

Perspectives

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The Entrepreneurial CIO



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Greetings

We all know IT can be an important differentiator to improve business competitiveness. However, we come across cases where the execution does not deliver results. In this edition of Perspectives, we have looked at behavioral aspects of an organization like entrepreneurship, collaboration and agility. These attributes can spell the difference between success and failure.

Perspectives is designed to give you specific ideas to make your business successful, especially under rapidly evolving market conditions. The ideas presented in this edition are fundamental to improve your firm's performance in the dynamic global business environment. The role of the CIO in this context is critical and hence our theme: The Entrepreneurial CIO. Perhaps, equally important are the effectiveness of linkages and interdependencies among the C-suite that are required to achieve sustained business results.

The current business climate has forced many global organizations to reshape, restructure and rethink their businesses. With operating conditions improving, firms that aggressively pursue change to meet new market conditions will be well positioned for the future. We hope that the ideas contained in this edition will help you map a successful path forward for your organization.

A handwritten signature in blue ink, appearing to read 'N. Chandrasekaran', with a horizontal line underneath.

N. Chandrasekaran
CEO & Managing Director



The wave of innovation that began with the commercialization of the Internet has gone through several different phases from the dot.com boom, through the rise of Web 2.0, to the commercialization of open source. Now we see increasing innovation in devices and mobile services as well as the rise of Software as a Service and cloud computing. As a result, companies find themselves awash in technology capabilities. The core question has changed from *What can we do?* to *What should we do?*

In this issue of *Perspectives* we examine why understanding the role of the CIO and the character of our corporate culture has become central to making effective use of Information Technology (IT). Differentiation, the key to business success, depends on knowing who we are and what we are good at.

This edition contains articles that explore the themes of IT for efficiency and IT for innovation. We analyze important issues affecting CIOs today. We conclude with a discussion I had with Peter Weill, Chair of the CISR (Center for Information Systems Research) at MIT, whose recent studies focus on the evolving role of the CIO. I hope you find reading *Perspectives* productive and insightful.

A handwritten signature in blue ink that reads "J. Rajagopal". The signature is stylized with a large "J" and a cursive "Rajagopal".

J. Rajagopal
EVP & Head, Global Consulting Practice



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Prologue: The Death of “Business-IT Alignment”

Business-IT alignment has been an issue ever since IT became to be seen as a cost center, a department that runs on money provided by business units. As long as IT runs smoothly and charges back reasonably, business units are happy. In the process, the CIO is often seen as a steward of server rooms.

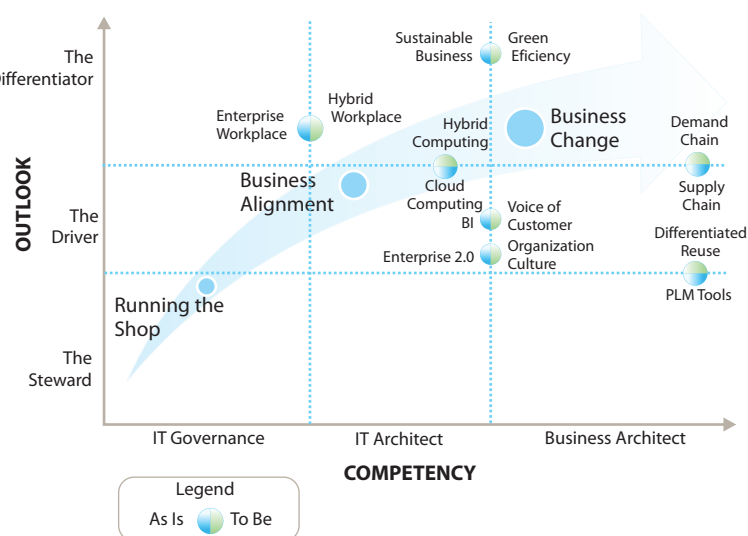
With this mindset, cost control is the primary directive. IT is not seen as enabling differentiation, a view promoted by advocates of utility computing. It is hard to tell where the business ends and IT begins.

The alignment is actually a trap in which IT is asked to chase demands without playing any role in their definition. With a traditional relationship between IT and business, a tight business-IT alignment is dangerous. Almost all modern business models are significantly influenced, if not defined, by Internet technologies. As you strive to perfect your business, technology changes its design. Consider the examples in telecom, where companies like Google and Apple emerged as leaders based on products with better IT foundations. Will the same thing happen in banking led by companies like PayPal?

The entrepreneurial CIO plays three dynamic roles using three core skills as shown in Figure 1. The roles include not only the steward, where most CIOs focus their energies now, but the driver of change and the leader of differentiation. The core skills of IT governance and IT architecture are complemented by business architecture. The identity of the CIO changes. He is simply here to help the company differentiate - everything else comes later. He can see the trap of focusing solely on efficient IT at the expense of differentiating IT, and he fights to avoid this trap and continue to use his expanded skills to keep IT a part of the continuing formulation and adjustment of strategy.

This edition of Perspectives is dedicated to helping businesses differentiate. *Fig. 1.1* shows incremental steps analyzed in this issue’s articles that CIOs can take to enable differentiation. In every article, two things are emphasized: one, how a business can differentiate, and two, how doing so forces IT to move beyond the traditional and obvious. CIOs will find both ambitious ideas as well as some that are more modest. Regardless of your appetite for risk, the important thing we are seeking is to provide experience-tested ideas to consider. The CIO’s journey toward entrepreneurship starts here.

Fig. 1.1 : Small Steps to Entrepreneurship



Source: TCS Global Consulting Practice - Research Desk

IT for Efficiency

The first three articles in this issue of Perspectives focus on how trends in application of IT can be used to transform a business and bring efficiencies that are so profound that they provide differentiation.

Enterprise Collaboration - Enterprise 2.0 That Suits Your Business

The success of collaboration technologies in the consumer sphere, the rise of Facebook and social media, and the rapid growth in Wikipedia all have provided a false positive for the enterprise. The false impression is that blogs, wikis, social media, micro-blogging, and other collaboration technologies will work in one way in the enterprise. There is no absolute best practice when it comes to collaboration and social media.

The first article in this section examines the way that an organization’s culture helps determine how to apply Enterprise 2.0 technologies.

CIOs must understand how to leverage their culture with Enterprise 2.0, not to replace it. The transformative effect will come not from attempting to perform the equivalent of a cultural heart transplant but to amplify the benefits of the existing culture. If a company has a top-down, hierarchical culture, the largest benefit may come from task-oriented collaboration that helps with execution. For dynamic, creative, horizontal cultures, technologies that provide a means for individuals to communicate with a broader group should be stressed. These tools are so powerful that they could mean more confusion than efficiency if not applied in a culturally compatible manner.

The key lesson: don’t mindlessly ape consumer successes without understanding what your culture is and how it can be supported by Enterprise 2.0 technologies.

Takeaways

- A good business does not jettison its organizational culture. It retains its own
 - Enterprise 2.0 initiatives that contradict one’s organizational culture create more confusion and socio-political conflicts than efficiency. At best, they are a waste of time
 - Every Enterprise 2.0 practice, like wikis or social networking, applies differently for each cultural archetype
-

Supply Chain - Use B2B Only Where It Matters

The second article in this section argues that there are two types of supply chain optimizations that companies should choose from. The Dell model, one that focuses on standardization and price competition, is one in which suppliers are the focus of B2B automation. The orchestrating manufacturer uses standardization to create a massive division of labor. In this model, demand signals are sent from the manufacturer to suppliers, who provide components on demand.

In contrast, the Apple model is focused on product differentiation. A smaller number of suppliers are chosen to orchestrate a high concentration of skills. The demand signals come from the market and channel and are passed through the orchestrating manufacturer.

The two models are different, and sometimes contradictory. To use supply chain automation to best effect, CIOs must make sure that company strategy is clear and supported by the right type of automation. The worst outcomes occur when a company attempts to pursue both models at once.

Takeaways

- A business can differentiate either on cost or on unique products. This reflects in one's supply chain planning
 - A cost player gets more benefit from B2B when it is applied on the supply side
 - A product differentiator gets more benefit from B2B when it is applied on the demand side
 - Application integration for B2B has different approaches for the two business models
-

Green Business – The Unconventional Efficiency

While greening and sustainability is another way to differentiate, it is usually seen as a matter of corporate social responsibility. The typical game plan for green and other sustainability initiatives is to look around for savings that occur during the normal cycle of cost cutting and process optimization. While such a strategy does rack up points, it does not really find new ways to be green. For example, if we look at reducing paper consumption, there is a celebration of green without really doing anything new. Green efficiency is different – it is a way to look at efficiency where improving the environment is the purpose and cost reduction is the logical end. We call this route “additional efficiency,” adapted from the “additionality” clause in the GHG protocol.

The final article in this section suggests that the principle of additionality can be used to find a way to even greater savings. Instead of looking for green and sustainability results as the by-product of cost cutting, additionality suggests starting with green goals and looking at the way that processes can be re-engineered and transformed to achieve results.

IT then has a role to play beyond analysis of carbon footprint and green IT. It can define processes that could be called green efficiency. Looking at a process throughout its business lifecycle, instead of treating it locally, is the key to this approach.

Takeaways

- The “Additionality” clause in the GHG protocol is not a constraint but a way to generate new ideas for cost reduction
 - Many green initiatives are local treatments, when it could be very different when one tries green on the business lifecycle
 - Total Cost of Environment is a way to look at efficiency, where a business decides how much of its emissions it can prevent instead of how much can be reversed
 - Enterprise Asset management (EAM) complementing Product Lifecycle Management (PLM) helps in working out a Total Cost of Environment balance
-

IT for Innovation

While creating efficiencies can be transformational, innovation is a less predictable undertaking but one that can achieve an even more profound payoff in terms of differentiation. To lead the way to innovation, a CIO must have both vision and courage to help promote innovation, because failure is inevitable. The entrepreneurial CIO reaches the highest level of performance when he or she can become a driving force for innovation. The articles in this section suggest three avenues that may result in differentiating discoveries.

CRM - When Social Intelligence Is Business Intelligence

In certain areas, social media can be an important new form of information and insight. When you have customers speaking about your products in open media, whether in admiration or in contempt, the competitive dynamics change. It is not merely about capturing data from social networks but quickly responding to them with your products. The information must be accompanied by some sort of process transformation to close the loop. The first article in this section examines the type of social media information that is of greatest value.

There is both a practical and innovative side to including social data into your processes. Not all data can be meaningfully processed in an automated way. Many of the current tools for analyzing social data are idealistic. Automating social analysis in CRM, for instance, works well in customer support but not as well for demand prediction.

In terms of innovation, social media promises to transform processes in unexpected ways. For example, the article argues that ITIL processes could be an unexpected beneficiary of social media-based innovation. The entrepreneurial CIO should help the company understand where and how to apply social media to innovate and improve differentiation.

Takeaways

- We will see new behaviors with social networks, which are quite different from what we see today
 - Customer sentiment analysis is emerging as the key utility for understanding social networking data
 - However, sentiment analysis must be augmented with human interpretation to avoid misunderstanding the data
 - CRM can integrate best with social analytics in customer self-service, qualifying sales pipelines, and in product beta testing
-

People Technology - The Workplace Consumerization

As businesses are trying to incorporate social networks, people are on their way to bringing businesses to their homes. The merit of this is still debatable, but gadgets are becoming extensions of one's productive self. It would be hard to ban personal iPad and smartphones in the workplace. The problem starts when a firm has to deal with security and regulations. Security is getting complex and people are beginning to find office IT incompatible to a natural work environment. This article examines how CIOs are promoting innovation by inventing new security models that allow personal devices to be incorporated into enterprise computing.

CIOs know that companies will eventually have to accept employees working on their own laptops, sometimes even with critical information. There are two sides to this evolution. First, perceptions about security must change. Current attitudes toward security are conservative and risk prone at the same time. Physical security principles still prevail when logical threats are more likely. The other side is that business needs adopt a workplace strategy that is simple, that imitates consumer technology, and that avoids complex technology. The CIO must find a balance, let's call it Workplace 2.0, that helps personal technology work in practice, without imposing rigid processes, but at the same time maintaining security and compliance.

Takeaways

- IT solutions adopted by masses are ones that are able to be simple, irrespective of the standards they may follow. Great technology products can even make standards irrelevant
 - Employees working on personal laptops and sharing documents through personalized cloud applications is inevitable
 - Many of the security threats are logical, but treatments are physical (physical isolation of data centers)
 - Business perceptions of security will change, as businesses and legislators work to understand the ramifications of cloud computing. Many of the threats that we see today may eventually be seen as trivial
 - Identity federation, with simple technologies like OpenID, will eventually be adopted by business to allow integration of business authentication with personal workspaces
 - Workplace 2.0 requires simple technologies and processes, instead of complex middleware and workflows
-

PLM – To Reuse or to Innovate: That Is the Question

Are people more important than processes? Let's take the manufacturing business. The principles of innovation for new products are different from those in downstream manufacturing. The former eschews processes for radical ideas and entrepreneurship. The latter believes in making things repeatable. Ironically, both are important parts of product lifecycle management (PLM), which helps design new products and produce them using existing systems. PLM has an inherent tension between innovation and optimization. It is the job of the CIO to find a way to use one system, PLM, to resolve this tension and achieve both goals.

Efficiency in new product development comes from reuse of IP and knowledge; innovation may come from discarding them and starting over. When you are in the business of making unique products (like the iPhone), PLM must be tuned for that purpose.

Takeaways

- Innovation and existing processes are inherently in conflict
 - Intellectual reuse is potentially a business metric for the IT shop
 - PLM should refrain from introducing too many processes at the fuzzy front-end (ideation) phase
 - Reuse of production assets is best for faster time-to-market
-

The CIO Hats

The Architect - Finding the Right Mix: On-Premise and Cloud-Based Computing

Is computing really just a utility? Is the IT department on its way out, in favor of moving everything to the cloud? The claims that utility computing will conquer all of IT are overblown.

