Why Software Development Matters:
Competitive Advantage and the On Demand Enterprise

SAUGATUCK
TECHNOLOGY

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Lead Author:
Mike West
Senior Program Director
Saugatuck Technology
203-454-3900 X254
mike.west@saugatech.com

"By now, the core functions of IT – data storage, data processing, and data transport – have become available and affordable to all. Their very power and presence have begun to transform them from potentially strategic resources into commodity factors of production."
>   - Nicholas Carr, "IT Doesn't Matter," Harvard Business Review , May 2003

"Software can endow computing devices with unrestricted variability in features and functions. The capability of a software-enriched global network has no boundaries."
>   - Paul A. Strassmann, Harvard Business Review , June '03

In the aftermath of the dot-com collapse and the subsequent decline in IT spending, Nicholas Carr asserted in the Harvard Business Review that "IT doesn't matter." The almost instantaneous backlash of rebuttals from academics and such industry leaders as Paul Strassman, also cited above, would suggest that IT certainly does matter. Yet there is still a lingering suspicion that competitive advantage may not be sustainable, and dollars spent on technology cannot make a lasting difference.

Certainly Carr was going with the grain when he argued that spending less on technology was the best strategy. Years of overspending on technology to support underdeveloped, and sometimes non-existent, business plans had come to a crashing halt. But, while indiscriminate and excessive spending may have created a receptive climate for Carr's anti-technology bias, it by no means proved his thesis that IT had lost its strategic power – especially as regards competitive advantage.

Competitive advantage arises from two sources, either from cost or from differentiation. The distinctive competencies of an enterprise produce something of value that appeals to its buyers because of its lower price or its superior features. Historically, information technology has allowed an enterprise to reduce the costs of production or distribution, on the one hand, or to add significant value, such as convenience or information, on the other. But rival enterprises soon match and exceed typical technology-based cost or differentiation advantages.

Much more difficult to duplicate or imitate are the core resources of a firm's internal knowledge and its processes. This intellectual capital – what the firm knows, and how the firm works – provides core-level differentiation from competitors. When effectively leveraged and managed efficiently, this intellectual property provides sustainable competitive advantage.

The basic issue for most firms is how to leverage intellectual capital into the most sustainable, efficient business models. And given that markets, competitors, customers, suppliers and every other aspect of a business change on a constant basis, *firms must be poised to respond to – and anticipate – constant change.*

Constant change requires continuous business transformation. This does not mean frequent, dramatic changes. Picture an airplane or automobile being piloted safely and successfully; the pilot or driver reaches his or her destination most efficiently through a constant series of small corrections. Sudden, dramatic changes bring danger, unpredictability and loss of control -- or injury. *Continuous business transformation simply means building and improving your ability to manage through a constant series of small corrections in systems and processes.*

In order to enable corporate management in this manner, information systems and processes must be tied together even while constantly changing. Take, for example, sales processes in a typical firm. Sales data often drives most other systems and processes in a firm, from sales and marketing, through ordering, production and shipping, to customer satisfaction, support and retention – not to mention billing, credit, accounting, accounts payable, and so on. Core company knowledge about its customers, prospects, partners and suppliers needs to be readily available and useable throughout these various systems.

But changes in one system lead to changes in the others. The firm needs to retain **and be able to act upon** accurate knowledge of each system, the processes it enables, the changes that have been made, and how those changes impact the firm's ability to do business – its costs, its resources, its processes, and so on. So the firm's core intellectual property – its knowledge, and ability to act on that knowledge -- is also constantly changing.

Therefore, sustainable competitive advantage lies in a firm's ability not only to improve its processes, but to codify, understand and manage the underlying operational knowledge in order to manage through a constant series of small corrections. The ties that bind these critical elements, and which therefore enable sustainable competitive advantage, are built through software development.

What is Software Development?

