

Modern Business Strategies and Process Support

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ABSTRACT

This paper is designed for business leaders who must make critical decisions regarding the development of the next generation of Web-based enterprise application systems, e-commerce products and Web-based services targeted at the business sector.

The key point is that building and maintaining an effective support infrastructure for business processes has become a technologically demanding task with relatively high costs attached. More importantly, the capability of the firm, to rapidly bring products to market, is significantly inhibited. On the other hand, embedding robust process oriented components within Web-based applications will speed the time-to-market and lower the cost of ownership. Unless developing process support engines for the Web is a core capability of your company, embedding a product architected for that environment will deliver a much higher return on investment than in-house development, while also ensuring that products and services are brought to market more quickly and effectively.

INTRODUCTION

In the emerging era of the Web, companies that don't have a Web-based strategy—don't have a strategy. Processes and value chains are evolving rapidly as companies outsource non-core activities and capabilities, leading to more sophisticated markets and a wider distribution of economic activity—i.e. the way we do business is undergoing a period of rapid change. It doesn't matter what industry you operate within, transformation is happening ever more quickly as technology advances, new entrants and new forms of business partnership overturn the rules of the game.

The effect of all this change is that the processes of the business are under threat. Further, the technology systems that support these processes require close scrutiny—most architectures are too rigid to handle the degree of change. Effective process support (workflow support) is a critical element for mission critical applications that need to handle rapid change. The problem is that traditional workflow products struggle to deliver effective solutions when addressing the broader value chain and the Web. Secondly, building and supporting such an environment is costly and fraught with unforeseen problems and issues. On the other hand, a new breed of process support technology is emerging that has dramatic implications for business and technology strategies.

PROCESS AUTOMATION IN THE 21ST CENTURY

We all now know that the Web is **the** channel of the future. Moreover, firms are looking to use these same Web-based technologies to coordinate activities internally and help staff share knowledge, lowering costs while improving efficiency and effectiveness. But e-commerce is not just a buy-side or sell-side package of software that is tacked onto existing systems. Well-run firms use the Web to link their business processes directly—integrating partners directly into supply of products and services to customers.

MODERN BUSINESS INTEGRATION

Organizations are starting to realize they can interact with customers, partners and suppliers, exchanging and leveraging knowledge in addition to undertaking transactions. Facilities that were once central to the business are now outsourced.

During the 80s and 90s manufacturing industry was evolving as margins were squeezed. For example, take Ford Motor Company. In the beginning they manufactured everything. Now the story is different—"The manufacture of cars will be a declining part of Ford's

business ... (Ford) will concentrate in future on design, branding, marketing sales and service operations.”¹

Like all modern carmakers, Ford has aggressively outsourced the supply of entire sub-systems—from engines and suspension assemblies to car interiors. And those components are getting bigger—now a sunroof introduced at the time of manufacture is the whole roof of the vehicle. In such situations, suppliers application systems are automatically kept abreast of requirements (via EDI).

But now service businesses (now representing 80 percent of US employment) are exploring similar concepts. Processes, once perceived as internal to the company, must now span the entire value chain.² Effective service providers integrate their operations directly into the processes of their customers.

Before the Web, organizations that worked closely together used EDI and fixed computer-to-computer links. In technology terms, these systems were hard-wired and difficult to modify. But with the emergence of the Web, expectations have changed. Customers now want to track the status of orders for themselves, gain privileged access to tailored content, or interact with their personal customer representatives directly.

Rather than hiding problems behind organizational boundaries, covering over the inefficiencies of their processes, savvy firms are learning to ‘live within glass boxes’—refining, then exposing their processes, and selling that as a benefit to their customers. FedEx and Dell are probably the most widely recognized exponents of this trend. By cutting down the number of customer queries that are handled by humans, these companies have saved significantly on their costs. In the case of Dell, around 20,000 customers check the status of orders every week, saving \$8 from Dell’s administrative costs every time. Moreover, when customers are able to check the status of their order or package, they are less likely to get irate leading to increases in overall customer satisfaction.

