BEYOND THE CHASM

PROFITING FROM THE NEXT TECHNOLOGY WAVE

BY JOHN SOPER

Will this post-boom period of technology consolidation mean declining creativity, profit and growth?

Not at all. The combined effects of a commodity infrastructure and application integration will bring dramatic growth and sustainable value – *if we can muster the imagination and business creativity it will require*.

THE NUTSHELL

In this post boom-and-bust period, many have forecast a slow growth era characterized by industry reorganization. In fact, we are entering an important new period in computing technology -- but certainly not one of slow growth. It will be an exciting and prosperous time. However, the dynamics of this decade will look much different than its predecessors – for reasons that go far beyond cyclical economics.

Over the last two decades we climbed a very steep learning curve. We went past the point of no return in the commoditization of the infrastructure. And, we learned that we could link systems and people together and make them communicate in useful ways. Now it's time to get to work!

The Reason: These two key trends have come together – infrastructure commoditization and application integration – to create a significant new market dynamic. Together they will produce a market force much more powerful than either trend alone. This will produce huge opportunities for market growth and sustainable profit. *However, it will require imaginative new business strategies to make this a reality*.

PUTTING IT INTO PRACTICE

The dynamics of these trends are discussed along with their impact on four areas of market development. Practical guidelines to exploit these trends are presented:

- **Mining the Infrastructure:** The New Cost Value Gap
- **Escaping the Alliance Trap:** The New Flexible Alliance Model
- **Creating New Markets:** The Democratization of Technology
- **Leveraging Business Processes:** The New Fusion of Process and Technology

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The enterprise technology rules are changing. The technology industry has been through a boom and bust cycle without parallel for seventy years. *This was not your father's business cycle.*

But neither is it unprecedented. In fact, major technology booms – e.g., railroads, automobiles, electricity – all entered a period of decline and consolidation, and then dramatic new growth. The industry vendors who understand this dynamic will profit greatly.

Few dispute that we are entering a period of industry consolidation. But many focus on the negative factors -- such as low margin commoditization, failures in application integration, market saturation and the attendant diminishing returns on investment -- as reasons why this will be a slow growth period.

This is only part of the picture, and misses the more important dynamics coming into play. Certainly this period will be marked by organizational consolidation efforts within the industry. However, unlike the more pessimistic outlooks, we believe this period will be characterized by the successful integration of enterprise applications, at high margins, riding on a wave of commodity based infrastructure into current and new markets, bringing significant growth.

This period will also be characterized more by the consolidation and solidification of enterprise technology, than the innovation of new paradigms of disruptive technological innovation, characteristic of the last two decades. The main challenge now is to make the technology automation promised in the last decade actually work and deliver value. The *real* underlying value proposition of the boom years was very real and very significant. Implementing it in the current decade *is* the "Next Big Thing."

Two caveats are in order, however. (1) While there is little mention of disruptive technologies here, we do believe the technologies now in development (e.g., gigabit Internet, nanotechnology, new client form factors) will in fact disrupt the enterprise technology market again by the end of this decade. Then we enter a new phase, and all bets are off. (2) The focus here is on enterprise as opposed to consumer technology markets. Key elements of the consumer markets are still forming in a pre-consolidation phase.

The Key Drivers. The two key drivers of this period are infrastructure commoditization and application integration. They are just now coming into focus. The first is becoming a clear reality at the systems level; the latter has found a model that works based on Internet and Web Services technologies.

Further, these *twin drivers are highly interactive*. The commodity infrastructure provides the platform for application integration to develop and thrive on; and, application integration provides the impetus for a continued build-out of infrastructure.

The Business Challenges. It will require not only technology innovation to make this a reality, but new and highly creative business and organizational models.

- We will need to determine how to monetize the gap between infrastructure costs and integration value.
- New industry organization, including new models of business alliances will need to take hold.
- We will need to find creative market opportunities in downscale markets and new geographies.
- More holistic approach to the integration of technology and business processes will have to evolve.