Cloud computing asks us, in effect, which parts of our infrastructure are commodities? Where does our differentiation lie?

The answer comes from an unexpected source: enterprise architecture (EA). It is true that EA has been overhyped, but when it comes to deciding what applications should strategically remain on premise, EA emerges as a very interesting tool.

Some infrastructure and apps will live in the cloud, and some won't, especially those related to differentiation. This article explains how applying enterprise architecture can help companies find the right mix of on-premise and cloud computing.

Takeaways

- Utility computing is not the absolute form of IT. Finding the right mix of utility and on premise computing depends on the business strategy
 - Enterprise architecture (EA) can help decide the various architectural states for each application. The states would show different mixes of on premise and cloud qualities in an implementation
 - There are four types of cloud implementations: Software as a Service, Platform as a Service, Infrastructure as a Service, and Business Process Outsourcing as a Service
 - Standardization versus differentiation helps us choose which of these types of clouds to apply while retaining differentiating infrastructure on-premise
-

The Entrepreneurial CIO

Modern discussions of technology are too full of uninformed speculation. When someone bases their insights on careful research and thoughtful analysis, it feels like a breath of clarifying fresh air. Such people see things differently from what we see as practitioners. Participation from academia has been a regular feature in Perspectives. This time we have none other than Peter Weill, Chairman of MIT's Center of Information System Research, who analyzes CIOs in terms of four roles: the services CIO, the embedded CIO, the customer CIO, and the enterprise process CIO.

Peter is as much critical of the role of the CIO as he is curious about it. Weill provocatively states, "I think the issue of alignment of IT to business is passé." He argues that if you are attempting to align IT with business it is already too late. In the modern world, business strategy and IT capability must be addressed in parallel.

As Weill produced statistics from his surveys on the CIO donning different hats, J. Rajagopal, EVP and Global Head of TCS Consulting, explored Weill's analysis with penetrating questions, while adding his own insights from the field.

Takeaways

- The CIO spends time in four roles: Services CIO (42%), Embedded CIO (36%), Customer CIO (10%), and Enterprise Process CIO (11%)
 - There is no evidence of CIO's reporting structure affecting his or her role
 - CIO should put SLAs with business units in business language. For example, it could be loss of production of goods due to IT outage
 - The IT shop should strive for reuse of IT assets, but even more importantly, reuse of business processes
-

Summing Up

In the takeaways for each article, we can see that it is not always new technology that offers a CIO new ideas. Instead, a CIO may use existing technology very differently to help a business do what others could not. The articles on B2B and green business illustrate such scenarios. The entrepreneurial CIO puts a new twist on the application of technology to serve strategic business needs.

Helping bring the vision of the entrepreneurial CIO to life so that IT achieves its full measure of value is central to our mission at TCS. We hope that by taking action on the suggestions in this issue, many companies are able to better understand their true nature and rapidly move closer to their ideal state.

As always, we look forward to hearing your thoughts about the insights presented in these articles. Please email us at global.consulting@tcs.com.



IT for Efficiency

Enterprise Collaboration

Adapting Enterprise 2.0 to Your Organizational Culture

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Don't disrupt your
organization's culture when
implementing Enterprise 2.0

Abstract

Enterprise 2.0 is not simply Web 2.0 within a firm. The collaboration and social exchange happening on the Internet does not function the same way for organizations as it does for individuals and occurs differently in different organizations. How a business accepts or reacts to a Web 2.0-like environment depends heavily on its culture. Implementing Enterprise 2.0 without considering that culture could easily create an environment hostile to the regular way business has functioned.

How distinctive is your organizational culture? How does it determine what kind of blog post, wiki, or document management system you should implement? This article clarifies how different types of organizational cultures can impact an Enterprise 2.0 strategy.

Enterprise 2.0 Requires Examining Organizational Behavior

Ever since Web 2.0 technologies opened up new ways for people to socialize, businesses started adopting internal tools that mimicked Web 2.0 features and called the result Enterprise 2.0 (E2.0). Software applications and services such as Microsoft SharePoint Portal and Jive became important tools for IT to enable employees to collaborate. However, such platforms, when implemented, were not as friendly as Facebook or Twitter. Was it because businesses placed too many security and policy constraints on them?

The problem is usually not with the software but with finding the right mix of best practices to suit the culture of the organization. For example, online social media within a company flattens the organizational structure, which might otherwise remain hierarchical. This potentially creates socio-political conflicts in the work environment. E2.0 is essentially a facet of organizational behavior in the digital age.

As a result, this article first delves into the subject of organizational behavior to see how an organization's culture affects the way it implements E2.0. We will find that many of our common perceptions about E2.0 are misplaced. For instance, the idea that E2.0 should allow uncontrolled sharing of blogs and documents is only appropriate in some cultures.

In a Good Business, Change Is Constant, and So Is Its Culture

"Company cultures are like country cultures. Never try to change one. Try, instead, to work with what you've got," said Peter Drucker. His statement counters the common perception that an agile business adapts to a dynamic environment by changing its culture. However, if we take the example of General Electric, the only firm that has stayed on the Fortune 100 list for the last 100 years, one would assume the company underwent several cultural changes. How much did the corporate culture change really? You can be sure that there have been some changes over the last 100 years, but at least some of the elements of that culture have stayed the same for many decades.

For example, "institutionalizing" a management philosophy has remained a cultural characteristic in GE for some time. In the '70s, when the mantra of the time was diversification, GE instituted the GE Matrix program based on the Boston Consulting Group (BCG) matrix concept of strategic diversification. Then in the '80s, with the Japanese Total Quality onslaught, Six Sigma became a religion at GE. Today, with its heavy customer-centric focus, GE uses Net Promoter Score - a metric that assesses products and processes based on customers' willingness to recommend the company to others. Regardless of the efficacy of these practices, this great company's effectiveness in making its employees buy in to its management philosophy remain unchanged - its culture has endured.

Drucker was right - an organization may change its structure, its processes, its people, and its policies while not changing its culture; changing the culture risks losing a company's very foundation. Therefore, if a firm is not inherently as unusual and innovative as Google but is heavily focused on processes, it may well remain that way because that is how it has learned to survive.

What significance does this have on E2.0 strategy? Any E2.0 strategy that ignores the company's cultural footprint is risky. We often tend to benchmark best practices from peers or based on best-in-class companies such as GE; this may make sense, but what applies to GE does not necessarily apply to your business. You could end up with an E2.0 emulating a very different business culture, one that won't be effective for your culture at all.

Several studies in management science have classified organizational cultures. Two stand out: one by Dutch sociologist Geert Hofstede (*Cultures and Organizations*, McGraw-Hill, 2004) and the other by British management philosopher Charles Hampden-Turner with F. Trompenaars (*Managing People Across Cultures*, Capstone, 2004).

Hofstede's work identified cultural parameters in organizations with an ethnic orientation. For example, "masculine" cultures value assertiveness and material forms of motivation, a quality that could be attributed to certain ethnic societies. While Hofstede's thesis has been important in business in areas of cultural sensitization and change management, it has less significance for E2.0 with globalization and digital media blurring the lines.

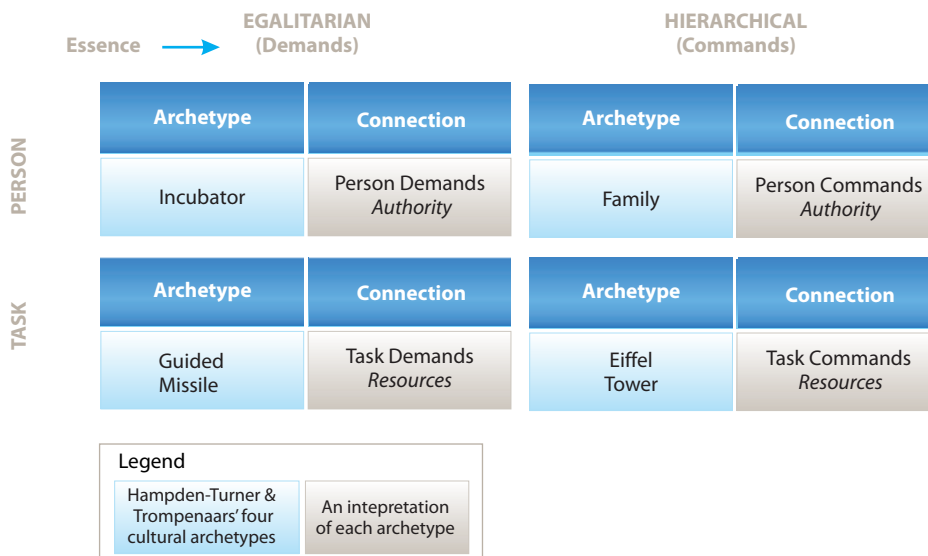
The cultural model of Hampden-Turner and Trompenaars fits best because it proposes cultural archetypes that supersede ethnicity. This article compares the four archetypes suggested by this model with various E2.0 practices in an effort to explore their suitability. It can help you benchmark your organizational culture to frame an effective E2.0 strategy.

Two Dimensions That Characterize Organizational Culture

Hampden-Turner's career started with political debates when he spoke for the Cambridge University Conservative Association. He later joined the Harvard Business School where he applied his aptitude in political science and discovered a talent for analyzing organizational behavior. After his return to Cambridge, his thesis and publications, especially the *Dilemma Theory* and *Radical Man*, received both academic and critical acclaim. Between the years 1993 and 2004, he coauthored several books and dissertations on business culture with F. Trompenaars. The research referred to in this article deals with two dimensions of an organization from which can be drawn four cultural types.

The first dimension is hierarchical versus flat or egalitarian organizational structure, which has been a traditional subject of study. The other dimension is innovation versus efficiency, which arguably is a matter of balancing individual talent and process (person versus task, as Hampden-Turner and Trompenaars would say). Hampden-Turner and Trompenaars used these two dimensions to delineate four types of cultures as illustrated (*Fig. 2.1*).

Fig. 2.1: An Interpretation of Hampden-Turner & Trompenaars' Organizational Cultural Archetypes



Source: TCS Global Consulting Practice - Research Desk

With businesses today having hybrid structures and increased globalization, it is difficult for a firm to fit into just one cultural bucket. However, a firm will usually lean toward one of the four cultural types. We briefly touch on each type specifically to gain an idea about how to formulate an E2.0 strategy. For more details about each cultural model, refer to the authors' cited work.

What would happen to someone who worked in a Silicon Valley startup for a few years as a software engineer and suddenly takes a position at Walmart? Alternatively, what would be the reaction of someone working in a middle management role at Toyota, which arguably is a vertical Keiretsu⁴ company (Japanese family-like culture in business), joining GM? The following classes of culture can help us imagine the possible consequences.

With these cultural classifications in mind, let's apply them to E2.0. Any organization that thrives in its own culture can do as well in its E2.0 design; E2.0, though sometimes thought to be hostile to more traditionally structured organizations, can in fact adapt to these cultures. No single E2.0 approach fits all cultures, and taking such an approach can be dangerous. For example, in an Eiffel Tower company that has always functioned on explicit procedures and policies communicated from the top, a portal that allows uncontrolled blogs and exchange of opinions could create perceptions that conflict with corporate policies running critical processes. The same approach would not be a problem in a Silicon Valley company (Incubator culture) where the team leaders meet every day and the chief executive calls a town hall meeting every week.

An Interpretation of Hampden-Turner and Trompenaars' Cultural Archetypes

Incubator - Some companies inherently spawn new ideas. People are empowered to promote new concepts. Everyone is an entrepreneur. Silicon Valley startups function this way since their business model relies on the creation of new prototypes to attract venture capital funding. Here, free sharing and discussion of new ideas are out in the open. Workplaces are casual; discipline is driven more by trust and less by regulation.

Guided Missile - This culture is similar to the Incubator in the sense that it is flat in structure (egalitarian). The difference is that the mission defines the processes and guides the decisions as opposed to individuals making them. Liberty to promote ideas or demonstrate entrepreneurship is limited at the bottom of the organization because missions are central to the organization's goals. Hampden-Turner mentions NASA as an example of such an archetype.

Eiffel Tower - As the name suggests, this culture strictly follows a hierarchical structure. These organizations believe in explicit delegation of authority and deployment of processes. Communication is more top-down than bottom-up unless sought out. Such an organization has learned to survive on efficiency and systematic checks and balances. People moving into this culture from other cultures require serious sensitization exercises. Military organizations are a good example, and many successful commercial firms also display this tendency.

Family - This is also a hierarchical archetype, but differs from Eiffel Tower in delegation and empowerment, relying on tacit channels. Family-like close relationships and formation of factions are common at higher levels and in succession. Criticism is handled in private and differences are sorted out in closed rooms. Some very successful Japanese and Indian companies show these characteristics.

The following illustration (Fig. 2.2) helps you to find out how liberal (or controlled) you should be on various E2.0 practices based upon your firm's culture.

Fig. 2.2 : Enterprise 2.0 Strategy for Different Organizational Cultures
(Organizational Cultures Based on Hampden-Turner and Trompenaars' Archetypes)



Source: TCS Global Consulting Practice - Research Desk

Notice that technologies such as blogs and discussion forums are at the top, while portal mashups and workspaces are at the bottom. This is because the former are driven by personal initiatives, hence are conducive to Incubator or Family cultures. Mashups and workspaces, at the same time, are conducive to task-driven companies where deployment of policies and templates are common. Such practices would succeed in Eiffel Tower and Guided Missile cultures.