At Dell, they outsource all the core R&D and component production facilities. Dell concentrates its own resources on developing a deep understanding of the customer and their requirements, maintaining intimate trading relationships with its customers and partners. Suppliers provide the largest part of the investment and expertise needed to support the broad array of customer requirements. To create a seamless product and service mix for their wide array of customers, Dell has needed to integrate its processes with those of its suppliers.

Based on these sorts of intimate trading relationships, modern business partnerships are eradicating duplication, irrelevant hand-offs and rework, ensuring that processes run smoothly and effectively. Pioneering work from companies like Levi’s have shown the way—LeviLink Services manage the inventory of their customers directly, reducing replenishment time from 14 to three days and cutting delivery time from nine days to three.

When looking at the broader business picture, it is clear that supply chains are constantly improving the processes that underpin the delivery of products and services. This is part of a natural trend—when all other things are equal companies will always seek the lowest cost option.

Quinn puts it like this: “...using sophisticated outsourcing and new electronic communications, modeling and monitoring techniques, companies can decrease their innovation cycle times and costs by 60 percent to 90 percent, decrease their investments and risks by equal amounts, and enhance the value of their innovations by orders of magnitude.”³

¹ Financial Times August 4th, 1999.

² For an in-depth analysis of the current state of outsourcing see Strategic Outsourcing: Leveraging Knowledge Capabilities by James Brian Quinn, Sloan Management Review, Summer 99.

³ “Strategic Outsourcing: Leveraging Knowledge Capabilities” Sloan Management Review, Summer 99.

Using the Web as the medium of interaction is only encouraging a more rapid evolution of the underlying strategies and business processes—right across the value chain. And to make matters worse, with the increasing bandwidth and geographic distribution of partners, it is even more difficult to know where those applications and users will reside—in-house, within the supplier or as part of a managed application service.

From a strategy and competitive perspective, the often-quoted example of Amazon.com, the online bookstore, demonstrates how a single organization can dramatically change the rules of the game. In this case, Amazon started selling books online, taking on the established high-street booksellers. Responding to this challenge, virtually all other book retailers have now set up similar operations. For those businesses, they had to radically alter their business processes in a very short time in order to remain competitive.

When you are subject to 'Internet Time' it is agility and responsiveness that makes the difference. Those that can capture the moment, developing revolutionary products or services, delivering them via the Web, can quickly generate massive competitive advantage. Moreover, with Web-based services and offerings, first mover advantages are even more critical than before.⁴

IMPACT ON PROCESSES

These trends imply support for a constantly evolving set of processes—processes that exist between (rather than within) companies. In turn, this suggests that firms must develop a systems infrastructure that can evolve along with these processes. Indeed, some companies have set out with the express intention of supporting constant evolution. For example, on average, the Bank of Scotland changes its processing rules every day.⁵

But we must also keep in mind that companies cannot afford to completely redevelop their applications—all established businesses have made major investments in systems (collectively estimated at over a trillion dollars in the US alone). Companies cannot just throw them away.

The problem is that virtually all of the applications developed over the last 10 years were designed to optimize single functions. Take for example the production planning applications of the 80s and early 90s. They see everything from the perspective of the transaction. Now we want these same systems to integrate into a broader framework of consistent customer and supplier relationships—without rebuilding them, re-using the systems capabilities.

The result is that 21st Century application systems not only need to support a broad array of interactions between partners, but they must also integrate the structured applications of the past. And the responsibility for administration and evolution of these systems now lies in the hands of business analysts or systems administrators (rather than programmers).

For the IT manager, looking to the future, the implication is that systems must be capable of evolutionary change to reflect business processes, partnerships and trading practices of the day. The dividing line—between those relationships that are economically viable and those that are not, is influenced by the extent to which application systems permit dynamic reconfiguration (to reflect the business situation and opportunity). In other words, the infrastructure must enable process definitions that have the capability to grow and change, re-using existing applications and leveraging existing and new components. To ignore these principles will ensure that the business will continue to spend more than it need on systems and technology.