This article will examine the key drivers and their impact on this period of change, and describe the

John Soper *(John.Soper@NPMarketing.com) is the managing director of* ***New Paradigms Marketing Group*** *(www.NPMarketing.com), a market development consulting practice focusing on delivering market growth strategies and implementation services to technology companies.*

key new imperatives of market development for those who want to profit from what we think is the is Next Wave of enterprise technology.

What Has Changed: Commoditization and Integration

While industry watchers were busy watching the bubble burst, many missed the key twin structural drivers forming the underpinnings of the Next Wave.

- **The Infrastructure Commoditized.** Prophesized for over a decade, much of the lower spectrum of the technology value chain did in fact enter a significant commoditization phase. The change was so dramatic that it gave Harvard Business Review authors pause to challenge the industry with the provocative question: "Does IT Matter?" Is it any different than electricity? The deluge of rejoinders left many to conclude that this was overstated, and that indeed strategic value was found at the upper reaches of the value chain.

  But no one doubts that the lower end of the value chain (systems software and hardware components) is in a radical shift towards commoditization. The growing acceptance of Linux in mid-range servers is evidence of its continuing growth.

  It is notable that Apple Computer, Sun Microsystems, and Hewlett-Packard are the only remaining US infrastructure companies that are still significantly vertically integrated – and all are in the process of changing models. IBM, the other historically integrated company, has changed its model, and is now listed on the NYSE as a service company.

- **Integration and Loose Coupling Unleashed**. The upper layers of the technology value chain are now in play, from middleware to point solution application and add-on software. It is here that we believe that developments are in progress that will deliver on the promise of the initial, pre-bust, phases of the Internet. Through standards based protocols (e.g., XML, SOAP, WSDL) layered on HTTP and TCP/IP protocols – what has come to be collectively called Web Services -- the ability to integrate systems in a modular, loosely coupled fashion is now possible.

  With key vendors (IBM, Microsoft, Sun Microsystems, BEA and a host of others) this development is now beginning a solidification phase – and changing the architectural design of enterprise computing. The network value effect of the last decade will continue at an explosive rate.

This joint effect of commoditization and integration is a powerful new market force. Managing technology businesses to extract new value from this trend defines the Next Wave.

The Interaction Effect. The effects of commoditization and integration are recognized by many. Less appreciated is the tremendous market power of the *interaction* of these two forces.

Commoditization provides the ability to greatly expand the platform on which integration rests. Integration provides the glue that extracts exponential value from this platform. Commoditization and integration separately have limited value. Together they offer the opportunity for explosive growth.

Managing technology business to extract value from their joint effects defines the Next Wave.

The New Imperatives of Value Extraction. The result is a dramatic new opportunity to develop markets responsive to these forces. To make this a reality requires new ways of thinking about market development. The balance of this article will discuss four key dynamics which we think are imperatives for extracting value from this Next Wave:

1. **Mining the Infrastructure:** The New Cost Value Gap
2. **The New Message:** Selling To the Infrastructure Context
3. **Escaping the Alliance Trap:** The New Flexible Alliance Model
4. **Leveraging Business Processes**: The New Fusion of Process and Technology

Mining the Infrastructure: The New Cost-Value Gap

Enterprises at the top of the market pyramid (Fortune 1000, Global 3000) are now saturated with enterprise automation technology. However, while introducing significant operating efficiencies, *this technology is not yet close to yielding the business value of which it is capable.*

About one-tenth of the US economy (GDP) is spent on IT products and services. That totals about $1T, and growing, with a significant portion spent on commodity infrastructure, including PCs, WinTel and LinTel servers, network components, as well as standard networking software (TCP/IP, HTTP, XML) and even the Linux OS kernel.