While the term "software development" often suggests the idea of building a system from scratch, most software development activity involves adaptation and creation -- by creating new custom code, pre-existing system assets or off-the-shelf application packages — building, extending, modernizing, integrating and deploying them — in the context of new business requirements:

- Building – creating new systems to meet business requirements, creating new custom code to augment the functionality of an existing system

- Extending – implementing significant enhancements to an application package that improves functionality, breadth, depth or reach

- Modernizing – performing technology upgrades, implementing platform change or migration, creating a new "front end" to a legacy system using current technology, e.g., a Web interface

- Integrating – linking system elements together, combining separate systems for synergy, ensuring information currency throughout the enterprise, usually through middleware

- Deploying – rolling out new or improved business systems into the production environment

Efficient and effective software development requires well-trained and well-managed development resources, a disciplined methodology that can orchestrate a wide variety of tasks, and a solid software development platform – an integrated toolset that enables fluid collaboration in the software development process among architects, business analysts, developers, technical designers and testing personnel.

The Software Development Advantage

Strategic software development capability enables an enterprise to be "poised and ready" — able to respond to market, supplier and customer demands by realigning business capabilities to meet new challenges. Consider the case of Anixter, a Fortune 500 company that distributes wire, cable, communications connectivity products and "C" Class inventory components.

Anixter realized that decades of investment in its information systems provided the company with a tremendous IT asset that it could tap through modernizing — by using current software development technologies — to meet their competitive need of making it easier for customers to do business with Anixter.

Anixter validated that concept with a prototype that demonstrated the project's feasibility. To create their business advantage, Anixter developers, who had been COBOL programmers, turned to JavaTM and the IBM Software Development Platform, utilizing the same concept of small dynamic development teams that had created the prototype.

The system that customers now know as eAnixter — a customizable "front end" to the company's well-established ordering system — allows a customer to access the product catalog, check inventory, place orders and check on the status of orders. Anixter's customers can now benefit directly from that system by eliminating the guesswork in job scheduling. Knowing with certainty when an order will arrive allows the customer to bring an installation crew on-site — just in time. Modernizing Anixter's ordering system helped put the company out in front of its competitors by putting its system, eAnixter, in front of its clients.

Thus, Anixter was able to create a sustainable competitive advantage for itself, and for its customers, by codifying its knowledge and process, and leveraging that intellectual capital into software that enables both Anixter and its customers to manage orders more effectively and efficiently.

Today Anixter doesn't consider itself as merely a distributor. Anixter sees itself as a partner to its customers and suppliers, adding value to the distribution process through its cost-reducing supply chain services, large inventory, logistics network and presence in 193 cities in 40 countries. From the highest levels of corporate management on down and throughout the company, Anixter believes in using technology — and software development — to create competitive advantage.

However, according to Anixter's CIO, David Lemme, the quest to create competitive advantage doesn't always mean chasing the latest and greatest in technology. Instead, Anixter uses well-established technologies — by modernizing existing assets with world-class software development — to create business advantage. Anixter will continue to emphasize its investment in software development as it continues its business and IT transformation.

Continuous Transformation

The term "continuous transformation" is often linked to emerging business models known as "on demand," "agile enterprise" and "adaptive enterprise." These models are becoming more and more widely used to describe organizations that can anticipate and

react rapidly to market changes while continuing to improve. Such enterprises are architected to benefit from the business promise of technology by linking business and IT requirements. Their strategies vary, because they're uniquely tailored to an enterprise's business needs and technology infrastructure.

But they share the same goal: an integrated business and technology environment in which an enterprise can transform and grow based on its own distinctive competencies — rather than change based on the limits of its own technologies and processes, or what's forced on it by market or industry shifts.

The "on demand" enterprise both requires and enables continuous business transformation and the continuous iteration of the systems that enable it. A typical strategy includes a series of linked incremental changes and improvements in business processes and technologies. These changes rarely take place at once. Instead, they become part of a long-term competitive strategy that targets where the business should be and how it will get there — allowing the enterprise to adjust to change in manageable amounts. In addition, on demand strategy allows for technology to adapt and adjust — and for expenditures to increase only incrementally — as business needs change.

