, but they become less helpful as the number of options expands or an unanticipated option surfaces. Process manuals may be feasible within the enterprise but, once we move beyond the boundaries of the enterprise, the lawyers start to get involved. Tightly negotiated contracts may be a reasonable supplement to process manuals, but they become increasingly untenable as the number and variety of business partners expands. Accommodating unanticipated options at this level becomes even more challenging (especially since most lawyers view their role as protecting the business, rather than creating room for new opportunities).

Rather than specifying in detail the activities within the business process, orchestrators of loosely coupled business processes tend to focus on specification of end-products at various stages of the process, qualifying appropriate service providers and creating appropriate economic incentives (and penalties) to ensure performance. Cisco illustrates the application of these principles in its operation

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of Cisco Connection Online (CCO). CCO represents a loosely coupled approach to customer relationship management that mobilizes hundreds of specialized channel partners to provide tailored support to individual customers. Based on a needs assessment prepared by CCO, the customer is referred out to a range of pre-qualified service providers to obtain a complex set of services ranging across consulting, configuration, fulfillment, installation, training and operation of Cisco equipment. Outputs of these services are specified and appropriate incentives help to ensure that the specialized service providers are motivated to deliver top-quality service.

As the number of enterprises participating in a business process increases, it becomes less and less feasible to provide complete transparency into the full range of activities across the business process. Simply integrating the applications and databases within a single enterprise is a daunting undertaking that few enterprises have fully accomplished.

Loosely coupled business processes do not need full transparency. They rely instead on much more selective visibility designed to provide early warning regarding potential inability to deliver end-products at various stages of the business process. Dell has mastered this approach in its management of supply chain partners, including specialized third party logistics providers and component suppliers. Dell's build to order assembly operations require high dependability on the timing and quality of deliveries to its assembly plants. To ensure this dependability, Dell has implemented an innovative event management system using Web services. This event management system focuses on defining key milestones throughout the process and then systematically queries service providers throughout the supply chain to confirm whether milestones have been met. In this way, Dell has been able to quickly and cost-effectively implement an approach that does not require integration of diverse databases to provide full transparency and yet provides the necessary visibility to determine whether expected end-products will be delivered on time.

Business process renewal approaches. Business process redesign is a massive undertaking. Few enterprises would want to undertake this effort more frequently than every five to ten years. The hard-wired approach to enterprise business processes dictates that major improvements to the process occur relatively infrequently.

Loosely coupled business processes, because of their flexibility, create the potential for much more frequent and significant performance improvements. By focusing on milestones and creating visibility on performance against milestones, orchestrators of loosely coupled business processes can provide continuous benchmarking capability rather than the infrequent benchmarking more typical of hard-wired business processes. Since major business process redesign efforts

tend to occur so infrequently, systematic benchmarking initiatives tend to be timed to coincide with the launch of these redesign programs.

Toyota has pioneered innovative collaborative business processes with major suppliers in the automotive industry. In its major assembly plants, it has set aside a room where it brings together its major suppliers and posts weekly the performance of each supplier against specific milestones. This visibility of performance among all suppliers creates rapid feedback on performance gaps and enormous social pressure for suppliers to act to close these gaps.

Loosely coupled business processes create an opportunity to dynamically reconfigure business processes based on the latest performance information. As an example, Li & Fung continually reallocates work among its service providers based on recent performance trends. If one service provider develops a performance advantage for a specific task, that service provider sees a quick return on its performance investment while other service providers see an equally quick decline in workloads as performance gaps appear. Li & Fung supplements this ongoing reconfiguration of the business process for performance improvement with regular, three-year, reassessments of their entire approach to orchestrating resources.

The benefits of loosely coupled business processes

Loosely coupled business processes provide a way to maximize the economic value of Web services technology. As long as companies rely on traditional, enterprise-centric, hard-wired business processes they will be blocked from exploiting the advantages offered by this technology.

Specifically, loosely coupled business processes provide much more flexibility than traditional business processes, allowing companies to benefit from the flexibility offered by Web services technology. Loosely coupled business processes also are more suitable for coordinating activity across enterprises, enabling each enterprise to more effectively leverage the resources of other enterprises. This is where Web services technology has distinctive advantages relative to traditional IT technologies. Loosely coupled business processes also require much less incremental investment in IT platforms by the participating enterprises since they do not require broad transparency and instead rely on much more selective visibility that can be provided as an overlay on existing IT platforms.