The result is that many targets of leveragable value are open to those vendors operating above the commodity level. *There is gold to be mined in the infrastructure.*

Very simply, the growing gap between cost and value, account for this highly leveragable opportunity to extract unprecedented value (See Figure 1):

- **Small Incremental Infrastructure Costs.** Adding new business functions places a relatively small cost burden on the customer. Much of the infrastructure is in place and a sunk cost, with much of the additional required infrastructure purchases available at low commodity prices, relative to value.

- **High Business Value.** The value that can be derived from incremental functionality added to current infrastructure has a non-linear multiplier (interaction) effect. The old, pre-network, model of layering software on isolated hardware systems had a relatively simple, and comparatively small, additive effect on system's value. The current network model, however, allows new software components which leverage the network to increase business value exponentially.

  The latent business value of an enterprise network is measured not only by the number of nodes that can communicate, but also by the number of data assets that can be interconnected. For example, the financial services industry has been able to design and sell new derivative products by combining data assets derived from customer portfolios, real time market

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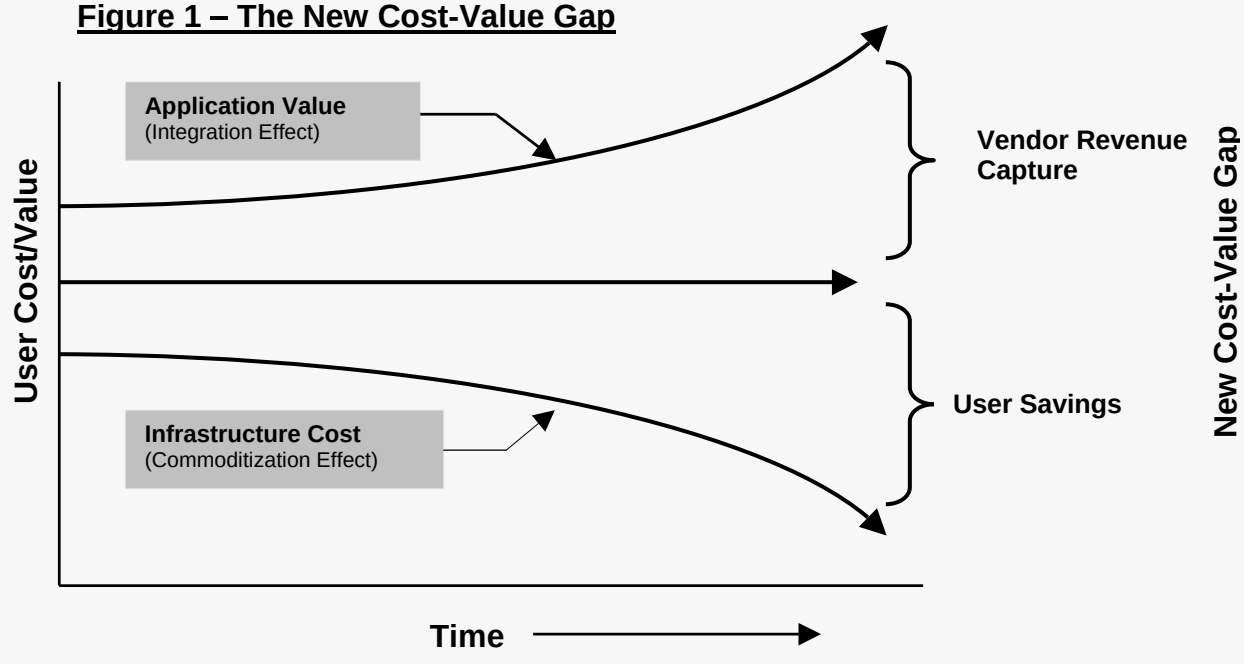
Figure 1 – The New Cost-Value Gap



data, and company financial analytics. This was no simple task, and previously impossible.