TRADITIONAL APPROACHES STRUGGLE

When it comes down to it, many applications rely on their ability to support users through a series of screens as they undertake their work, coordinating their actions with the needs of the customer or supplier. In the early days, we were told that workflow was the process

⁴ The relative market share of Coca-Cola and Pepsi is still approximately the same after 50 years.

⁵ See "The Business Case For Case Handling" Miers & Hutton, available at the Enix Web site at <http://www.enix.co.uk>

support technology that delivered work to people. Others saw it as a mechanism to thread applications together, integrating legacy systems into the modern desktop.

In-house developers often feel they can produce such applications themselves without reference to third party process support environments, citing greater control over code and tighter integration. However, the perception of lower development costs is misplaced. When assessing the cost of ownership of such systems over their full life cycle, it soon becomes clear that development costs are but a small part. It is just a question of perception—developers would not dream of writing their own database management system, yet 15 years ago it was quite common.

Until now, supporting processes that crossed organizational boundaries was extremely difficult. Traditional workflow environments concentrated on the internal business process—routing work from one user to the next. Users and their roles were regarded as relatively static (changing little), with processes imposed on workers in order to ensure that appropriate controls were maintained. The result was an ever more complex web of procedures that tried to cater for every eventuality and in the end, a high cost of ownership.

But when we consider the needs of the modern enterprise, with its outsourced processes and complex partnerships, traditional models of internal control delivered via workflow are no longer relevant. The processes evolve too quickly. Furthermore, when it comes to linking those evolving applications across organizational boundaries, all of the established approaches labored.

Developers had to reference information on customers and partners from third party applications, building in delays to represent tasks that they must undertake along with associated timers and escalation procedures. Organizations that went down this route paid the price in terms of development costs and time to market.

Modern approaches allow applications to 'wrap' the sources of routing information, resolving the correct participant from the business case and sending the work to them, wherever they may be. This approach leverages the capabilities of Directory Servers such as Microsoft Active Directory in Windows 2000 and the Lightweight Directory Access Protocol (LDAP). Now it is possible to send the work item to the customer directly by email, providing a unique link for them to login to the server and carry out the next step in the process.

But the problems do not end there—over the last few years we have seen a plethora of document management systems emerge. Documents are the focus for most knowledge workers and their management has become increasingly important. Yet when we distribute the process across companies or divisions, with knowledge workers forming a project team, the management of documents is critical. Moreover, these documents are key aspects of the processes that bind the team together.

Spreading that team across a Web-based infrastructure provides a low cost mechanism to keep participants informed of required actions. But it is not always a simple exercise to resolve the email address and provide that participant with appropriate access permissions. Knowledge workers produce, organize, collect and distribute documents in support of their projects. And access to these documents is governed by business rules—the policies, standards, responsibilities and authorities of the participants. These business rules exist at all levels and they are continually changing.

Just consider for a minute the implications of this trend toward greater virtualization—where companies come together as partners in response to one opportunity, yet in other sectors they are fierce competitors. Such security issues can have far reaching implications on the construction of applications.

When properly designed and constructed for the Web, modern workflow systems can add significant value and lower the cost of ownership for applications. From an infrastructure point of view, the workflow system must have the capability to re-use what is already available, rather than forcing organizations to maintain yet further layers of security and systems complexity.

The key to realizing the value delivered by the modern workflow environment is in speeding time to market. Applications and products are developed far more cheaply and quickly than would otherwise be the case.

APPLICATIONS DELIVER VALUE

Process support (workflow) itself does not make something possible that wasn't possible before. In the final analysis, firms can always program applications from scratch. What workflow delivers is the ability to easily thread together those applications, supporting the process as it integrates users and other systems.

However, the majority of 'old-style' workflow systems place a heavy onus on the developer to write suitable programs to support interaction with other system. It is here that established workflow approaches show their lack of sophistication. The amount of effort required to integrate a third party application used to make up as much as 80 percent of the overall project. However that must be balanced with the realization that, on average, a system using a modern process support engine will deliver a given set of functionality in about 50 percent of the time taken to develop the equivalent system from scratch.