Given this, hierarchical and egalitarian cultures would implement the same practices quite differently (Fig. 2.2). Therefore, if your company is like 3M, which introduces numerous products every year and has a culture of sharing new ideas, it is probably an

Incubator. If your IT shop decides to implement a portal platform that is configured with predefined templates and communities, this approach is too inflexible to be natural to the organization. Typically, in such cases, the business users blame the platform. Usually most platforms allow users to personalize templates. The problem here lies in the implementation (configuration) where a top-down system is imposed on a bottom-up culture.

Similarly, in an incubator culture, a wiki to share knowledge ought to be used to debate online. Management's role is to seed the tool and leave it there. Yet in a family culture, the wiki content would be filtered through a workflow process.

What Keeps Enterprise 2.0 from Being Like Web 2.0?

If a person wants to find out what people are saying about a product that he/she intends to buy, he/she could look at the product community on Facebook, sites like Yelp, or the product web site where buyers post feedback. However, despite so many options, he/she first makes a quick search on Google.

Human behavior related to Web 2.0 is closely tied to search engines. Google and others play an important role in mobilizing the knowledge that Web 2.0 creates. However, when we try to bring the same capabilities to the enterprise, we find that search engines on internal portals are not as useful as Google. Why?

Despite businesses encouraging sharing on internal portals, important shareable documents still reside on desktops and attached to email. Unless desktop search is combined with the search engine on the portal, the search will be less useful. This is the foremost challenge for Enterprise 2.0 today.

However, technologies for enterprise search are fast evolving. One such standard is OpenSearch, a protocol that allows a repository to be plugged into a central search engine. For example, Windows 7 comes with features that allow a desktop folder to be included in the SharePoint search engine. This technology is being called federated search, since it is based on the principle that individuals proactively share their public repositories and thus contribute to enterprise knowledge.

Isn't this the same principle on which the Internet works? The Internet is the purest form of federated knowledge since no single website can make claim to a central or a parent repository. All websites are only contributors to the information channel. Unless the same ideas are applied in enterprise knowledge management, centralized portals fall short of achieving the knowledge currency found in Web 2.0.

Security controls are obviously needed for such practices. When dealing with sensitive information, refer to the afterword to this issue's article on workplace security, "Workplace Consumerization." Nonetheless, the cultural factors discussed in this article also apply to implementing enterprise search.

Source: TCS Global Consulting Practice - Research Desk

Every Organization Is Unique, and So Is Its Approach to E2.0

One of the evils of benchmarking is that we tend to emulate rather than differentiate. Culture is what differentiates an organization. If a business has learned to withstand the test of time, it has done so in part due to its culture. The interesting thing about a culture is that it has no metric; a successful business identifies with its culture in a manner no other business can. If a company has learned to run its processes by simply imposing regulations (Eiffel Tower style), it may very well continue that way. Whether or not this is an ideal way to function, we need to accept it.

When the proponents of Enterprise 2.0 say that it should be like Facebook or Twitter, we should think twice – are we pushing a Google or a 3M culture into a company that is otherwise a Walmart?

We discussed four types of cultures, but the four types are not watertight. Rather they are classes, with each company being a mix of them but leaning toward one. The CIO should find out which one and then use E2.0 features in a controlled (or liberal) manner that suits the inherent culture.

Enterprise 2.0, if you read the phrase literally, would seem to connote the emergence of a completely new enterprise. Does E2.0 really change the enterprise? It may, but it shouldn't fundamentally change or disrupt the organizational culture - let's be clear about that.

For Further Reading

- 1 *F. Trompenaars & Charles Hampden-Turner, Managing People across Cultures, Chichester: Capstone, 2004.*
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Supply Chain Management

Setting Up B2B Where It Matters

Dr. Syama Sunkara

Head, Supply Chain Management, Global Consulting Practice

A differentiated business model can apply B2B supply chain systems effectively in fewer places that make better sense...

Abstract

Recent examples of good business processes show that supply chains don't always have to be very dynamic. Supply chains for businesses dealing in unique products are very different from supply chains for businesses based on unique processes. The two approaches can't strictly coexist. In fact, some business models thrive on the supply chain being efficient but not being dynamic.

The supply chain strategy has implications for B2B implementation. This article explores how a business with a unique model would apply B2B supply chain management (SCM) systems in fewer places, focusing on either the demand side or the supply side. Focusing on both sides may reflect a confused business model.

New Rules for the Supply Chain

Until recently, Dell and Nokia were epitomes of supply chain excellence. Nokia's modular products are designed so that suppliers can be swapped on the fly. Dell's make-to-order model is based on supply-side economics. They both became industry benchmarks. AMR had awarded Nokia the best supply chain three times in a row. However, today, two years later, a very different example of supply chain management is leading the pack.

For the last couple of years, Apple has been rated as having the best supply chain, even though its supply chain is not nearly as intricate as Nokia's or Dell's. Apple has dedicated suppliers for key iPhone components because its products are designed to be unique. Standardization never appealed to Apple. Also, Apple refused to depend on retail channels and instead came out with the Apple Store. It also sold the iPhone through carriers like AT&T. Apple's success causes me to wonder about a resurgence of an old economic model. Do a few suppliers and a captive distribution channel make for a sophisticated supply chain?

In fact, they do. This article will show that a company's optimal supply chain depends on how it differentiates itself in the marketplace. And technologies like B2B apply differently to different companies. Such technologies may not even be relevant to many of the leading supply chains.

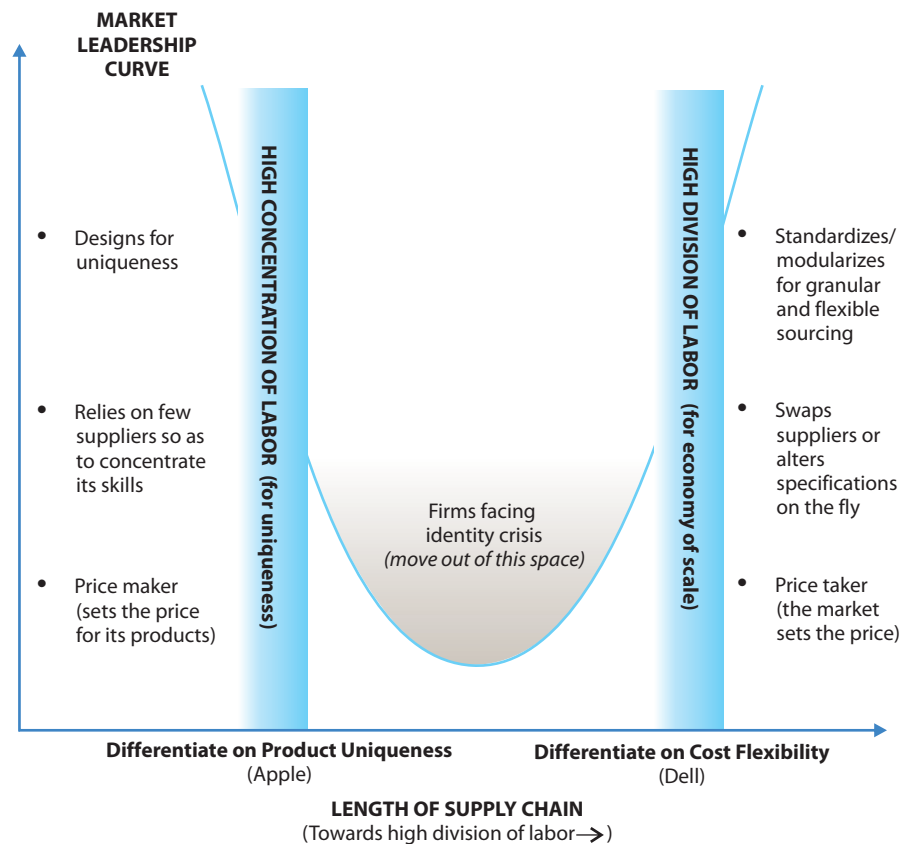
Identity Crisis

In the 1990s, Hammer and Champy's writing on organizational re-engineering (*Re-engineering the Corporation, Harper Business, 2001*) changed the way many businesses treated processes. Multi-national corporations were then starting to turn toward globalization by building a global supply chain. Hammer and Champy's Business Process Re-engineering (BPR) talked about end-to-end rationalization and considered the economics beyond enterprise boundaries. They presented division of labor, the classic Adam Smith principle, as a yardstick for making a business more efficient. By increasing the number of contributors in the supply chain, a business could choose the cheapest resource at each point in the process. As a reflection of this in recent times, we have seen products designed to support a massive division of labor; Nokia assembles 1 billion component units with 200 suppliers. Operating such a model requires a high degree of process maturity.

Yet, our treatment of BPR might not always work since division of labor is not an absolute criterion. In fact, a company may take the lead over its competition without it. The dichotomy of Apple's captive supply chain and Dell's dynamic supply chain highlights this. Apple has fewer suppliers. A good part of its product value is concentrated in niche suppliers and captive channels that differentiate Apple on its ethnographic subtlety and aesthetic distinctiveness. It is a supply chain finely tuned to a very different business strategy. It will never emulate Dell. And Dell will not survive if it tries to be Apple.

Fig. 3.1 : It is Either One Way or the Other

Every firm has to consciously choose between
Division of Labor and Uniqueness of Product in its strategy



Companies Must Choose Between Product Uniqueness and Cost Flexibility

Source: TCS Global Consulting Practice - Research Desk

Neither Apple nor Dell needs to choose a strategy because their business models have chosen it for them. Apple differentiates on product; Dell on cost flexibility. These companies are at two ends of the spectrum. However, businesses in the middle of the spectrum will need to make a choice to move toward either concentration of labor (uniqueness) or division of labor (standardization). Companies that stay in the middle are in an identity crisis, and they blame it on changing business models. In reality, such companies don't have a business model (Fig. 3.1). Companies innovate, looking for unique products while at the same time attempting high division of labor; these two strategies cannot be strictly combined. I draw this distinction as an important basis for choosing how to implement B2B in a supply chain strategy.

I'll limit this discussion to companies that face such an identity crisis and the approach these firms should take to B2B.

Positioning B2B – Demand Side or Supply Side?

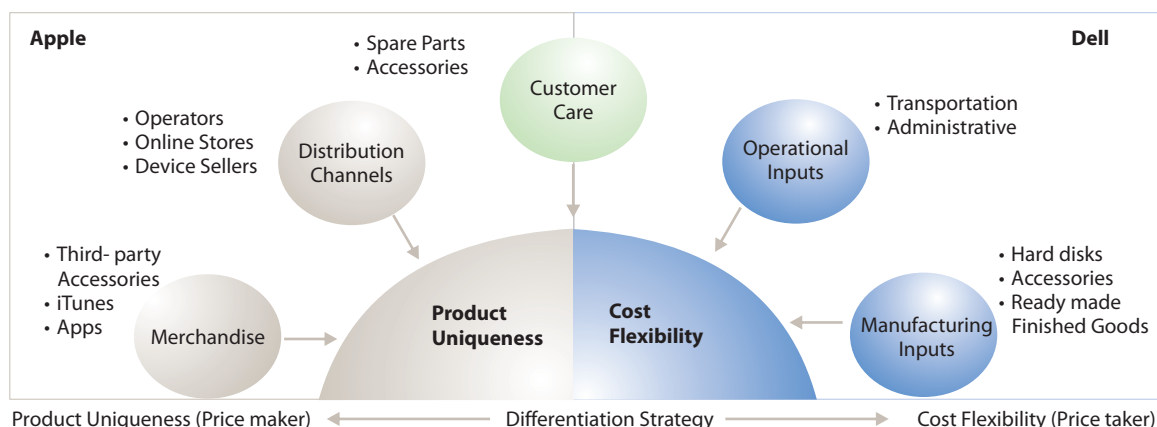
For a company that competes on cost, products are typically price takers (in which the market sets the price), and they respond to market prices by using a flexible cost structure. They are not price makers (who set their own prices with little or no regard to the markets). Price takers require standardization of components that can be supplied by multiple sources. Thus, manufacturers can swap suppliers with every assembly to hedge price pressures. For such firms, B2B plays a strategic role in manufacturing inputs (*Fig. 3.2*).

However, in the case of a differentiated product that may dictate its price in the market (e.g., the Apple iPhone), the supply chain model is very different. It seems Apple gets its iPhone multi-touch screen controllers from Broadcom, which makes them to unique Apple specifications. This type of a supply chain strives for just-in-time delivery through demand and inventory management, but without swapping suppliers frequently. B2B exchanges are not usually used in manufacturing inputs. Such companies differentiate on high brand equity. Typically, it uses B2B to extend brand merchandise using affiliate products. Apple iPhone Apps and iTunes are examples. Though not as immediately obvious, provisioning services through AT&T is another example.

Boeing has B2B exchanges to sell merchandise under the Boeing brand, connecting suppliers directly to its customers and channels. In some models, B2B integration with distribution is core to the business. Nestle, for example, issues products to cafés by connecting kiosk-branded franchises to their B2B service, selling 94 billion cups of coffee annually.

Any business that tries to focus on all of the roles (*Fig. 3.2*) is likely to have an ambiguous business strategy. Its B2B footprint will reflect the lack of a business model. Having said this, the question for IT professionals is whether or not B2B exchanges have come of age to support each of the strategic business roles.

Fig. 3.2 : Application of B2B Depends on Business Model



The rule of thumb

- Product uniqueness strategy would entail stronger B2B on demand side
- Cost flexibility strategy (like made to order) would entail stronger B2B on supply side

Source: TCS Global Consulting Practice - Research Desk

Aligning IT with the Right Process

A just-in-time (JIT) philosophy in the supply chain is nothing new. Today, every supply management system is pursuing JIT. Manufacturers continually try to increase inventory turnover and decrease inventory levels. No matter how simple it may sound, in reality, those two metrics (turnover and level) are a function of factors like availability of supplies and opportunity cost of missed demand.