Figure 1: Continuous Transformation
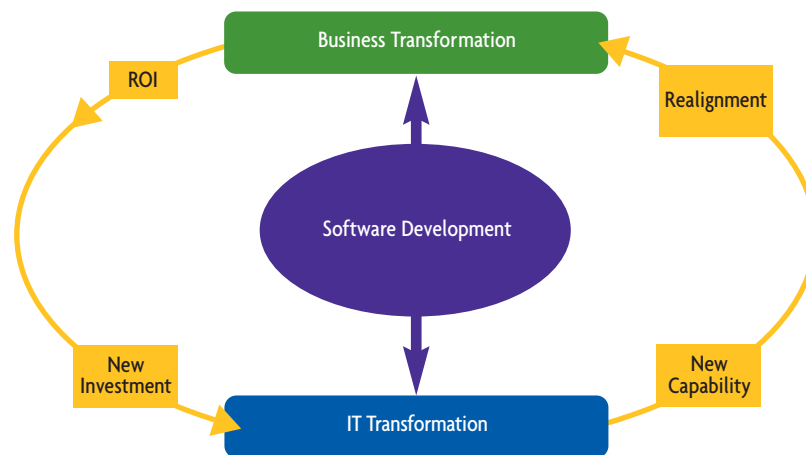
Source: Saugatuck Technology Inc.

During this process of continuous transformation (see Figure 1), return on investment (ROI) from business transformation funds new investment in IT. As IT transforms itself, often through technology transfer or on-site training — adding to and extending its distinctive competency — this enhanced software development capability allows the enterprise to realign its business processes and to compete more effectively. This business transformation generates still more return on investment, and the cycle of continuous business and IT transformation continues.

But without strong software development capability, the cycle soon falls apart as processes, systems and data change and become more unmanageably complex over time. Investments in business and technology improvement without integrated software development generate little, if any, return. New business capabilities either don't

come, or aren't delivered fast enough. Furthermore, the enterprise begins to stagnate as it fails to find new ways to transform the business. The Software development process is, therefore, the linchpin of ongoing business transformation.

Continuous Iteration

Sometimes that ongoing transformation is driven by building new software, but other times software development has to follow the lead of the business and manage an iterative process of continuous improvement — extending, modernizing and integrating acquired systems. In the case of Flowserve, software development made it possible to keep the enterprise functioning coherently during a period of intensive mergers-and-acquisition activity, by integrating and extending many otherwise incompatible off-the-shelf and homegrown ERP systems.

Flowserve Corporation — based in Irving, Texas with 14,000 employees globally — is the world's largest manufacturer of industrial flow products and a leading provider of related repair and replacement services. Flowserve's three operating divisions manufacture and sell its three product lines — pumps, valves and seals — and operate in 56 countries worldwide. Since 2000, Flowserve has nearly doubled its annual revenue to $2.25 billion, with much of that growth coming from acquisitions.

Unfortunately for Flowserve, this acquisition strategy has resulted in vastly-increased complexity in processes, systems and technology. The Pumps division alone acquired thirty-eight ERP manufacturing and resource management systems — from SAP, Baan, and Symix, as well as some homegrown software — all of which were required to interoperate and exchange data. The key to managing this challenge was to focus on software development -- leveraging tools, skills and technology to connect the many acquired businesses and their heterogeneous IT assets.

Although Flowserve considered standardizing on a single ERP system, an internal analysis showed that integrating its many acquired ERP systems through what's known as a middleware platform — and extending and modernizing them to meet new requirements — would cost less than replacing the established ERP systems. It would also enable the company to codify its operations in a more standardized manner, improving information availability and system reliability. This software development strategy also gave Flowserve the flexibility and capability to integrate new operations as they were acquired and to address other future challenges quickly.