In a study we carried out for a major international bank⁶ the average life cycle costs on the introduction of complex applications that utilized workflow were as follows (not including hardware):

ITT & Selection	2-3 percent
Software Purchase	8 percent
Architecture & Design	4-5 percent
Process Development	15 percent
Application Integration	40 percent
Lifecycle Support	30 percent

These figures represent the previous generation of workflow management products.

The modern approach is to develop interface adapters that allow the workflow system to hide the complexity of the underlying systems, encapsulating and wrapping the application while allowing the firm to leverage its existing investments.

The key here is to separate the functionality of the applications from the processes that use them. When the process is buried deep in application code (when built from scratch) it is particularly inaccessible and difficult to change. As a result, the cost of ownership is high. If, on the other hand, the process is maintained independently of the core functionality of the application, the cost of ownership is considerably lower. Furthermore, with the interface adapter approach the company can insulate itself from individual application suppliers. Embedding the process information into the application itself (such as that in SAP) only ensures your continued reliance on that product.

Moreover, if the system involves interaction with participants outside of the firm, it is much harder to realistically define their involvement. And what ever is defined, will usually require modification at a later date. Processes embedded within application systems inhibit the ability of the firm to adapt its offerings in the light of changing business circumstances and the actions of competitors.

Another aspect of corporate agility is the ability to quickly tune the corporate offering to the needs of the specific customer—mass customization. Again, modern workflow systems can offer superior support in this area. Sometimes referred to as Case Handling Systems, the best approach here is to develop fragments of business process with the relevant application functionality attached. These fragments are then combined on the fly, as required, to suit the needs of each customer. Rather than having to compose ever more complex end-to-end offerings, the firm can leave it to the knowledge worker (or customer) to choose those elements that are most appropriate, combining the process fragments into a cohesive whole. This approach, selecting fragments of process to make up the whole, further lowers the cost of ownership.

⁶ Carried out in 1997 based on the evaluation of 8 major workflow projects. Products used involved fixed integration links.

These are agility and speed to market issues. In the world of supply chains and networked partners, or supporting customers via the Web, speed of adaptation is the critical success factor. Companies are looking for lighter solutions, where they bypass the heavy integration effort required in traditional workflow approaches. By contrast, modern workflow systems, designed for the Web, support the company in adopting an agile stance in the market.

STRATEGIC CHOICE—BUILD OR BUY?

For firms developing applications, whether they are Independent Software Vendors (ISVs) or large end-users, there are several issues to consider here—developing a proprietary workflow environment will have significant implications for the business, its development and marketing strategies. The key questions are these:

- Would you expect to build a proprietary database or operating system? How about an application server? Most likely not, so why should an infrastructure element such as a process support engine be any different?
- Do you want to maintain a proprietary workflow development effort when others are reaping the benefits of quick market entry?
- Can you commit resources over the long term to handle changes in operating system platforms and databases?
- What are the implications of project overruns and the lost market opportunities that relate to them?
- What commitment of discretionary resources will have the biggest impact on your ability to generate revenue and market share?

For software engineers there is always the temptation to try and build a solution from scratch, preferring to rely on their own skills than those of others (the 'Not Invented Here Syndrome'). They often do not appreciate the benefits of running with best of breed products and integrating the desired functionality into their own applications.

Large end-users have known for a long time that they are better leaving this sort of development work to others, preferring to buy-in infrastructure technologies and integrate them with their existing applications. Of course there are exceptions—a bank in the UK decided to develop its own workflow systems to support the wide variety of applications that existed. However, user departments found their systems were difficult to change and adapt—changes to an individual standard letter were costing as much as \$6,000. The Bank spent several million dollars discovering the pitfalls of homegrown process support engines before finally selling the technology off to a specialist support organization.

Quotable evidence from vendors is hard to come by (since firms do not readily share their experiences in this area). During our research for this paper we spoke with the CEO of one vendor that initially thought it would develop its own process support solution. However, on further analysis the management felt that, overall, this was a risky approach with significant impact on their time to market.

Indeed, the development team had initially estimated that they would take 18 months to deliver the base functionality. On further investigation it was realized that this approach would deliver minimal process capabilities and would lack graphical process modeling tools (instead being table driven). Management felt they would need 2-3 years to bring a process-enabled product to market.