As buyers pursued JIT, the suppliers learned to support it. Modern supply chains are looking at suppliers to drive JIT within the buyer's business. Inventory replenishment is shifting to the vendor. The vendor is provided with policies or simply "events" that tell them when they need to replenish. Suppliers capture the events to determine the delivery quantity and time. It is like a managed service in procurement, with the vendor wearing the buyer's hat in this case. This practice is thus called Vendor-Managed Inventory (VMI). This model plays an important role in shaping the two supply chain strategies we've discussed, since it comes with the promise of "federating" the supply chain.

In fact, VMI is currently the practical form of B2B, where there is a tight lock between the buyer and supplier. The other form of B2B, which involves dynamic aggregation of multiple suppliers through an exchange, has yet to evolve in mainstream production procurement outside of a few industries, such as steel. Because VMI is being adopted so rapidly, we'll take a look at the VMI model in its simplest form.

Is the Technology Ahead of Its Time?

While one might think that standards have to catch up to B2B, in reality, existing standards are adequate to allow businesses to talk to one another through applications. The problems lie in the maturity of the data models supporting such standards.

If we look at the general evolution of SOA, especially XML web services, most of the standards are designed to support information exchange and are not specific to business processes. For instance, WS-Security deals with security aspects during data exchange. This standard is independent of the business process, which means it could be implemented in any process. B2B integration across firms, however, needs standards beyond generic data exchange. The goal of B2B is to standardize processes before standardizing data exchange. It requires common processes across both buyer and seller. Such processes would usually be specific to the business domain. For instance, RosettaNet, a consortium of companies complying with a common set of supply chain and manufacturing processes, evolved from the semiconductor industry.

For the CIO, it's important to note that the adoption of SOA standards like WS* does not necessarily lead to B2B readiness. Neither does the adoption of B2B standards like RosettaNet unless it incorporates common processes across buyer

and seller. While RosettaNet is gaining adoption in the US and Asia, wide use of traditional exchange standards like EDIFACT in Europe suggests that most B2B exchanges are able to be successful regardless of the standard followed. The freight and transport industry, for example, has been able to define common industrywide metadata for locations and shipments. In fact, many firms exchange data using traditional EDI instead of XML.

Yet standardizing processes across an entire industry faces a challenge that has less to do with technology. Most businesses have a host of legacy systems with highly fragmented data. For instance, item or inventory data resides in multiple applications such as SCM, ERP, CRM, and various BI systems. Each application has its own version of the data and synchronizing those is a continuous activity. The looseness in process often stems from the data maturity. Hence, to have common processes, each transacting firm would need to rationalize its master data into a common model, a situation that seems quite idealistic. Technologies and standards are already ahead of their time, since most firms still have master data problems in their own backyards.

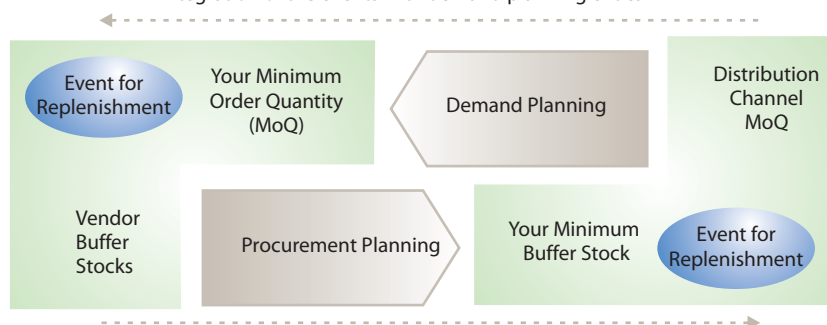
Looking at information channels from the point of view of supply chain strategy, there are two types of process integration to choose from: forward integration and backward integration. In order to choose between these approaches, the first question is whether the business intends to engage VMI vendors or become one. A firm might like to become a VMI vendor so that its distribution channels keep minimum stocks of the products. The question makes us choose between lean procurement and lean distribution. You may ask why they can't coexist. We argued earlier that companies differentiating on uniqueness of product are more likely to find B2B useful in distribution and merchandising. On the other hand, companies that compete on cost find B2B more effective for sourcing. The former is a demand side player, while the latter differentiates on the supply side.

Fig. 3.3 : Forward or Backward Integrated Supply Chains

A Supply Chain Can Either Be Forward Integrated or Backward Integrated Depending on Your Business Model

Backward integration - When your vendor is VMI* provider

- Vendor responds to events set on procurement policies
- Integration of the events with demand planning critical



Forward integration - when you are the VMI provider

- You respond events set in channel's premise
- Integration of events with procurement policies is critical

*VMI – Vendor Managed Inventory

Source: TCS Global Consulting Practice - Research Desk

Forward Integrate if You Are a Demand Side Player

Lean distribution means a firm is responsible for replenishing stocks of its distribution channels in a timely fashion. It should put triggers in the channel's system to pull stock from its own inventory. Nestle serving 94 billion cups of coffee annually through its Kiosk franchises is one example. Such a system makes the firm act as a VMI vendor to its distribution channels.

To replenish stocks in a timely way, there needs to be a sufficient quantity of finished goods as a buffer (for example, the Root mean square of all Minimum Order Quantities in each channel outlet). The business has to keep the buffer at a minimum and has to align its capacity to compensate for the buffer quickly.

Typically, the bottleneck in this model lies in the connection between procurement planning and inventory in distribution. The needed flow of information is usually as simple as pushing forecasts from the demand side to procurement management (*Fig. 3.3*).

Backward Integrate if You Are a Supply-Side Player

Conversely, if you're a supply-side player, creating a system using VMI vendors is important. As explained earlier, VMI vendors manage your procurement on your behalf; your systems should support that by setting events that would notify the vendors when your inventory levels need to be replenished.

The VMI model on the supply side usually faces the problem of setting triggers that aren't closely connected to demand forecasts. The bottleneck exists between the VMI vendor's estimate of demand and the buyer's.

The system integration for such an operating model is quite the opposite of the demand-side player's model. Instead of forward integrating, the firm should work backward. The information needs to be pulled from CRM analytics systems into procurement systems to set accurate triggers.

Note that the two integration approaches have numerous contrasts (*Table 3A*).

It should now be apparent, at least theoretically, that these approaches cannot coexist. One has to choose between them. When a company has a demand-side business model and chooses a backward integration approach, business and IT alignment fails right there.

Table 3A : Positioning VMI

	When Vendor is VMI Provider	When You Are the VMI Provider
Strategy	Cost Player	Product Uniqueness
B2B Footprint	Supply Side	Demand Side
Process Flow	Backward Integration	Forward Integration
Information Flow	Forecast Pulled by Procurement	Forecast Pushed to Procurement
Replenishment Event Triggered	Within Your System	Within Channel's System
Basis for Event	Your Procurement Policies	Your Demand Aggregation Policies

Source: TCS Global Consulting Practice - Research Desk

Carve Out Your B2B Strategy

There should be a conscious strategy that can be as simple as deciding how to differentiate – whether on product uniqueness or cost. Both are valid, each having its own business model. Recent changes in supply chain benchmarks underscore this, such as Apple coming back to life and Dell sustaining its made-to-order business.

Yet companies like Nokia, which have led in efficiency in the past, are now moving into new business models, such as application services and music merchandise. Dell too has been toying with this through the Dell online store. While leading firms are venturing into places where others have excelled, a successful strategy is always one that is distinct from the others. How they choose to handle their supply chains must be distinct as well. The choices are clearly reflected in their supply chain strategy and their B2B footprint. Having B2B everywhere might work in theory, but not in practice.

Afterword: More on B2B Information Management

This article has argued that companies differentiating on uniqueness of product are more likely to find B2B supply chain management methods useful for distribution and merchandising. On the other hand, companies that compete on cost flexibility will find B2B effective for sourcing. This argument has implications in information management.

Key supply chain information, often called master data, consists of two types of data – static and dynamic. Static data remains constant during the lifecycle of the order. Item code and attributes like SKU (stock keeping unit) are typical examples. Dynamic data, on the other hand, consists of data that either originates or changes during the order fulfillment process (for example, an item's location during transit or serial number of each item).

Fig. 3.4 maps typical master data with processes.

Fig. 3.4: Priorities in Information Management for B2B Depends on Business Strategy

B2B Readiness for Product Uniqueness - Focus on Standardizing Static Data						
Merchandise		Distribution	Customer Care	Operating Inputs	Manufacturing Inputs	
Static Data (Does not change throughout the order life-cycle)	Purpose of Data Sharing through B2B					
	Item Code	Cataloging	Channel Integration	Channel Integration		
	Location Code	Supplier Routing	Channel Integration	Channel Integration		
	SKU		Channel Integration			
Dynamic Data (Generated or changed during the order lifecycle)	Serial Number			Ticket Tracking		
	Order/Batch No.		Delivery Tracking		Procurement Tracking	Assembly Tracking
	Current Location		Delivery Tracking		Procurement Tracking	Assembly Tracking
	Fulfillment Status					Assembly Tracking
B2B Readiness for Cost Flexibility: Focus on Standardizing Dynamic Data						

Source: TCS Global Consulting Practice - Research Desk

Source: TCS Global Consulting Practice - Research Desk

Green Business

The Unconventional Efficiency

Dipak Kripalani

Head of Operations, Eco Sustainability Unit

New efficiencies
unfold when businesses
redefine green ...

Abstract

Methods for improving business efficiency have always stemmed from unconventional ideas. Outsourcing, just-in-time, lean supply chains - these were all unconventional at one point in time. But now, these methods are like yesterday's news. Where will new efficiencies be found?

The pursuit of green business for environmental sustainability seems to be largely misguided because we tend to think of green business only as a cost. On the contrary, it could be the new efficiency mantra, especially when defined using clear business goals.

This article stresses the need to define green business not only as an environmental goal, but as a unique approach to the business lifecycle. It then demonstrates how certain parts of IT can show more business value in the process.

Sense of Urgency

Quarterly financial reporting keeps businesses focused on the short term. Often, chasing profitability every three months can cause worthwhile investments to be deferred to a later date. Meanwhile, the long-term vision is often lost. The upside, however, is that short-term reporting brings a sense of urgency - an immediate purpose. This drives companies to action quickly and causes them to strive for high efficiency. It applies to green business as well. Here's the connection.

Corporate decision makers are becoming increasingly aware of their ecological responsibility. It is generally accepted that the current pace of civilization will affect the next generation. However, the pressure to deliver quick business results makes us oblivious to the planet's future. Therefore, sustainability requires a sense of urgency too, and it should somehow be in the context of business. We then approach green and business efficiency together. The two are not always at odds.

How Green Is Green Really?

My study of the accounting practices handbook for greenhouse gas emissions (namely, the GHG Protocol) made me stumble curiously onto the clause of "additionality." It says - GHG reductions should only be recognized when they come from activities that would not have "happened anyway." This means that projects that reduce GHGs beyond "business as usual" should be accounted for separately.

In fact, ignoring additionality has led to typical efficiency improvements, like efficient lighting, being reported as green improvements. In reality, such an improvement would have happened in the regular course of business. Green initiatives that don't delineate between normal business improvements and additional GHG reductions are green in name only, sometimes referred to as "greenwashing."

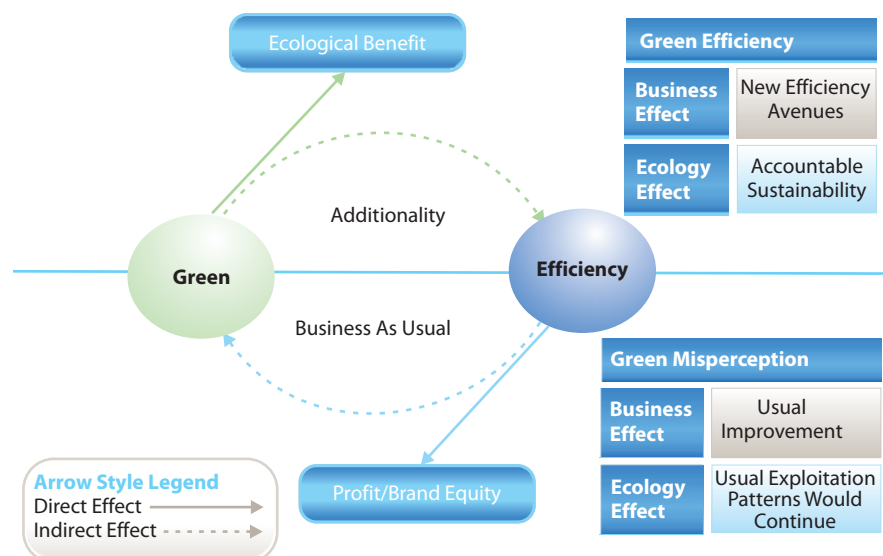
Additionality might be seen as a burdensome constraint on business, much like the Sarbanes-Oxley Act. However, with additionality, businesses can find uncharted forms of efficiency where green is pleasantly incidental because businesses have exhausted conventional methods. In the wake of Six Sigma, Lean, and other quality practices, green is the next wave.

New Efficiency: Starts with Green, Ends with Profit (Not the Converse)

Lets call an initiative green when it starts purely from an ecological purpose and ends with a business benefit. However, what usually happens is the opposite. A company starts aiming for cost reduction and ends up citing indirect ecological benefits (Fig. 4.1). In this case, business is doing what business has usually done, just accounting for it differently. The net contribution of sustainability remains doubtful. Here's an example.

Fig.4.1 : Starting with a Pure Green Motive

Why Green efficiency drives should start with a pure green motive to find profit



Source: TCS Global Consulting Practice - Research Desk

Using more energy-efficient lighting fixtures (replacing incandescent bulbs with carbon fluorescent lights (CFL) and more recently light-emitting-diode (LED) lamps make good business sense. The fact that it may also reduce carbon emissions does not justify calling it a green initiative. On the contrary, if a business comes out with a solar lighting solution and eventually finds that it is saving money, that is green efficiency in the true sense. In the process, the business discovers new ways to drive cost efficiency.