The Gap and Leverage. As cost decreases and latent business value increases dramatically, the difference between the two leaves an ever-widening gap from which to extract a price at high margins. This opportunity is open to those vendors who can extract value by combining data assets in new middleware and end-applications

Not only is the network effect of data assets highly leveragable; on the revenue side it is unbounded. Businesses have, and still can achieve significant bottom line advantage by utilizing intra- and inter-enterprise networks to increase operational efficiency. Dell, Wal-Mart and others are well known cases in point. However, no matter how much the technology costs are reduced by commoditizing forces, the law of diminishing returns limits opportunity as cost reduction drives to zero. However, on the revenue side of the equation, the ability to enhance and build new products – and even new businesses (e.g., eBay) – and therefore create new revenue, is unbounded.

For example, the banking industry has gained enormously by the ability to handle twenty-five fold as many transactions with no increase in personnel costs compared to a decade ago. But, as significant as this dramatic increase in operational efficiency is, banks are now turning their attention to attracting new customers with *new products* made possible by the network effect of interconnecting disparate financial and customer profile data assets.

Mining the Gap with a New Message. In order to take advantage of this new Cost-Value Gap, industry vendors need to create new messages, based on a new way of thinking about the context of the infrastructure they are selling into.

That context did not exist a decade ago, became only slowly understood in the subsequent years, and finally eroded due to unsustainable business models, and the boom and crash that ensued.

Consider the case of Netscape. There was little established context to sell to. A marketing message based on a new architecture of thin clients and interconnected application servers would not have been well understood, much less the broader values of a frictionless supply chains, or full information economic behavior – assuming Netscape itself could have articulated it. Subsequently, the message was hyped, mismanaged and oversold. Now, although that particular company does not exist, the value message is both real and comprehendible.

The same was true of Java. Customers could comprehend the message that it was a purer, safer objected oriented programming language; and perhaps they could begin to understand that it enabled Internet messaging application development. But the concept of an Internet based application server for loosely coupled Web Services was not ready for prime time. With the release of the most recent Java J2EE, the message, and the value, is finally becoming clear.

> Much of the value lies in the context of the infrastructure. It is incumbent on the seller to explain how their new products leverage that context.

Exacerbating the situation is the fact that following the crash, technology vendors largely went into reactive mode, *and seemed to have lost their imagination,* if not their voice.

Now buyers are listening and are able to comprehend this new world of value. They are asking that it be well defined with a provable business cases. The challenge for the seller is to not only to develop a well-articulated message of functionality and value, but also to link it clearly to the context of the evolving technology environment.

This is not easy, but failing to o sell the full value of your product in its context, is to undersell your product, its value and your profit.

Example: RFIDs (radio frequency identification devices) are being marketed largely as asset management devices. Descriptions center around features (e.g., frequency range, storage capacity) and functions (e.g., inventory management, asset flow control). Less than compelling references are made to database integration. This may suffice for initial sales to an asset control manager. But it misses the context of the infrastructure it can leverage, and vastly undervalues the product. *Much greater added value is found by integrating RFID*

capabilities into the enterprise's broader systems, including marketing systems for sales analysis, supply chain systems for end-point analysis and control, and financial systems for real time asset analysis and. product pricing management. Recently, for example, the Department of Defense entered into an RFID procurement that linked to heat sensors at distribution points, and sends alerts based on modified real time shelf life estimates. The list goes on.

The leverage is in the infrastructure; the product is only the enabler. The challenge is to sell it that way.

Imperative # 1:

Sell to the Context. The gap growing between commodity costs for infrastructure and the returns available from the network effect of data asset integration has opened an unparalleled opportunity for vendors to seize. It is critical to develop a sales message that is closely linked to the gold that lies in the information infrastructure.

Escaping the Alliance Trap: The New Best of Breed Model

Business alliance development is also undergoing a game changing transformation. This is particularly true in the upper rungs of the technology value chain – the area of technology that is now in play.