IT MANAGERS PLAY A KEY SHAPING ROLE

IT managers will need to become significant shapers of this new management approach. In the process, they can help unleash the significant economic value

associated with Web services technology and position their enterprises for success in an increasingly challenging world. To exploit this opportunity, IT managers will need to exercise a new type of leadership that involves redefining their role within the company and changing the nature of their interaction with the CEO.

Skill builders

Loosely coupled business processes are significantly enhanced by the availability of Web services technology. Most enterprises today have very limited skill in the deployment and management of this new technology. Among the skills required are node enablement (exposing existing IT resources as Web services), node management (managing Web services on an ongoing basis to ensure availability, reliability and problem resolution), service grid outsourcing (determining the right mix of enabling services required to support application services and accessing these enabling services from specialized service grid providers). These very new skills must be effectively integrated with more traditional enterprise IT skill sets in such areas as system architecture, network operations, database management, security management and enterprise application integration.

Standards shapers

Loosely coupled business processes tend to encompass a growing number of enterprises. Developing and refining shared meaning is one of the key challenges in ensuring effective coordination across a diverse group of enterprises. XML provides a potentially powerful framework for developing this shared meaning, but the real work begins with trying to identify what terms must be understood for a process to operate smoothly. Managers must then mobilize the necessary support from all the participating enterprises for standard definitions of these terms.

Service providers

In some cases, IT managers can leverage distinctive capabilities of their own organization to support the operation of loosely coupled business processes. For example, General Motors intends to provide its dealers with access to some of its major financial management and inventory management applications delivered as shared services. These shared services can be helpful in coordinating the efforts of the dealers and General Motors to respond more quickly to customer needs in purchasing a car. A large enterprise seeking to coordinate activities with much smaller enterprises often finds that its deeper IT capabilities can be a significant asset in mobilizing support from the smaller enterprises. By offering

access to its capabilities as a shared service, the large enterprise can often create significant incentives for other enterprises to participate in a loosely coupled business process.

Service evangelists

Web services technologies offer a very promising tool to support loosely coupled business processes. As described in the side bar, the service grid is a key missing link required to increase the functionality available to support mission critical business activities while removing complexity from the enterprise. Many of the specialized services required to populate a service grid are already emerging, but there are many more that will need to be deployed over time to address the needs of particular types of business processes or industries. IT managers can help to accelerate the development of these specialized services by clearly identifying the need, publicly encouraging providers to address these needs and agreeing to serve a pilot users of the specialized services as they begin to be deployed.

Knowledge architects

Loosely coupled business processes provide a powerful platform to disseminate information and build knowledge. IT managers can be very helpful in identifying ways to capture and disseminate the data required to help business process participants gain further insight into existing performance gaps and pinpoint the source of performance shortfalls. IT managers can also help to build collaborative problem-solving platforms to help participants learn what can be done to address these performance shortfalls. Designing appropriate information flows can help to enhance both near-term business performance and long-term learning.

THE BOTTOM LINE

Technology can be a key enabler in responding to business needs for greater flexibility and collaboration as well as continued efficiency improvements. However, it is only an enabler. Companies will needs to master a very different approach to managing business processes in order to harness the real economic value of Web services technology. IT managers can play a key role in generating more economic value from this technology by working with business line managers to ensure that appropriate foundations are built for these new business processes. By better understanding the business context and the specific tools available for impact, IT managers have substantial opportunity to play a much more prominent role in the business changes ahead.

SIDE BARS

Web services technologies

Web service technologies are designed to provide much more loosely coupled connections across applications. In addition to relying upon existing Internet standards and protocols like HTML, HTTP and TCP/IP, they employ an emerging set of public standards and protocols derived from eXtensible Mark-Up Language (XML). Using these standards, existing application resources can be made available to other business users as shared services across electronic networks.

Many of the early champions tend to describe Web services technologies as an example of a peer-to-peer architecture where the focus is on functionality in the nodes. In fact, Web services technologies require significant enabling services to provide effective support for mission-critical business processes. These enabling services cover a broad range of needs. Some of them involve transport management, such as message queuing, filtering, routing and metering. Others focus on resource knowledge management, such as directory services, brokers and data transformation services. Service management represents a third category of enabling service, including provisioning, ensuring quality of service and synchronization. Even more broadly, a category of enabling services like security, auditing of third party service and billing and payment services are needed not just to support application services but the other categories of enabling services as well.