Flowserve and its services partner SBI have worked together since 2000 extending, modernizing and integrating systems. Flowserve's vision was to use a common set of development tools and e-business frameworks — built on WebSphere and the IBM Software Development Platform — integrating and extending its back-office systems and modernizing those systems through Web front-ends and portals. Through investments in training, common toolsets, and software languages (such as JavaTM), Flowserve and SBI successfully implemented four Internet storefronts and a distributor network, intranets that help lines of business work together and share information, and extranets that facilitate the manufacture and sale of its largely commodity products through differentiated, high-value customer service.

Flowserve streamlined and automated many related processes, effectively eliminating the need for manual orders. In addition, customers and distributors now have instant access to Flowserve's back-end databases, which allows them to:

• Search product catalogs electronically

• Review the status of ongoing projects

• View engineering diagrams

• Download technical manuals

• Place orders

• Perform other functions associated with purchasing products and services

So far, results have included:

• 100% return on investment in just one year

• Reduced order-processing time by 50%

• Improved margins stemming from better pricing controls

• Lower transaction costs from extending internal systems capabilities outward to customers, distributors and markets

• $100 million in revenue generated by Web solutions and e-marketplaces in the first year

Flowserve plans to continue its strategic evolution by incorporating suppliers into its on demand reach, using point-to-point supplier platforms for bids and requests for quotes (RFQs). The key to it all has been an ongoing process of software development — extending, modernizing and integrating systems through building software on a platform of "off the shelf" and other acquired solutions.

Optimizing the Enterprise

Whether or not they realize it, almost all firms are on the path to becoming "on demand" businesses. The ability to operate, to respond, to grow, and to improve, "on demand," is the very achievable state of sustainable competitive advantage built on core company knowledge and capability to manage and execute.

Figure 2 below illustrates the strategic interdependency between business and IT transformation, how this transformation results in an "on demand" enterprise, and why it cannot occur without the distinctive competency of software development.

Business transformation requires moving from optimizing individual business processes to optimizing the enterprise's value network, creating an end-to-end experience for its buyers and its suppliers. The IT transformation requires a similar transition — from platform solutions to a dynamic capability for managing the portfolio of IT assets.

Figure 2: Interdependency of Business and IT Transformation
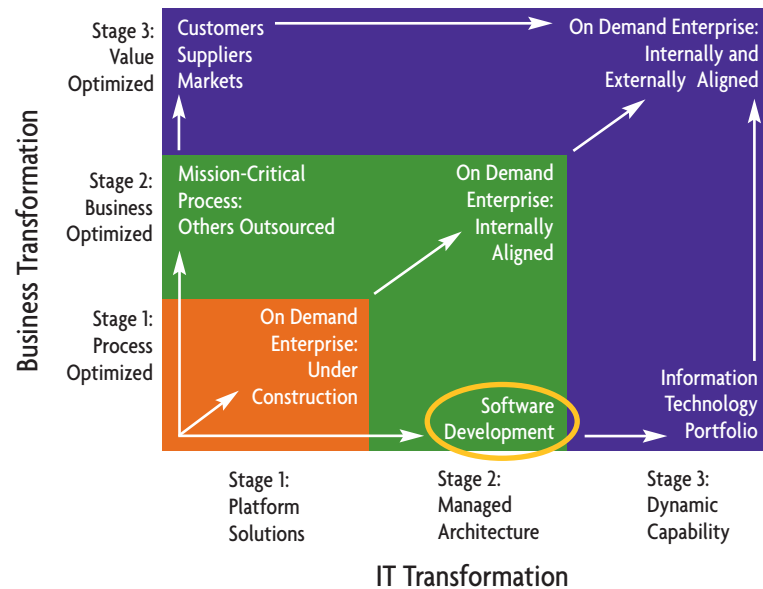
Source: IBM adapted by Saugatuck Technology Inc.

Business Transformation

Business transformation occurs in three stages: process optimization, business optimization and value optimization.