This also applies to Green IT. Green IT initiatives of late were supported by technologies like virtualization - a way to make a data center run on fewer computers by dividing each into many logical parts. This made IT consumption more efficient, reduced carbon emissions, and reduced costs. However, virtualization was a general trend in IT infrastructure to reduce IT costs. It would have happened without the green imperative. On the other hand, completely revamping data centers for efficient cooling and power is largely ignored because of the high investments required. Yet the green and cost benefits of such projects could be significant.

Having said this, the CIO's role in sustainability is no longer confined to Green IT, especially when IT is the source of only 2% of the emissions. For the other 98%, the rest of the company has a larger responsibility to account for its impact on the environment - either through forced regulations or through social consciousness. This accounting would involve new applications of existing information systems that have largely not been used thus far. The CIO should first help the company define its green strategy and then help account for it.

Taking a Lifecycle Perspective

Take, for example, the retail industry, where green initiatives are already well known. Walmart was among the first to come up with a sustainability index for its merchandise; IKEA has suppliers subscribing to a green policy called IWAY. Walmart applies Product Information Management (PIM) and IKEA uses a specialized supply chain management system.

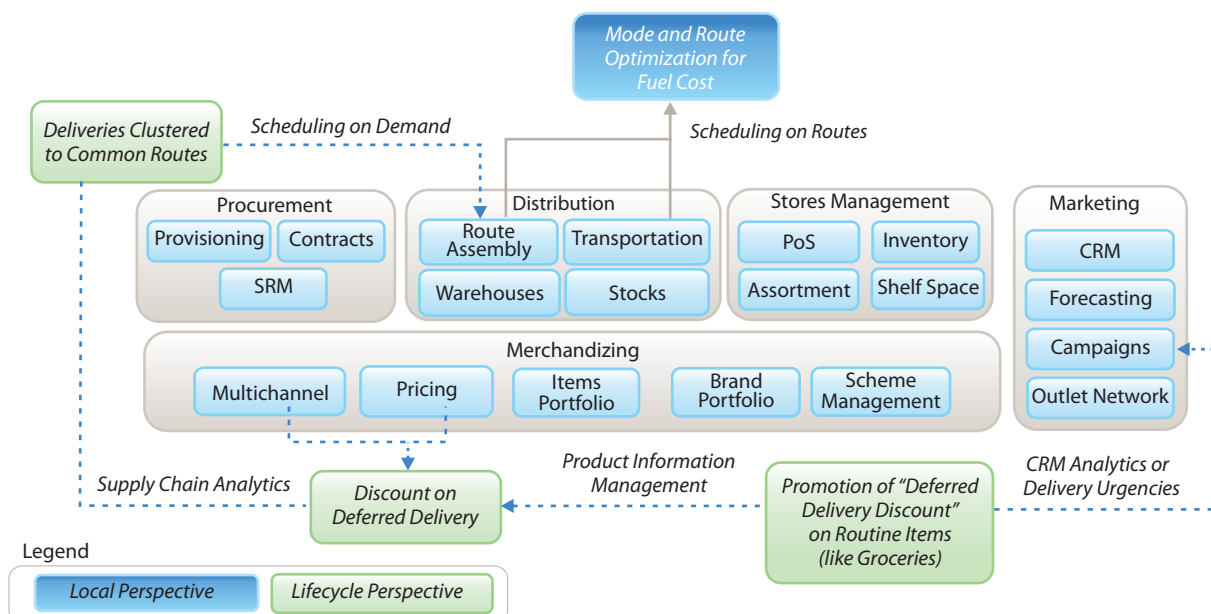
However, when green is viewed from a lifecycle perspective, and not as local treatments, we discover new value propositions. Many green targets, like low power consumption, have a very different approach when seen from a business lifecycle perspective.

Fig. 4.2 : Reducing Fuel Consumption in Retail

Retail Industry: Role of IT Lies in Connecting Business Functions to a Common Green Idea

Scenario 1: How price management can reduce transportation fuel cost while increasing demand

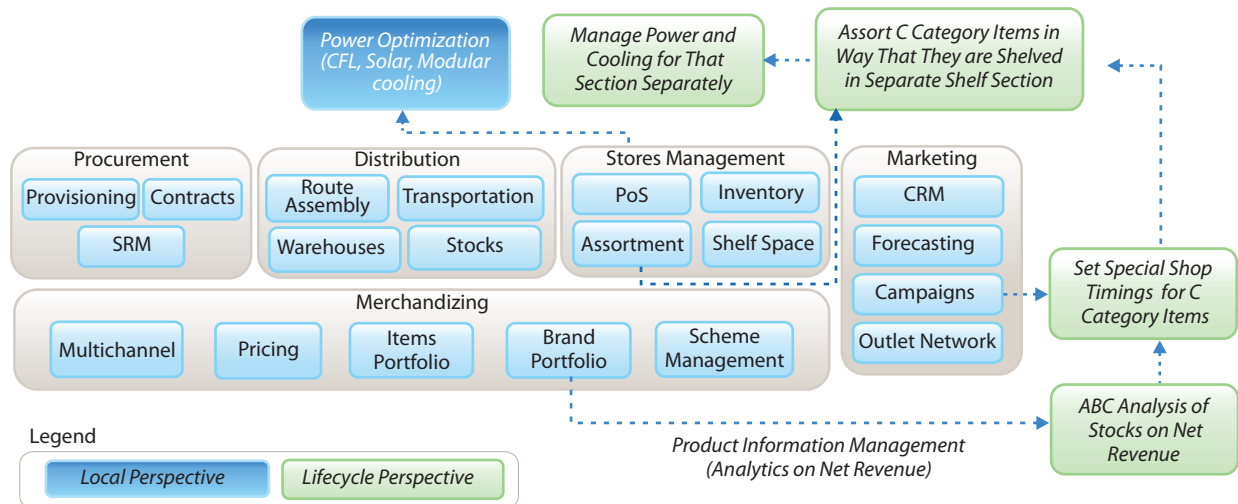
Optimization of transportation for fuel consumption can be very different when linked to merchandizing scheme. For example, lower shipment fees when online customer choose a deferred delivery. The deferred delivery then allows more flexibility to cluster routes.



Source: TCS Global Consulting Practice - Research Desk

Fig. 4.3 : Using Demand-Based Assortment to Reduce Power Consumption**Retail Industry: Role of IT Lies in Connecting Business Functions to a Common Green Idea****Scenario 2: How demand based assortment can reduce store power consumption**

In addition to usual power reduction methods (like using CFLs), retail stores can use assortment techniques. An ABC analysis of slow moving brands can be modularized in a store section that may be open fewer hours.



Source: TCS Global Consulting Practice - Research Desk

Power reduction in retail stores is usually driven by using technologies like solar energy and CFL bulbs. The usual role of IT is to help in carbon analytics to meet compliance targets and support carbon trading (where emissions below the regulatory cap is sold as security to those who have high emissions). However, there are other opportunities to reduce power consumption when we look at the business holistically; IT can be instrumental in that.

Today, most retail stores also have online shopping portals. It is a part of the multi-channel strategy. One may order regular items online and they are delivered either to the door or to the nearest outlet for pickup. The shipping time is usually pre-set for a product and the location. The shipping cost is optimized on the routes that would be the shortest consolidation for a particular batch of deliveries. This does reduce carbon emissions from transportation, but after looking at the process from a global perspective, we can come up with some very different green ideas.

For example, is the consumer offered the option of a delayed delivery on the grounds that it would be greener? This would give the retail chain a larger bucket in which to consolidate deliveries and optimize routes. An order may be delivered in bits and pieces along with other deliveries to that location. This can be encouraged with a shipment discount, which in turn may increase demand (Fig. 4.2).

The role of IT is very different here. It will require managing green campaigns on CRM and portals and devising dynamic shipping discounts. It can then use scheduling algorithms based on flexible shipment timings. Yet the truly entrepreneurial CIO can demonstrate efficiency gains by connecting various systems and using green data analysis to show visible results.

Notice that this initiative starts with green and ends with profits (more demand and less cost) – it is in fact additional efficiency according to the GHG Protocol.

There are two aspects of the business lifecycle. One is the product lifecycle and the other is the operations lifecycle. They represent two aspects of green management – green by design and green by controls. They go hand in hand.

Total Cost of Environment from Lifecycle


Additionality has two sides to it, as well: a practical side and a philosophical side. Most green investments today have a high acquisition cost. Some of the pure green initiatives may return high on investment only after a long period. In short, high capital investment is the key bottleneck to sustainability, not a lack of social consciousness. Any green strategy that does not recognize this impediment won't be very practical. Having said this, we will see how green accounting could be very similar to conventional capital accounting.

Total Cost of Ownership (TCO) is an old costing method used in the aerospace industry and later popularized by Gartner, an IT analyst firm. The concept, simply put, says one should include the cost of running an asset across its useful life in addition to its cost of acquisition. Assume that in a perfect economy market, the TCO for all competing products is the same because if the price of a product is high, it will most likely be more

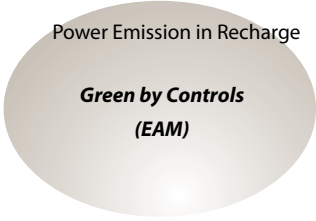
Fig.4.4 : PLM versus EAM Approach

How two approaches hedge each other on Total Cost of Environment

Product Life Cycle Management Approach (PLM)		Parameters	Enterprise Asset Management Approach (EAM)	
Implementation	Example		Implementation	Example
Green Components	Recycled Material Used by Apple	Supply Chain	Green Accreditation	IWay Enrollment by IKEA
Eco-labeling	ISO14040	Branding/Marketing	Green Merchandize	Walmart Sustainability Index
Low Consumption	Reduced Water Use	Administrative Cost	Reversal Policies	Water Treatment Plant
Recovery Policies	Dell's Disposal Buy Back	Health and Safety	Disposal Policies	Waste Treatment
Product Emission	Hybrid Cars	Power	Site Emission Caps	Power Emission in Recharge



Green by Design (PLM)



Green by Controls (EAM)

Notes:

- PLM and EAM play complementary roles
- A firm can be placed more strongly in one of the two
- The policies are governed by investment cost versus control cost

Total Cost of Environment

Source: TCS Global Consulting Practice - Research Desk

efficient to use (otherwise, it would cost less). So TCO, whether or not strictly measurable in real life, presents an interesting dichotomy. One has to constantly hedge capital cost with running cost. To help define the balance, one has to look at financial liquidity as compared with the useful life of the asset. Interestingly, the same dichotomy applies to accounting for green efficiency.

Green by design, that is, making a product designed to be eco-friendly in production and use, can have higher development costs. Conversely, a business can improve itself by making its operations discharge less emissions using green controls (i.e., using water treatment plants instead of designing products that consume less water). A business has to constantly hedge between the two. The deciding factor is the net emissions saved by the firm, which may thus be called Total Cost of Environment.

In fact, this dichotomy splits green management into two conventional disciplines of IT - Product Lifecycle Management (PLM) and Enterprise Asset Management (EAM). The former is evolving faster toward green by design, and the latter toward green by controls. The two disciplines play complementary roles, with one often overcoming the shortcomings of the other (*Fig. 4.4*).

Lifecycle Matters More

The philosophy of sustainability is that a business gives back what it takes. Optimizing a process or product, in and of itself, does not matter if the net environment cost is not reduced. Many sustainability initiatives are local. One may adopt electric power in place of fossil fuels, yet most electric power is generated with coal, which has higher emissions. This contradiction will be more pronounced in the near future. Intense measurement may not be the answer to this problem – rather a company will have to redefine its fundamental operations.

The financial benefit will not be things like traded carbon, as is seen today. It will be a new form of efficiency and when that shows up, businesses will come to terms with the environment more quickly.

As sustainable green efficiency has evolved, so has the role of the CIO. As the keeper of the IT shop, the CIO started with green IT. When sustainability became a business objective, the CIO had to be consulted when defining green processes and analytics. Today, however, the CIO goes beyond that. He is an evangelist of how green can benefit business, if not the environment as a whole.



IT for Innovation

Customer Relationship Management

When Social Intelligence Is Business Intelligence

Anita Nanadikar

VP & Head, Connected Marketing Solutions

How social networking
is changing the
rules in business...

Abstract

It is a new paradigm. Customers are speaking out openly. It is as if businesses are on public trial every day. Online social media challenges the traditional relationships businesses have with their customers. But forward-thinking businesses consider social networking from a fresh vantage point. Facebook, Twitter, Yelp, and other services like them can tell us what our customers need, what they will buy, and when they will buy it. It is as if the old promise of business intelligence is finally coming to fruition.

What is the reach of social networking when integrated with CRM? Can we really merge online qualitative social data with CRM in an automated way? What can businesses do today and what can they hope to achieve in the near future? This article discusses the evolution social networking is sparking in business.

CRM and Social Networks

The Internet is metamorphosing, and social networking is just part of this dynamic change. Society has found a new form of expression and is forging new connections. Does it change the basics of the way people relate? For example, an introvert in the offline world can become an extroverted blogger.

At the same time, businesses are poised to capitalize on social networking. Ethical or not, intrusive or not, hard lines have yet to be drawn in the online social world. Society and businesses are dealing with a new frontier. The social structure will eventually settle down. However, it is difficult to predict the evolution of online social media based on offline societies, since they had household, patriarchal, or even feudal structures, from which online media are free. Hence, attempts to draw inferences from the works of Hegel⁵ or Karl Popper⁶ to predict the path of the evolution of social networks over time face some difficulty.