These enabling services are best provided by specialized utilities operating independently of the nodes being connected, especially when many enterprises with diverse technology platforms are involved. Addressing the diversity of technology platforms at the node level in more traditional one to one or one to many approaches would create exponential increases in complexity and cost within the enterprises involved. By centralizing enabling services independent of the nodes, Web services technology architectures can radically reduce the expertise and investment required within the enterprises being connected, especially when many to many relationships are involved.

These enabling services collectively constitute a service grid, which represents a key "missing link" in deploying Web services technologies to support mission critical business processes. In practice, many service grids will emerge as companies integrate specific enabling services to create tailored service grids to address the needs of particular business processes or industries. The enabling

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services required to create a service grid are emerging rapidly and will continue to increase in diversity as the demand grows for specialized capabilities.

Li & Fung

Li & Fung is an interesting, but little-known, company. It has developed a specialized role as the orchestrator of loosely coupled supply chain processes for a broad range of consumer products requiring labor-intensive manufacturing. Although not widely known outside its industry, Li & Fung has become a $3.2 billion revenue company with revenues doubling over the past 5 years. Over the same time period, it has sustained a return on equity exceeding 30% in an industry known for notoriously thin margins. With only 3,600 employees, Li and Fung generates almost $1 million per employee.

How did it do this? Li & Fung began 95 years ago as a trading company based in Hong Kong selling fireworks and ceramics to customers overseas. Over time, it began to develop deep knowledge of the various suppliers throughout Asia required to deliver apparel and other products to designers and retailers looking for low-cost, but reliable, sources for their apparel needs. Today, Li & Fung coordinates the activities of 7,500 suppliers in 37 countries that extend well beyond its original Asian focus to include Africa, Latin America and Europe.

Li & Fung works with a broad range of well-known customers like Levi Strauss, Reebok, Disney and Ann Taylor to determine product needs. Li & Fung then uses its deep expertise to locate the best suppliers to meet the specific product needs of its customers. It doesn't just source finished products. Instead, it begins by sourcing raw material. It then mobilizes as many as five links of labor-intensive production facilities to produce the product and couples that with the appropriate logistics and packaging firms to deliver the product to the end customer.

John Suh, the CEO of StudioDirect, an affiliate of Li & Fung based in the U.S., pinpoints some of the keys to success for Li & Fung: "Li & Fung keeps it simple for the customer while mastering in great detail the complexity of understanding the specific capabilities and economics of each supplier. In this way, customers get a supply chain optimized for their individual needs." As an orchestrator, Li & Fung has become a master at building and managing loosely coupled business processes that embrace a highly diverse group of participants dispersed across the globe. Their particular specialty is consumer goods requiring labor-intensive production. We predict that similarly specialized orchestrators will emerge in a broad range of markets and product categories as the benefits of loosely coupled business processes become apparent.

90 Day Plan

Loosely coupled business processes cannot be implemented overnight. They will evolve in stages, starting with some clear near-term successes in delivering economic value by creating more flexible technology and business connections in areas where your company must interact frequently with many other enterprises. The key challenges in the first 90 days will be to identify key near-term opportunity areas, mobilize executive support and develop a plan to address major capability gaps.

¶ Begin by pulling together a team of executives to investigate Web services technologies, focusing both on their capabilities and their limitations. Interview those who have already had experience implementing Web services technologies to understand what organizational capabilities are required.

¶ Look for activities within the enterprise that involve frequent interactions with a broad range of other enterprises. These are often found in procurement, supply chain management, channel management, customer support and product design.

¶ Determine where the major frustrations occur today in coordinating activity across those enterprises and prioritize them based on their potential near-term economic impact. Look for the major opportunities to reduce cost or reduce asset investments.

¶ Constitute a team that includes both IT executives and line managers from the areas where highest near-term economic impact appears likely. Explore how Web services technologies might be deployed to help deliver the cost or asset savings and identify other potential organizational obstacles to implementation. Develop a short list of initiatives targeted against the areas with highest near-term economic impact and lowest implementation barriers.

¶ Define an initiative plan that clearly specifies short-term (6 – 12 month) economic objectives, the technology and business initiatives required to achieve these objectives and the capability gaps that must be quickly addressed to support these initiatives.

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