Stage 1: Process Optimization — First, an enterprise must examine how and where business processes can save money (for example, removing duplicate efforts, or sharing steps or technologies across processes). This ROI can help fund further enhancements. Although this step improves efficiency, costs may not drop significantly. To really start reducing costs, the enterprise needs to move to the next step —business optimization.

Stage 2: Business Optimization — In this step, processes not part of the core business are removed, or outsourced, to firms specializing in this area (for example, human resources management). Remaining processes should be assessed for how well they can be integrated into one set of business operations that can be managed flexibly.

Stage 3: Value Optimization — Once an enterprise has integrated and optimized its processes, it finds itself better positioned to reach out to partners, suppliers and customers, and link its processes with theirs.

IT Transformation

IT transformation also occurs in three stages: platform solutions, managed architecture and dynamic capability.

Stage 1: Platform Solutions — Implementing and upgrading platform solutions is one of the first steps that many businesses take when trying to address IT transformation. Because most of these solutions have grown and changed, they need to be re-examined and likely re-architected. Some are obsolete or redundant, and will be outsourced or replaced.

Stage 2: Managed Architecture — Once the various point solutions have been made as efficient as possible, an enterprise needs to assess which parts of the IT architecture are core to its business processes. These can usually be integrated through a series of improvements, enhancements and new technology investments; others may be outsourced. Software development capability will be essential in enabling the integration, modernization and extension of the IT architecture. This new managed architecture forms the foundation for more responsive and cost-efficient use of IT resources.

Stage 3: Dynamic Capability — Maintaining competitive advantage is a continuous process of responding to customer requirements, supplier relationships and market competition. This final stage of IT sophistication allows the business to link processes with partners using a secure, reliable, dynamic and affordable IT portfolio. A "poised and ready" software development capability combined with a managed architecture enables the IT portfolio to respond to any competitive challenge to the business.

"Poised and Ready" through Software Development

Another way in which software development can make itself felt is through extending existing business functionality of its IT portfolio through implementing new custom code.

Acuity, a Wisconsin-based regional insurance company serving commercial and personal customers through a network of independent agents in 11 Midwestern states, writes more than $600 million in premiums and has more than $1 trillion dollars in total assets. From 1999 through 2003, written premiums and income per employee more than doubled — but not at the expense of customer service and efficiency, which in many businesses easily slip in the face of growth of that magnitude. Incredibly, 95 percent of customers and 99 percent of agents rated Acuity's service "very good" or "excellent."

At Acuity, there is a relentless striving after ways in which its software development capability can make a competitive difference. However, not only does software development make a competitive difference — it puts Acuity way out ahead of the pack.

Acuity's CEO — formerly the company's CIO — understands the value of building software and modernizing systems already developed, rather than buying and extending off-the-shelf systems. Consequently, software development sits at the core of Acuity's business strategy, which is "to take the friction out of the insurance equation," according to Neal Ruffalo, Acuity's current CIO. "The role of IT at Acuity is to build world-class applications that make it easy to do business with us. The flexible systems that we build allow us to change whenever business and customer needs dictate, — and to do it faster and better than the competition."

Regardless of the technology or the channel, Acuity continually evaluates how it can change the business for the better through software development. A good example of this is Acuity's solution for improving access and boosting productivity for its independent agents by modernizing the functionality, and especially the reach, of its agency system.

Acuity engaged with nVISIA, a Chicago-based integrator, to replace its PC-based agency system, modernizing its functionality, by building an Web-accessible, Internet-based rating engine that would allow agents to obtain quotes without having to leave their own agency management system. nVISIA brought in JavaTM skills and object-oriented

design capabilities, and transferred those skills to Acuity developers. Through its software development capability, Acuity was able to provide its independent agents the Web-accessible functionality to submit new business and manage it online without any duplication of effort. Acuity now processes 98 percent of new personal insurance policies within 24 hours and 70 percent of commercial insurance policies in less than 10 days — both far ahead of industry averages.