In the middle of this evolution, a new breed of software and tools is emerging that helps leverage the data from online conversations. The data contains customer conversations and feedback from people who influence buyers and users of our products. Their tones are diverse, with feedback from kudos to insults. The problem is that all of this data is unstructured. Emerging “sentiment analysis” tools use language heuristics. For instance, you put in your brand name as a keyword and select Facebook as source, and the tool can say how many people are happy with your brand and how many people are annoyed. You can even drill down to individuals and tag them as leads. But how accurate are their assessments? The tools claim accuracy levels ranging from 60 to 80%.

Is this all premature, when the very language of social media is still in flux? Social media’s expressions of meaning will evolve rapidly in the coming years, affecting the semantics and taxonomies of social networks and the data that we see today. Nonetheless, developers of these tools cannot afford to wait.

It is clear that the rules of the game are changing, especially the rules of marketing. Because consumers research products online, word of mouth on social networks spreads faster and is more effective than ads. However, businesses have yet to effectively connect social media with backend business systems like CRM and ERP. Add to this the relative immaturity of social media analytics tools; what value can these tools currently add?

Can Social CRM Deliver on the Original Promise of CRM?

In enterprise applications, or any software for that matter, only 20% of the functionality is really used in practice. Most businesses use CRM simply for tracking sales pipelines and for customer support (field service and contact centers). However, the advent of CRM in the late '90s brought with it the promise of being close to the customer at every “touch point,” knowing the customer’s tastes, preferences, and buying patterns, enabling businesses to predict demand. Over time, this promise evaporated. CRM became an extension of ERP, with the sales force simply tracking leads and the support staff tracking problem tickets.

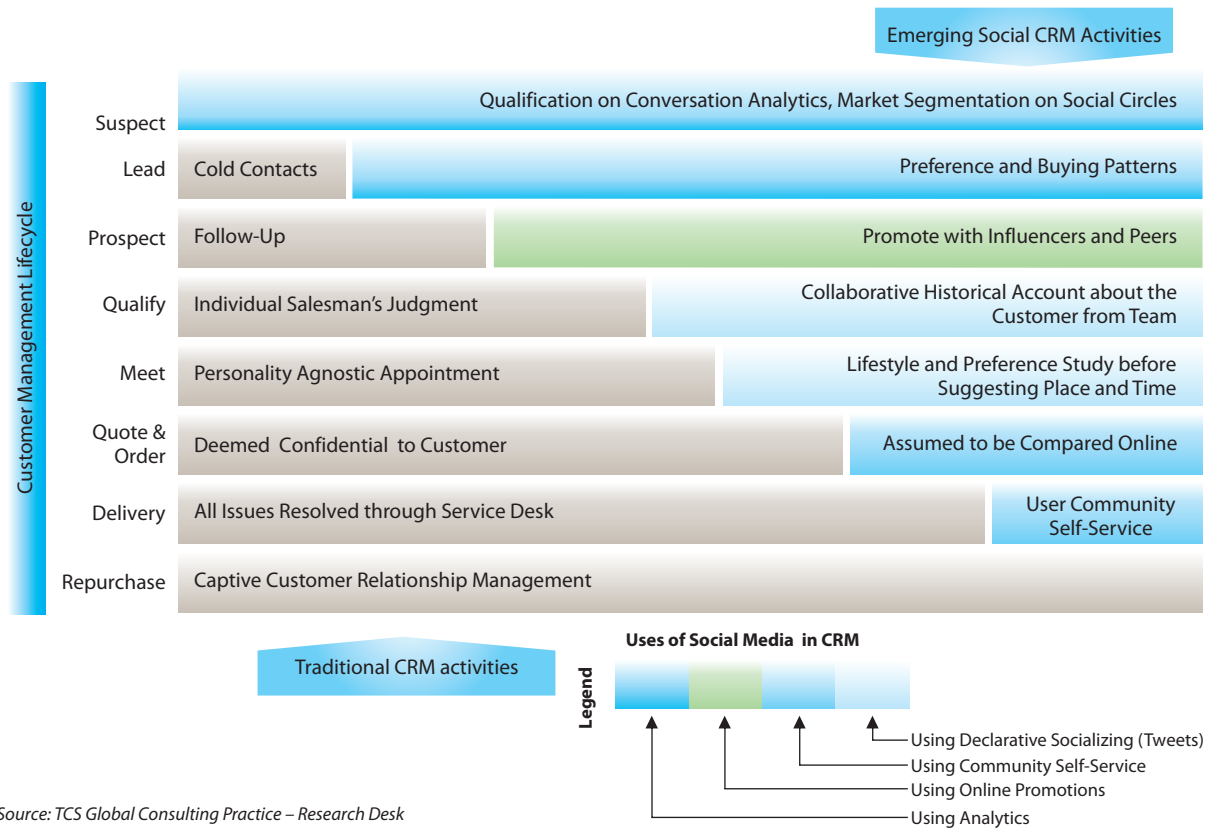
Now, with social networking pulled into the CRM fold, it seems the old promise of CRM has been brought back to life. Social CRM has become a buzzword at a time when social networking itself is evolving dynamically. First, let’s examine why CRM fell short of expectations and then we can project the extent to which social networking can bridge that gap.

Limitations in traditional CRM stem from the very cause that brought practical challenges to Business Intelligence (BI)-over-reliance on external data. BI originated with the expectation that cross-entity data mining would mature to the extent that consumer taste and preferences could be traced from transaction points such as credit card transactions. Capturing customer data at various points over-burdened the front office with more data entry than output. It turned out to be impractical in a real-life office environment.

Now the question is, will this problem be resolved if data entry about customer preference, taste, inclinations to buy, and so forth is handled automatically? It seems that integrating CRM with social media should solve some of the problems CRM had.

Integration with social media bridges some of the gaps in traditional CRM (*Fig.5.1*). The reason is that social networking empowers customers to tell their peers about their choices. Social CRM simply channels this data into CRM in a meaningful manner. Services such as Facebook and Twitter are data sources themselves, and there is no need for business web sites to create their own online customer forums (many have made that mistake). On the other hand, connecting the large number of anonymous social voices with customer records in CRM remains an untapped area, requiring more advances in analytics.

Fig. 5.1 : How Social Networking Complements Traditional CRM



Source: TCS Global Consulting Practice – Research Desk

The diversity of interactions on social media plays different roles in the CRM buying cycle. For example, we call the social interaction on Twitter declarative socialization, since on Twitter, customers can broadcast their activities to their friends and peers. Twitter can be useful in customer support; the customer can simply tweet and the nearest support person can respond. Facebook, on the other hand, can help in gauging customer sentiment from interactions posted online.

We see that social networking holds promise for CRM. However, since we are dealing with unstructured data and a largely anonymous population, the analytics to yield actionable insights are still evolving. Natural Language Processing (NLP) will take a few years to mature. The ability of a system to pick up on the nuances in a conversation, tag it to the context, and gauge the sentiment are still far from 100% accurate. As a result, we limit this discussion to what businesses can glean from social CRM in the near term.

Social Networks and Current Business Use

How does Facebook differ from Twitter, and Twitter from LinkedIn? If you try to explain the functionality in a detached way, it is rather hard to explain the differences. Yet they play very different roles in our lives and in business. For instance, Facebook may be a better choice for putting up a discussion forum about a domestic product. LinkedIn could be a good way to get connected with a professional faculty. Twitter, on other hand, helps to keep people informed with a single short broadcast message. We also have Yelp, which is no less disruptive - a search engine that distinguishes itself from Google by being a local yellow pages open to public feedback. (If you are looking for a Mexican restaurant in London, check out the feedback on Yelp, but don't expect any restraint in those reviews.)

The examples cited bring us to four business uses of social networks (*Fig. 5.2*) declarative messaging (Twitter), community self-service (Facebook), social network analysis (sentiment analysis and other classes of analytics we will discuss), and indirect sales channels (marketing and promotions on social networks). We will explore the practicalities of each of these when social networking is integrated with CRM.

Fig. 5.2 - Benefits of Social CRM
What's a Safe Bet and What's a Long Shot in Social CRM
Social Media Attributes

	Analytics			Promotion			Community Self Service			Declarative Socializing (Tweets)		
	Safe Bet	Long Shot		Safe Bet	Long Shot		Safe Bet	Long Shot		Safe Bet	Long Shot	
Sales Force Automation										Lead Allotment		Automated Scheduling
Field Service					Field Promotion through Community Members					Case Allotment		
Contact Center		Known Error Database Mining (Manual)	Automated Resolution Mining		Upgrade/Patch Notification		Level Zero Problem Resolution	Customer Satisfaction Analysis		Ticket Routing		
Pipeline Mgmt.			Pipeline Generated From Sentiments		Feedback-Based Prospect Qualification					Collective Qualification of Prospects by Sales Force		Grouping Customer Attitude
Market Intelligence		Discrete Data Like Social Circles, Social Statistics, Traffic Analytics	Natural Language Processing		Teasers		KPO on Community Self-Service Data	Advanced Sentiment Analysis (Automated)		Archiving Tweeted Tickets for Compliance		Automated Opinion Building
Promo. Mgmt.		Identifying Influencers	Definitive Peer and Influencer Identification		Aligning Promotion to Identified Influencers	Effectiveness of Non-Interactive Ads (Speaker vs. Listener Strategy)	Viral Marketing	Market Penetration Gauging (Analytics)				
Product Mgmt.		Sentiment Analysis Screening				Very High Ad Effectiveness	Sentiment Analysis on Social CMS Data	Automated Configuration Management on Social CMS Data		Opinion Generation through Surveys, Polls		

Source: TCS Global Consulting Practice – Research Desk

Typical CRM Components

The State of Sentiment Analysis

Did we ever wonder why smileys came into vogue on chats and comments in social media? Literal language has one limitation– it cannot convey true context. For example, if you say, “I am done with it,” it could mean you have finished the job, or it could have a more negative connotation - that you just gave up. H. Paul Grice¹ wrote widely about these differences in meaning, calling them *pragmatics*.

We believe that today’s limitations in Natural Language Processing lie in capturing pragmatics. While we have tools that perform sentiment analysis on textual data extracted from Facebook and Twitter to tell how our customers feel about our products, the accuracy levels vary from 60-80%. To understand the shortcomings, we need to understand linguistics more deeply.

While there are several schools debating the structure and modular aspects of language, a simpler explanation can be taken from A.P. Martinich’s *Philosophy of Language*.² Interestingly, Martinich uses Grice’s pragmatics as a part of language organization, which Martinich classifies as follows:

- Semantics: Relational structure that comes before representation
- Syntax: Symbolic representation (grammar)
- Pragmatics: The context, independent of representation, conveyed by facial expression, place, noise, and so on. It also has cultural attributes.

Today, sentiment analysis is quite successful in processing (parsing) syntax and semantics to quantify sentiment levels. However, there is an enthusiastic school of linguistics that believes pragmatics have a larger role to play in sentiment analysis. One hypothesis is that pragmatics fail when we process shorter sentences, which appear blunt.

For a prudent businessperson, however, the statistics that sentiment analysis provides (blunt, as the followers of Grice would call them) nonetheless help in providing some rules of thumb. At the end of the day, that is what most businesses run on!

Source: Perspectives Research, Tata Consultancy Services

Here are some applications of social networking in business:

Bringing an internal reality check to the sales pipeline – While the sales pipeline dashboard is one of the most noted features in CRM, ask sales managers how much they trust the figures shown on it and you'll hear a different story. Leads are entered with optimism, but never eliminated when the opportunities don't materialize. In addition, month-end pressures keep the numbers rigged. Can social CRM bring a reality check to unrealistic sales pipelines? The answer is yes.

Democracy is not the answer to everything in the world, but when it comes to qualifying prospects among the sales team, it works. For example, John has a customer calling a few times asking him about a product. John tweets his interaction to the team, and his colleague Harry catches it, recalling - "Oh, he is waste of time." Notice that this is not customer social interaction but interaction within the sales team using the same platform. This is equally important.

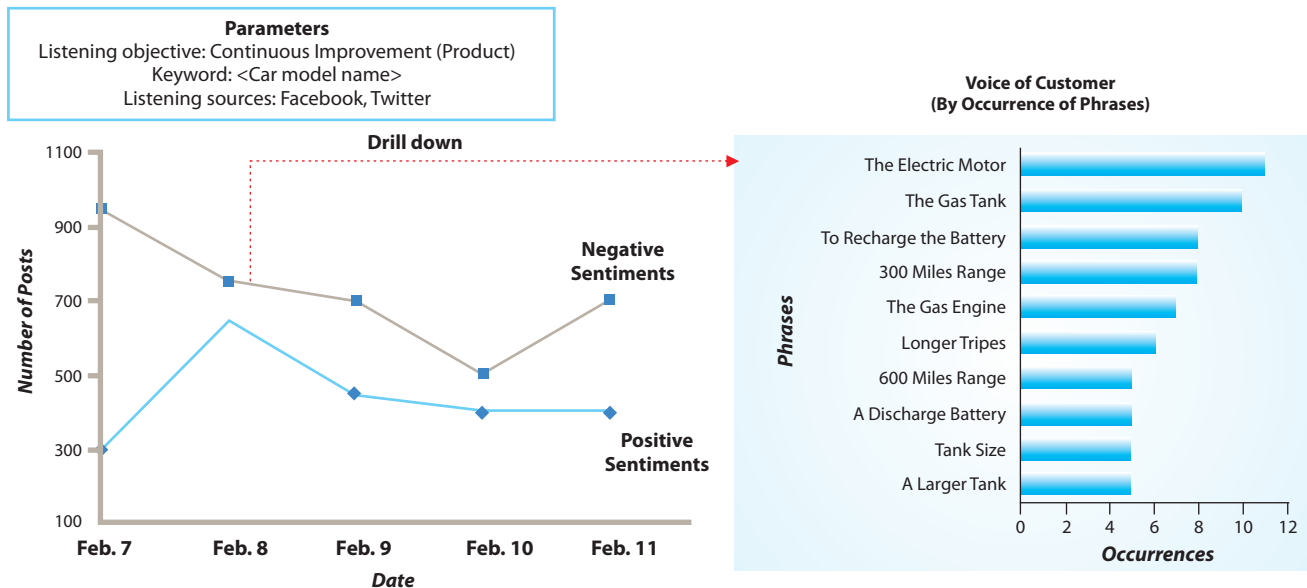
Customer self-service at its best – Service management, a discipline of customer support, derives its best practices from ITIL standards. The functions of the service desk, like managing problem tickets at various levels of severity with a change management process, are well defined in ITIL. ITIL also talks about having a Configuration Management System or CMS - a knowledge repository that helps support teams resolve problems by looking at historical records of resolutions. In simple terms, a CMS is the service desk back office. However, for most customer support functions, it is hard to establish a truly useful CMS.