The High Cost of Doing Business. Business alliances are necessary to develop and market complete products, especially as the vertical integration of vendors declines. However, previous alliance formation was constrained by the technology requirements of tight coupling between layers. Even with abstraction layers (e.g., hardware abstraction layer between an OS and hardware components), and open APIs, system interfaces needed to be carefully designed, developed and tested, at great time and expense. The age of Open Systems had not yet delivered on its promise.

The result was a system of interconnected vendors paying a high price for development and maintenance of technical and business relations – and passing the cost on the their customers.

There were also indirect costs. The system was rigid. With a high cost of entry, the customer was denied broader, fuller featured and robust products. Further, the vendors with the strongest choke holds on the value chain, could enhance their power by exercising a strong influence on the new entrants in the market.

The result of the old model was a rigid, cumbersome and costly Alliance Trap, which benefited few and over burdened many (See Figure 2).

The New Alliance Environment. The drivers of commoditization and integration that mark this period are also significantly changing the model of business alliance development – both between vendors and with customers.

- **Lower Cost of Entry.** A new entrant with an auxiliary add-on product in a market where customers are adopting loosely coupled architectures (usually around Web Services protocols) will find a lower cost to entering an alliance with the core (e.g., a CRM or ERP vendor) application vendors driving the market.

- **More Flexible Product Development.** The converse is also true: The core application vendor will have lower cost and more flexibility in adding auxiliary products, though they will find their control lessened (their alliances can, and often will, strike deals with the core vendors competitors.)

- **Increased Customer ROI.** With the cost savings passed on to customers, and the increase in value, the customer's ROI is increased.

- **New Industry Development Incentives.** There is an indirect effect of this alliance model: There are additional new incentives to the development of new application technologies, with

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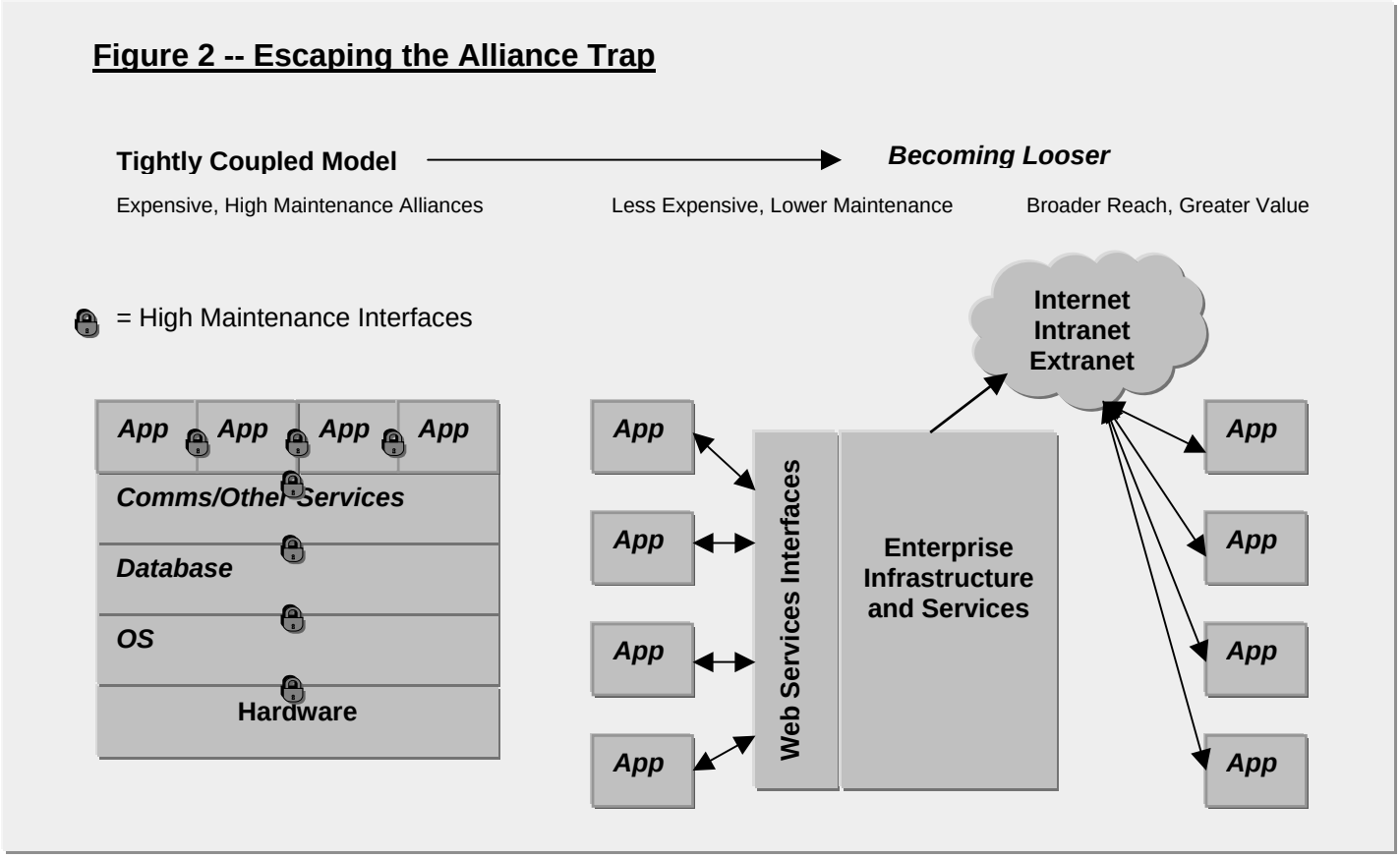
the knowledge that the pathway to the market has fewer barriers.