Reuse of legacy systems and Java™ frameworks by its software developers is now integral to Acuity's IT culture. This ability to leverage legacy systems — by modernizing their capability through more current technology — enables Acuity to respond more quickly than its competition and continue to reap returns from years of investments in building systems. Acuity has a "poised and ready" software development capability that can move into new areas of business, make its independent agents more productive and ensure its superior customer service.

Since then, Acuity developers have continued to modernize Acuity's legacy systems through the Internet, to its agents and customers. The company also has extended its links (like the one developed to the rating engine) to other endpoints. Many of these functions aren't what one would normally expect an insurer to link its systems to — for example, a glass company, an auto repair shop, or a state or other regulatory agency. But to Acuity, reaching out to other parts of its value network by building new software and modernizing its functionality, goes back to the mission of IT at Acuity — continually making it easier to do business with Acuity.

Benefits from Acuity's continued strategic software development have included:

• $200 million increase in premiums in two years

• 15 percent higher profitability than property-casualty national average by using technology to lower administrative costs and accelerate sales cycle

• 40 percent increase in average premium per agency in most recent fiscal year

• 46 percent higher productivity per employee than national average

• Increased agent satisfaction and productivity

• Ability to develop new applications in days, as opposed to months

• A resilient, easy-to-maintain infrastructure

And like any on demand enterprise, Acuity has no intention of resting. Next in Acuity's ongoing software development is enhancing its real-time policy underwriting and processing system to incorporate expert systems technology. It is this relentless striving after competitive advantage by utilizing its essential distinctive competency — software development — that gives Acuity its "poised and ready" competitive edge.

The Software Development Process: Sustaining Competitive Advantage

Developing and sustaining competitive advantage requires a continuous response to customer requirements, supplier relationships and market competition. A strategic software development process makes it possible for the enterprise to do this. Managing the IT portfolio — internally and externally aligning it, re-architecting it to enable dynamic market response — puts the enterprise on the path to competing effectively and sustaining its "poised and ready" competitive edge. However, unless the

enterprise has a real commitment to world-class software development, that goal will never become a reality.

The payoff comes from investing strategically in the software development process:

• To capture and evolve, iteratively, the core value propositions of the enterprise

• To transform the enterprise into a more responsive and competitive entity

• To sustain competitive advantage by continuously adapting to marketplace conditions.

As we have seen at Anixter, modernizing its legacy ordering system helped put the company out in front of its competitors by using new software development technologies to meet their key competitive challenge: making it easy for customers to do business with Anixter. At Flowserve, the software development process kept the enterprise functioning competitively during intensive mergers-and-acquisition activity, by extending, modernizing and integrating many otherwise incompatible systems on a middleware foundation that enables Flowserve to integrate new operations and to address future challenges quickly. And, regardless of the technology or the channel, Acuity has continuously evaluated how it can change the business for the better through the software development process: building and modernizing its business functionality by enhancing the IT portfolio. This proactive software development posture has enabled Acuity to respond more quickly than its competition and to continue to reap returns from many years of investment in the software development process.

What all three companies have in common, despite their different industries and their different competitive challenges, is one thing — a commitment to software development as a strategic business process. Software development represents the essential distinctive competency: a strategic business process that enables other business processes to respond immediately to market forces, adapt to competition, and manage the process of continuous business transformation.

So, while information technology by itself may offer no defensible competitive advantage, it does create the opportunity for competitive advantage. The codification and standardization of business knowledge and processes enable continuous business transformation without dramatic, resource-draining changes. Building business transformation around software development enables firms to "shift on the fly," managing growth and change through a constant series of small corrections, adapting to — and anticipating — competitive activity, and sustaining competitive advantage, as part of everyday operations. A "poised and ready" software development capability makes these responses immediate and continuous — realigning business capabilities to meet any market challenge.