Secondly, they were concerned that an in-house development implied other, less easily quantifiable risks. Specifications of required functionality is less likely to be complete when those writing the specs have little experience of process support. When implementing the software the developers would inevitably take short cuts that would allow them to get to a solution more quickly. But this would be at the expense of a more general solution—one that was applicable in a wider variety of situations. With a proprietary approach, they also ran the risk of taking their application set up a dead-end road, while customers and industry passed them by. In the end, they went for an externally developed product. Beta test software was available within 6 months and 2 months later they had their product in the market—i.e. the use of a robust workflow product saved at least 50 percent on the time to market. Moreover, when they factored in the additional functionality they received (but had not foreseen), management were pleased with their initially contentious decision.

So maintaining independence is an expensive luxury. Those ISVs that have developed proprietary workflow systems are now generally seeking to replace them with industry standard, best of breed solutions.

They have discovered that it is more difficult to build a workflow system designed for the Web than might initially appear to be the case. Infrastructure products are difficult to engineer well and require many man-years to develop and refine—these technologies are not simple. Rather than committing their scarce development resources to their own applications, firms spent inordinate amounts of time responding to the rapidly changing technology infrastructure requirements of the Web, or endlessly customizing applications for clients.

Those ISVs that did work with leading products found that as the workflow vendors developed new functionality, supported new platforms or added new interfaces (adapters), then their applications benefited from the increased flexibility. They found that workflow functionality itself did not provide competitive advantage. It was the application of workflow to support the processes of their own niche markets that provided the differentiation.

More importantly, from a marketing stance, these ISVs were able to point to their use of the best-of-breed solutions to meet evolving customers' requirements. They had realized that developing effective process support engines takes time and usually, several iterations of product. In that intervening period the market could easily move on to settle on other solutions. In the world of rapid prototypes and evolving needs, it has become increasingly important to enable dynamic configuration in the field, tuning the application to the existing systems infrastructure.

CONCLUSION

The selection of an appropriate architecture to underpin technology development projects is crucial to long term profitability and viability of the firm. In this Internet age, it is just not possible for companies to develop their own process support infrastructure and still competitively bring products to market. Strategy must incorporate an assessment of emerging process support technologies and the identification of the ways in which they inform and guide choices in the 21st Century business environment. For most businesses that means working with partners and suppliers in delivery of the firms products and/or services.

When assessing products one must keep in mind the location of the process support engine (server) and the needs of application developers for the user interface. Essential features to look for in the server include:

- Routing—establishing an effective outsourcing capability implies the ability to route work to employees, customers and partners. Mechanisms are required that inform participants of required actions—i.e. an email notification facility is useful.
- Flexibility—the need to easily adapt processes via a graphical modeling interface is clear. But the requirement is greater than that. Systems should also handle dynamic binding of process fragments on the fly, allowing participants to re-use existing functions and, where authorized, build up new functionality.
- Adapter Interfaces—linking in popular document management and directory server environments, leveraging existing systems while also binding with emerging technologies such as LDAP and Active Directory. Integration with current application systems is also a key pinch point—effective adapters will lower the cost of ownership in the medium term.
- Scalability—both in terms of large systems but also small servers. The core functionality must be capable of being distributed across multiple nodes while also working well in small robust servers.

Of course, all of this functionality has to be 'served up' and delivered via Web-based interfaces. The generic user interface is the ubiquitous Web-browser. Out of the box functionality on the client-side is important as it enables firms to get up and running quickly. But once established, the requirement changes to cover the adaptation and evolution of that user interface. Indeed, some organizations will want to embed the functionality in custom applications from the beginning. Here comprehensive Application Programming Interfaces (APIs) and Software Development Kits (SDKs) are vital.

The effort required to build process support products, designed from the ground up for Web-based infrastructures, should not be underestimated. But examples of these modern architectures are starting to appear. Visionary workflow vendors have been making critical investments in the development of these highly scaleable environments. The challenge, for industry, is to realize the full potential that these products create—in terms of alternative business models and speed to market.