It has been said, by a CEO with a vested interest in tight product integration, "best of breed is for dogs." His refers to the belief that customers want one stop shopping, and one point of contact to manage quality. It is true that tight integration is the order of the day at the lower, systems, end of the value chain, and some middleware components, such as data management. Here tight coupling between systems is still required. However, we do not believe that customers will give up the value of broader product functions, at lower cost, while ceding more control to their core vendors. They will find other means to manage quality.

Vendors of add-on products will clearly find new advantage in this alliance model and should strive to leverage its value. Core vendors will find that they have more to gain by wider, more flexible offerings than they have to lose from any diminution of control (See Figure 2.)

Example: There are two key competitors in the higher education market for ERP and CRM type software: SCT and Datatel. Both have lived through this alliance model restructuring. Previously, a great deal of their efforts were focused on integration with their platforms (hardware, OS and database) partners, and a few peripheral value-add partners. *This approach has now been stood on its head.* Most of the focus is on their core value, with little mention of platform, and a great deal of attention to added value vendors products and services, including financial transaction processing, class scheduling, higher education specific supply chain management and the like. Many of these are loosely integrated on campus intranets, or over the Internet.

Figure 2 -- Escaping the Alliance Trap



Imperative #2

Avoid the Alliance Trap. Application vendors should avoid the expense and rigidity of an old alliance model, in favor of the freedom and flexibility of a low technology-spend, loosely coupled model. Re-thinking their approach to alliances will benefit their customers, and their own bottom line.

Creating New Markets: The Democratization of Technology

The new market dynamics also facilitate down market moves to small-to-medium enterprise market (SME) sectors, as well as new market development in under-developed geographies. This new room for growth is a very exciting dimension of the Next Wave.

Commoditization and Downscale Market Entry. A key characteristic of these sectors is their low capital and operating expense base. A low capital base in the past has foreclosed many opportunities to procure the necessary infrastructure equipment. But as, or more, significant is the low operating margin base. This significantly limits a small company's ability march up the learning curve which enterprise automation requires, much less to maintain, service and support in-house systems – the intangible, but critically inhibiting, factors that go into a TCO analysis.