Many support inefficiencies stem from a lack of configuration knowledge. Interestingly, with social networks, today CMS ceases to be the support back office; rather it has come out in the open enriched, changing the very definition of CMS. Let us see how.

Today, a significant proportion of customer problems are resolved online by users helping peers. The support desks rarely need to intervene. Forums and blogs are enriched every day by users who narrate experiences of how they solved problems themselves, which in turn are used by other users who Google them. Aren't these repositories a kind of CMS in their own right? It is interesting to note that until now the service desk best practice has been to increase the number of first call resolutions, or FCR, (problems resolved at service desk without involving the technical team). We now see the "next practice," where calls pre-resolved before they are reported to the service desk (usually referred to as level-0 problem).

If the authors of ITIL are reading this, I believe that CMS should cease to be the service desk back office and that social media should become as an essential component of ITIL.

Listening to social conversations for improving products and quality – The data in the “social CMS” (as I would call it) can be used for designing new or improved products using sentiment analysis tools. Sentiment levels of customers regarding the launch of a new car can be tracked and analyzed (*Fig. 5.3*). This is further drilled down into the “voice of the customer” based on occurrences of phrases that indicate causes of complaints.

Fig. 5.3 : Using Voice of Customer for Continuous Improvement of Product

Source: TCS Connected Marketing Solutions – listening@tcsdigital platform

The technology behind such analytics is still evolving, and recent developments promise more maturity in coming years. Today, such analytics is limited to contextually harvesting social data. Comprehensive analysis will, however, require human intelligence for tasks like filtering out noise from nuances inaccurately tagged to conversations. This is in fact emerging as a specialized form of Knowledge Process Outsourcing (KPO). With such tools, the KPO process can become more efficient.

Time to market shortened – The benefits for listening in on customer conversations are not confined to customer support. They apply equally to product development. Product improvement ideas and defect resolutions are captured more easily and faster on social media today (the same way we discussed in service management) when a beta is released to social media to test user reaction. A client that sells mobile devices uses social media to listen to customer feedback about issues such as poor battery life and blank screens. It uses sentiment analysis tools to filter the messages and then finds patterns on product feedback. For the product managers, these tools enable feeling the user's experience and preventing defects well in advance, shortening the time to market.

New Frontiers in Social Networking Analytics

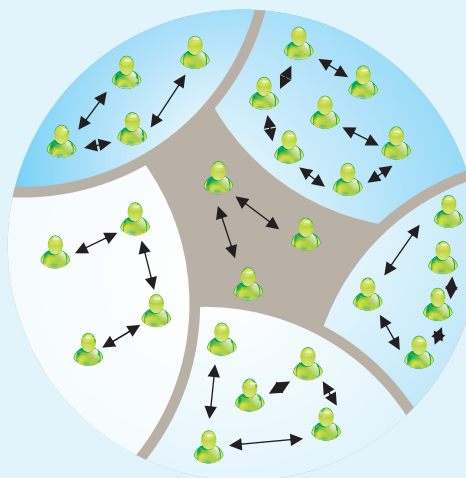
The expectation that social networking analytics can provide better feedback about customer experiences requires additional examination. While places like Facebook and Twitter contain rich customer interactions, analytics have been less successful in dealing with soft data from such sources. Quantifying textual data, which falls in the field of cybernetics or artificial intelligence, has a long way to go to translate conversational data into discrete product suggestions or even just “the voice of the customer.” Today, many BI tools on social networks claim to have this sophistication, but practical uses elude certain heuristics (like sentiment analysis as suggested in this article).

Therefore, for CRM planners, the more practical question is what part of social network data is quantifiable by automation for marketing. We believe this is where a lot of innovation is in the making. Technology and business can tap the true potential of social networks.

We will present one practical application of the social network analytics. It goes into the realm of abstract mathematics, but bear with us.

Social networking is a marketplace that does its own segmentation; each social circle can be considered a segment. For example, if A is a friend of B and B of C, A is directly or indirectly connected to, say, 1000 people. These 1000 people could be called a social circle surrounding A. We may call these 1000 people the perimeter of A's social circle. The relationship of A with members of A's social circle is mathematically called an equivalence relation⁴ since such relationships are transitive (carried from one hand to another) and symmetric (mutual). Now, going by the law of equivalence relations, any society defined by such relations would bear a set of communities that would be both disjointed and collectively exhaustive. Hence, any social networking site is a disjointed set of finite social circles. What does this mathematical principle have to do with marketing and CRM?

Any social network is a finite collection of disjointed communities, according to the law of equivalent relations⁴



Traditionally, a CRM system would judge a customer's purchasing power using a historical account of his or her purchases. It would be unaware of how the customer may have further promoted sales by word of mouth. Today, thanks to social networks such as Facebook, we can estimate a customer's word-of-mouth capacity by using the social circle perimeter. This can be quantified since popular social networking sites provide developer APIs to calculate this metric to a certain degree of accuracy. Such APIs can be further integrated with CRM.

Citing another example, suppose a firm decides to come up with transferrable discount coupons for its product to boost sales. It would like to target a market segment with the widest reach and who travel the most. It would then choose the social circle that has the largest perimeter.

As with any analytics, integration with social network analytics eventually comes down to practical algorithms to drive heuristic marketing decisions. It should avoid the pitfall of making theoretical promises that often accompany any new form of analytics.

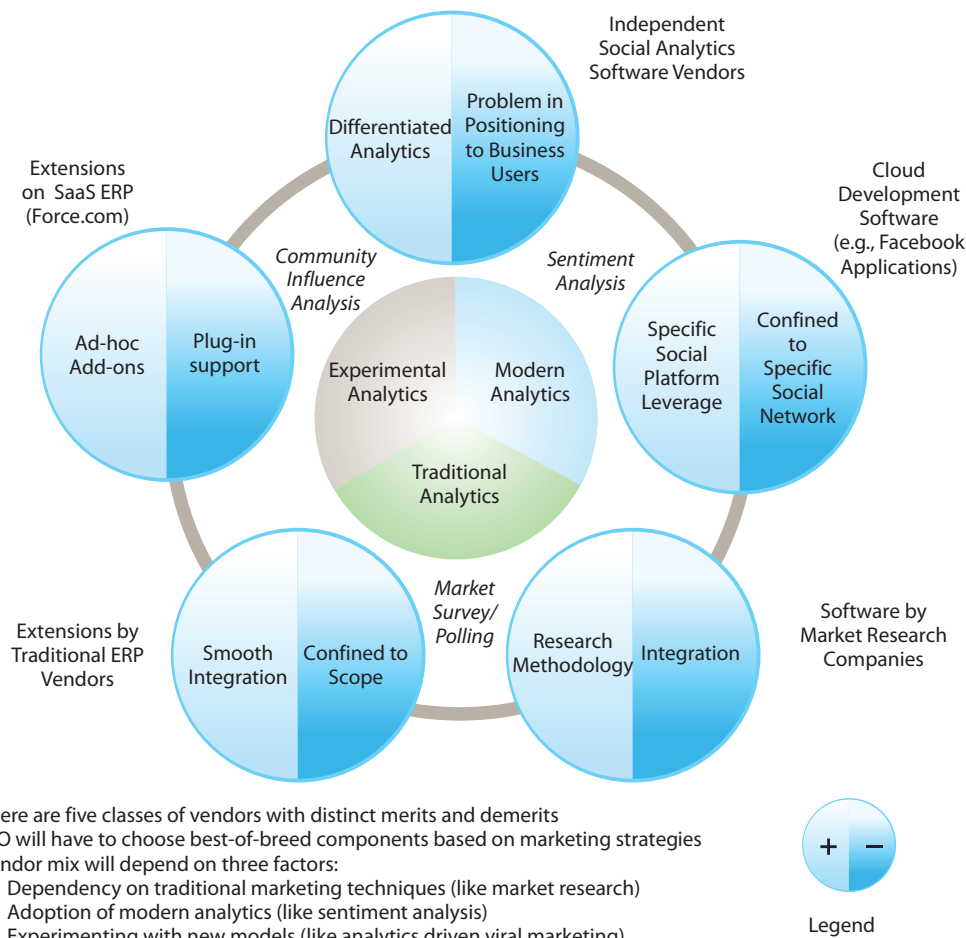
Source: TCS Global Consulting Practice - Research Desk

Lessons from the Past

CRM was reinvented as society also found new ways of expression. Online society will probably normalize, creating its own language, mannerisms, and lines of moderation. It is interesting how subjects such as sentiment analysis and social analytics deal with these dynamics.

For businesses, there are lessons to learn from CRM. There is a part of every software product that lives up to its promise and a large part that remains an ornamental waste. That will happen with social CRM too, even though it addresses many of the gaps of traditional CRM. Customer self-service, listening in on social media, product improvement, and marketing and sales pipeline management are some areas where social CRM can help. Social CRM can help a business to transform itself into a customer-centric organization. It has the potential to provide the 360° view of your consumers by listening to them and engaging with them socially. It brings a new dimension to business in terms of differentiating services to customers and delivering value.

Fig. 5.4 : How the Vendor Ecosystem for Social Software for CRM Is Evolving



Source: TCS Global Consulting Practice – Research Desk

Automation such as sentiment analysis is a promising technology when applied to social networking. Looking at the current limitations of Natural Language Processing, it is good for certain types of heuristics. Relying solely on social media has its pitfalls too. Diversity of languages and cultures makes it impossible for computational intelligence to draw insights beyond a certain point and can be downright misleading. For example, in a market study for a car model, some sarcastic comments were interpreted as positive reviews. Such data is better interpreted by humans. Hence, social intelligence requires simple tools for practical analysis supported by human intelligence, no matter what CRM we use.

For Further Reading

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People Technology

The Workplace Consumerization

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Tomorrow's workplace will be very different; businesses will just have to accept it.

Abstract

The workplace is set to change. Despite security concerns, businesses have little option but to accept the cultural change being brought in by social, cloud, and mobile computing. The workplace will become increasingly virtual, traversing handheld devices, laptops, SaaS applications, and office desktops. We call this Workplace 2.0.

This article does not see Workplace 2.0 in the context of enterprise collaboration and knowledge management. Rather, it deals with how the invasion of gadgets and personal cloud software affects traditional business policies.

For the CIO, this is quite a challenge. The CIO must design a computing environment that enables a new workplace which fosters personal productivity. At the same time, CIOs must keep security considerations in mind, and handle the security perceptions of business unit owners to whom these cultural changes and technologies are quite new.

Where is the workplace heading? What approach should the CIO take?

Simplicity is Key

Simplicity appears to be a key to success. Case in point: consider the success of the iPad. One million iPads were sold in the very first month. It makes all the sophistication we pursue in research and development look wasteful. The iPad is not the first touch-screen tablet; neither was the iPod the first digital music player. Apple products are made beautifully to bring novelty to otherwise old concepts. Today, IT watchers are split on whether iPads will be used in business. When I look at the large number of applications being downloaded onto iPhones, I feel companies will create more iPhone or iPad extensions for their applications to allow users to use them on their personal devices. The lines between personal and business gadgets are blurring.

Apple is not the only juggernaut that believed in making things simple. Google started with a search engine with no ad banners - just a blank page with two buttons - and then proceeded to dominate Internet ad revenues. The Chrome browser has the same "minimalist" approach - fewer buttons, maximum space for content, and very little footprint on disk. The same applies to Google Apps; Google Docs and Google Sites meet most collaboration needs, especially if you are willing to trade features for convenience and collaboration.

Where is Microsoft in all of this? Microsoft taught the IT world that second movers could be winners. Windows, SharePoint, Office, Internet Explorer, and Xbox were all second movers in their categories and are now formidable incumbents. Microsoft is rather quiet in the midst of all the mobile and cloud computing noise. But Microsoft is certainly solidifying its base in the enterprise, where people are finding smart Excel pivot tables a simpler alternative to complex BI tools, and ready-made portals in SharePoint easier than application hosting platforms. If the second mover trick works again for Microsoft, the company may yet win the cloud computing race.

So simplicity rules, but what about the workplace? So far IT has been driven by business policies. Soon IT will be driven by employee choices because personal IT is so compelling. CIOs face a challenge; they cannot stop people from using devices like the iPad in the office, and furthermore it is hard to push users toward an ungraceful desktop.

Devices are disruptive but Web 2.0 and cloud applications are equally so. I posit that devices will increase adoption of cloud applications. For example, iPhone and iPad users will find it convenient to use Word documents kept in the cloud, making Google Docs or Office Live better options.

But where is security in all of this? Where is compliance (with SOX, AML, and all other important regulations)? The CIO is caught in a dilemma between a cultural force and a regime of control. Change is certain and the risks are real.

The following sections sketch the workplace of tomorrow – one that will be shaped by trends we have seen in social, mobile, and cloud computing, all made simple. In this discussion, I'll focus on changes that are imminent.