The commoditization of the infrastructure has solved much of the initial investment problem. The range of vendors who will make basic services (e.g., web hosting, messaging, storage), as well is pure compute cycles, available on a fee for service basis also reduces capital-intensive investment.

However, this does not solve the more formidable problem – designing, installing, managing and servicing an enterprise system. There are only two ways to get around this time drain -- make the systems less complex and more robust, or pay someone with the expertise to do it.

The Appliance Model. One mode of simplicity comes with making computer systems and applications into appliances – solutions in a box. There are two ways to do this: The first is to physically limit the functionality of a computing system, such as Internet hosting. The idea is that you plug and go, the same way you deal with your kitchen appliances. This in fact has gained some currency. There are products marketed as computer appliances, such as web site hosting appliances, security appliances, storage appliances and the like. There are limits to this approach however. It does not optimize the use of computing resources. Further the appliances themselves become subsystems which require management.

The other alternative – pay someone else to do it – has two solutions: The first involves sourcing the problem out to resellers (VARs) and/or integrators (SIs). The second approach is to hide the application management all together. That is, to offer it as a thin client Internet service – a *virtual* appliance. This is the ASP (Application Service Provider) model which enjoyed some success, and a great deal of hype, in the last decade, and is now finding a revival. Of course, ASPs themselves require management – a problem that is partially handled by aggregators such as jamcracker. ASPs have the additional advantage of financing the capital expense items.

The solutions that will be developed to attack these markets will likely be hybrids of all these models: simpler appliance-like computing, with assistance of VARSs and SIs, and the use of ASPs for at least many non-core functions.

However this sorts itself out, it is important to note that this is yet another trend – driven by commoditization and integration – that will find its answer in business models rather than disruptive new technologies. This is a significant characteristic of the current period. Consolidating the advances in technologies through creative business strategies will lead the expansion of technology into significant new markets.

One industry commentator summarized the developments as the "end of software." Perhaps it is the end of software as we knew it, but it is the beginning of a new process of democratizing technology. This will be one of the great levelers that the Internet promised.

Example: Salesforce.com entered the market as a pure ASP play. Positioned as a sales automation tool with functions such as lead database management, sales campaign implementation, forecasting and other analytics, this is based on a thin client Internet hosted service. Its key differentiator is fi-

nancial: Since the customer does not have to bear the overheads of installation, service and maintenance, and replaces a software license fee with a monthly service charge, they claim to have significantly lower startup and ongoing costs. This positioning is most compelling to the smaller companies who do not have a broad capital and operating expense base on which to amortize these costs.

Equally important is the effect commoditization and integration had on opening up a market opportunity large enough for Salesforce.com itself to amortize its own costs. This is one example of the economics driving the Next Wave.

Imperative #3

Broaden Your Market Base*:* Use the new economics of technology to develop business models which provide access to new markets*.*

Leveraging Business Processes: The New Fusion of Process and Technology

In the Next Wave, technology will not be merely an adjunct to business management, augmenting efficiency in islands of automation; but rather it will become increasingly fused with the business processes itself. It is not just a tool for business processes, but a part of the process itself.

Technology will not be merely an adjunct to business management, augmenting efficiency in islands of automation; but rather it will become increasingly fused with the business process itself.

Effective Business Process Reengineering (BPR) has been an elusive holy grail of information technology, and is now becoming a reality in new guises. Confirmation of this can be easily found by calling your bank or telephone company with only a slightly complex process question. The most illuminating part of the response will be found not in the fact that the person on the other end is reading an answer about procedures from a computer monitor, but rather that *he or she does not perceive the difference between the two*. So tightly welded are an enterprises computer systems and human processes, that, especially to those born into the Information Age "the computer is the process."
The fact that this fusion of human and technological processes is beginning to take place is an opportunity; that its dynamics are not well understood or engineered is a challenge.

Limits of the Old Process Models. The beginnings of human-technological process integration began with basic email, scheduling and the like on mainframe and minicomputer systems, and became more prevalent with PC, server and LAN technologies. The subsequent advent of collaborative technologies in intra-enterprise computing came with a growing sophistication in backend applications based on multi-point communications, multi-phase, and highly stateful engineering, together with human factors engineering of intuitive front ends. With these advances collaborative sales forecasting, budgeting, manufacturing planning and similar systems became commonplace in larger, IT sophisticated, enterprises.

Monolithic Systems Too Limiting. However, this technology architecture tended to be built on monolithic, tightly coupled systems, which could not sustain the next phase -- inter-enterprise (a.k.a., B2B and Extranets) business process automation. *The technology that would enable this phase required a qualitative, if not a quantum, leap forward.* Early attempts which used proprietary systems such as electronic data interchange (EDI) were highly useful within their domains; but they were limited by their nature. Two issues arose:

- **Limited Market Reach**. Inter-enterprise business systems are limited by the number of enterprises that can participate. A supply chain management system that could only communicate with upper tier channel partners, for example, would similarly limit the vendor's market reach down-market.

  Here, commoditization is providing a solution. Systems capable of supporting complex business processes are within the reach of an increasingly large number of vendors. For example, 25% of US distributors under $25M in

revenue are invested in supply chain technologies today, and commodity based systems are quickly opening up this bottom end of the pyramid to Web based technologies.

- **Unmanageable Networks**. The shear number of business enterprises that will become available due to the economics of commoditization, complicates the problem in other ways. The number of connection points is difficult to manage, and the fact that they are often based on heterogeneous systems would make the problem unsolvable under a monolithic, proprietary and tightly coupled architecture. Web Services with its open standards and loosely coupled design focus, holds the promise for the answer to this problem. Many proofs of concept, and numerous running production systems bear this out.

Challenges of the New Model. The commoditization and integration drivers, in addition to enabling a platform for automation build-out, present vendors with critical new challenges and opportunities. The rigidity of monolithic, cookie cutter systems tends to force processes to adapt to the system. Like assembly lines in an earlier age, the focus was on efficiency of the system with less focus of the people in it. Flexible systems offer more opportunity to take a broader systems view of the fusion of the human and technological systems. For example:

- As automated systems become more complex, the most effective role for human interaction will become more passive -- i.e., more management-by-exception based – and more difficult to develop.

- Further, as systems become more intelligent over time, the role of human intervention becomes more dynamic – requiring more sophisticated human factors design to leverage the human side of automation.

- Finally, as systems become more interlinked across enterprises, collaborative human processes need to be developed to resolved cross-enterprise issues with minimal efficiency impact.

Each of these challenges however, holds the promise for significant opportunity, yielding human interfaces that are both more efficient and effective. The increasing symbiosis of human and technological systems has now taken center stage. The vendors with the holistic system design capabilities and professional services abilities – through their own offers or those of partners -- will give them an advantage,

Example: Dell has developed a core competency in management of its supply chain, from end-customers back through several layers of suppliers. With time-to-ship and inventory reduction being two of the critical success factors in Dell's business model, highly distributed, Web Services based systems became a critical component of that success. The rapidity with which an order could generate shipments, modify inventory requirements in real time, develop success metrics and highlight problems for management intervention, became a showcase for the industry. *What has made this model a success however, is not the pure application of technology, but the fusion of that technology with a complex and expanded network of people.*

Imperative #4

Leverage the Value of the New Technological-Human Process Fusions. To profit from the value that commoditization and Web Services has provided, requires a holistic approach to systems development – one that recognizes the value of adapting technological processes to human processes, and vice-versa. The vendors who work closely with their customers on process problems with have the edge.

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John Soper *(John.Soper@NPMarketing.com) is the managing director of* ***New Paradigms Marketing Group*** *(www.NPMarketing.com) a market development consulting practice focusing on delivering market growth strategies and implementation services to technology enterprises.*