Changing Security Perceptions

You step off the railway platform and keep tweeting while you walk down the sidewalk. As you enter the office floor, your iPad becomes part of the office network. But Twitter is still connected; your friend list changes, your colleagues and customers come to the fore while the rest are grayed out. Your gadget morphs into a business device as you walk toward your office. You might say that's not fair. It is your Twitter, and the business network should not "hack" it. But what if your company is using Twitter too and has identity federation? With identity federation, all employees have their professional identities subscribed to Twitter, and the employees can opt to connect their personal Twitter identities to them.

Identity Federation Comes of Age – Simpler Way

Workplace 2.0 stands upon the premise that there will be identity sharing between business and personal identities. For example, if users have a personal Google site or Microsoft Office Live subscription, they can share a folder with colleagues through the company's knowledge management application. This is called identity federation. The technology behind this is part of the WS-Security standards, which looked complex. Identity federation experienced a breakthrough with Google, Microsoft, Yahoo, and many others signing up with OpenID, a simpler consortium. With identity federation, there are two parties. One is the authentication provider, like Google or Microsoft, IDs from which can be used to authenticate. The other party is the relying partner who accepts those IDs as authentication in their systems.

The important thing to note here is that soon many businesses will sign up as relying partners of the likes of Google or Microsoft. This will help them in retaining their own authentication system while they swap it with employees' personal authentication at the workplace as the device changes. One can relate it to the Twitter example described in this section.

We attribute the overwhelming success of OpenID to its simplicity. It is a model of Federated Identity simpler than SAML (promoted by Liberty Alliance). OpenID's success reinforces that technology standards are meaningless unless the standard is simple to adopt. Today, OpenID has 35,000 relying parties and 1 billion

This is also the reason I believe that likes of Google Docs and Apps and Microsoft Office Live will be a more popular medium for business exchange than traditional office suites and close-walled knowledge management suites. Despite the richness of features that on-premise applications carry (which I think is only a temporary lead), employees will find live applications simpler to use at home and on handheld devices. Any barrier between such applications and enterprise tools becomes annoying as the virtual workplace increasingly replaces the physical workplace. For instance, you do a napkin sketch on Google Docs and save it on your Google Site only to be disappointed to find it is not shareable with your team at your workplace due to some security control. What if your firm allows a personal

folder to be shared with your business site in a similar federation as explained in the Twitter example?

I believe security will see a sea change in the following years in terms of perception. Many security standards groups are still trying to understand the risks associated with Web 2.0, cloud computing, and social networking. As happened with the Internet, we find an initial surge in control. Eventually we will see a shift in perception. Consider this: if your data is vulnerable to insider theft, Google or Amazon datacenters are probably better places for privacy than captive datacenters simply because your data is less identifiable in a highly multi-tenant environment (in simple terms, user data is logically partitioned instead of physically partitioned). This is an example of a change in perception that will evolve over time. Today, businesses and standards are putting all their efforts in dealing with controls based on traditional perceptions about security. On the other hand, the workplace is tending to shift toward a culture that warrants new perceptions as shown in *Table 6A (see Afterword for more about security)*.

Table 6A : How Security Perceptions of Cloud Services Will Change

Parameter	Analogies from the Past	Evolution of Cloud Providers
Privacy	Eventually people found bank lockers safer than in home	They would be like bank lockers keeping multi-tenant private data
Data Durability	Share certificates became time-proof after they got dematerialized in depositories	They would be like depositories for all electronic data
Malicious Attack	It is more difficult to rob a bank than to rob an apartment	They would have multi-layered managed security like banks have
Insider Data Pilferage	Agency security personnel became more reliable than personal security	Datacenter people would be professionally validated; multi-tenancy rules out insiders

Source: TCS Global Consulting Practice - Research Desk

Workplace 2.0

Workplace 2.0 will have a few specific characteristics. The line between handheld devices and the laptop/desktop gets blurred, and this influences the applications you use. The characteristics of Workplace 2.0 include the importance of sync, dynamic form factors, and fluidity in networking.

Handhelds and laptops seek to be in sync: The critics of the iPad think that it is just a big iPhone, but that may turn out to be the very thing that sells the device. Most of the 9 million iPhone users have documents and eBooks that they would like to view on a larger screen while at their workplace. What if those files are continuously synched with an iPad? In the workplace, handhelds and desktops will seek continuous synchronization. This will call for new security norms (and perceptions).

Dynamic form factor (screen size) to make documents simple: Microsoft Office 2007 is a genuine productivity enhancer and brings a higher level of professionalism to business documents. At the same time, Google Docs chose simple Rich Text Format on SaaS. Microsoft Office 2007 received rapid upgrades.

Business document collaboration is now at a crossroad. Businesses will have to decide between the richness of features that Microsoft offers and the simplicity of Google Apps. If documents, eBooks, and spreadsheets have to traverse mobile devices and laptops with multiple screen sizes, they have to compromise on richness of features for the sake of better portability. At this writing, Microsoft Office 2010 beta offers Office Web Apps that run in a browser. What strategy Microsoft takes to blend the richness and mobility of the cloud has yet to become clear. However, in time, the workplace will not remain captive to a device - and even less so to a software application.

Fluidity in networks will drive cloud applications: As the workplace boundaries get fuzzier, your customers, suppliers, and friends will be closer to you and be an active part of your network in some capacity. For instance, Facebook allows a business to set up a social network within its corporate domain to connect the employees. With appropriate policies, the business may allow the employee to add professional friends such as subject matter experts. These federations do not need to be limited just to social networking, but can include SaaS software in general - the fluidity of business networks will drive the adoption of cloud applications that can include users from multiple networks. Hence, Google Sites and SharePoint Live are better candidates for collaboration suites because of federated identity services.

This raises the question of how new workplace practices affect our approach to enterprise collaboration suites – often called Enterprise 2.0.

Workplace 2.0 and Enterprise 2.0

Workplace 2.0 is about devices and applications driven by user choices. CIOs will need to enable and support them. More importantly, the workplace will become more virtual than physical - the line between home office and workplace will fade.

It seems many Workplace 2.0 practices will become part of Enterprise 2.0 (E2.0), which are Web 2.0 practices (such as social networking and wikis) within the firm. However, their evolution is quite different. E2.0 is social, and collaboration is the natural quality that drives it. On the other hand Workplace 2.0 makes the workplace more personal; it helps one deal with office and home in tandem. Workplace 2.0 requires integration with personal domains by adapting external devices. It needs to manage security risks and process flows through controls and workflows.

Table 6B shows the characteristic differences between the two trends.

Table 6B : Differences between Enterprise 2.0 and Workplace 2.0

Parameters	Enterprise 2.0	Workplace 2.0
Triggers	Web 2.0	Gadgets
Key Technology Enabler	AJAX, Mashups, Atoms	Identity Federation (open ID)
Building Blocks	Communities	Domains (Social/Office/Home)
Security Policies	Mostly Preventive	Mostly Detective
Applications	Collaboration Tools (like Wikis)	Personal Utilities
Integration with Business	Workflows	Extensions (like iPhone Apps)
Organizational Behaviour	Socio-Political and Cultural	Personal Psychology (like Ethnographics)
Policies	Bottom-up or Top-down	Bottom-up
Adoption Metric	Volume of Data Stored	Volume of Data Exchanged
Performance Metric	Reuse and Sharing	Individual Responsiveness (Mobility)

E2.0 adoption, especially in the areas of knowledge management and collaboration, depends on how well people adopt social networking practices. Most E2.0 initiatives are only half way implemented with firms still trying to get people to embrace them more enthusiastically. Amid this, changes in personal computing behavior calls for a fresh look at how E2.0 should align with personal preferences. An example of this can be seen in social media, where mobile applications for social networking have created new preferences for people socializing with each other. Not finding the same collaboration capabilities at work creates a mental block. We may soon find it hard for people to use enterprise social media without an iPhone or Android application available.

Start Simple

We cannot say definitively what practices will drive the workplace of tomorrow. This is because the trend has high ethnographic factors (cultural evolution of preferences). In such situations, the usual practice is to apply standards. However, in the last few years, we have seen technology chasing standards and an explosion of various consortia. Given the limited success of many of the standards that are touted (as in many messed-up SOA projects today), simple technologies prevailed irrespective of the standard they follow. Apple's products are largely proprietary.

Although we pursue standards, it is safer to just start simple, even if the technology is proprietary. Simple things become ubiquitous and ultimately de facto standards. Today, many collaboration suites and groupware strategies are mired in overkill, with too many applications, features, and workflows. Workplace 2.0 requires a strategy that is quite the opposite.

Although open source is often seen as a standard, some recent changes in personal computing have less been affected by open source than by differentiating products such as the iPhone. The dynamics of community innovation and competitive differentiation are very different. The former seems to always emulate the monopolists by making the commodity free. The latter, on the other hand differentiates new product lines to stay in business and then defines an entirely new commodity. Google's Chrome eating away at Firefox and Apple's iPhone eating away at Symbian are examples that show that proprietary technologies will always exist and play the game very differently from community products. Blindly choosing open source solutions is not always wise.

I have been following what differentiating companies like Apple, Google, and Microsoft intend to do to the workplace. I saw a video produced by Microsoft about the 2020 personal computer. Like MIT researcher Pranav Mistry's SixthSense, the computer has no mouse or physical screen. Rather the screen can be thrown on any flat object in front of the user (call it desktop anywhere?), and the user can operate it using finger and hand movements. Interestingly, what iPhone did with multi-touch, a way two fingers together can control software screens, is the same strategy now working on any surface using laser and infrared technology. It shows that the recent technologies are not merely the product of an idea, but the sources of many to come.

In the near term however, businesses must think about how they can eliminate some of the traditional bans put on personal devices in the workplace.

Afterword – Looking at Security

New Threats or New Mitigations?

The perception that data security and privacy can be dealt with using physical isolation overlooks the growing role of logical threats and mitigations emerging in the digital age. We have yet to fully understand the logical threats after the advent of cloud computing. An impending change in security perception warrants deeper treatment.

The physical and logical mitigation of threats is often inversely related. In simple terms, more often than not higher logical security can be attained by less physical isolation. An ideal security strategy should strike the right balance between the two.

One such example can be drawn from healthcare where HIPAA laws in the U.S. protect the privacy of the insured. Such laws in current form have yet to deal with many new scenarios (both positive and negative) that cloud computing presents. We find new mitigations come along with new threats – one has to decide which is more important. Usually, physical security is inherently weak in traditional systems due to multiple versions of patient information being exchanged (partly electronically and partly physically) between consultant doctors, suppliers, and insurance parties. This is more vulnerable to insider pilferage of patient information (one of the reasons HIPAA came into effect). Many argue, cloud Personal Health Record (PHR) services like Microsoft HealthVault, and Google Health mitigate this by having a single source of data, where the patient controls access to medical and insurance parties. This is different from in-house Electronic Health Record (EHR) services by medical service providers, where providers keep patient data and share it with medical parties. In fact, many firms in the U.S. have adopted Google Health as an option and have claimed HIPAA compliance at the same time (like Blue Cross Blue Shield of Massachusetts, the largest insurer in the state, allows patients to keep data on Google Health and to control its access).

The key factor is determining the most likely security breaches and their impact. If insider pilferage of data is more likely than hackers successfully hacking Microsoft and Google systems, a reliable cloud service is a safeguard instead of a threat.

When we apply this to workplace applications like Office suites, we run into such security trade-offs. Increasing use of mobile devices and Internet services like SaaS will overcome weaknesses in physical security of on-premise applications.

The Two Sides of Workplace Security in Workplace 2.0

This article shows a paradigm where employees would use personal handhelds and laptops in business (one may argue it is already happening with personal BlackBerrys). It also proposes how cloud applications, like Google Apps and Microsoft Office Live will enable collaboration between multiple devices across security domains. This opens up new security threats. Are recent technologies able to handle such threats? For example, Workplace 2.0 stands on identity federation between personal identities (like HotMail ID)

and business identities stored in business Active Directory (Single Sign-on login system commonly used in business). We find that, most of the threats we encounter are similar to those that already have existed in on-premise applications, with its form changing from physical to logical. Hence, the mitigations too, would change from physical controls to logical controls.

Let us consider a situation where an employee has a personal Gmail ID and uses Google Apps. He dedicates a folder for business collaboration. The business accepts his Gmail ID and maps it with the business ID on Active Directory (intranet single sign-on). This is possible with OpenID (for techies, Active Directory and OpenID are both LDAP compliant. Hence, they can talk and allow encrypted tokens like Kerberos and OAuth). This would allow users to log into business applications with both their Gmail ID and business ID. Business applications can also fetch data from his personal Gmail folder when shared. The role and access management definitions in Active Directory would define different access rights permitted within each ID.

We will divide the analysis into two perspectives – 1) the threats seen by sharing business information with one's personal cloud folder 2) the privacy concerns an employee may have in sharing their personal cloud folder with business colleagues. For simplicity, we will discuss shared folders instead of security domains, although the same logic applies.

Threats from Using On-Premise vs. Cloud-based Office Apps

Table 6C shows traditional security checks in on-premise applications, and how the same is possible using simplistic implementation when Microsoft Office Live and Google Apps is used on personal devices. We will discuss sophisticated controls for more sensitive data later.

Table 6C : Controls in Office Applications

Control Type	Traditional On - Premise Controls	Features for similar Checks on Microsoft Office 2010 or Google Apps folder
1 Preventive	Disallow pen-drive and USB on desktops	Read-only access; clipboard disabled
2 Preventive	Disable 3rd party internet mail and storage	Read-only access; clipboard disabled
3 Preventive	Synchronize laptop with offline proxy policies	Read-only access; clipboard disabled
4 Detective	Log downloads through internet in server	Edits and sharing logged & notified to business
5 Detective	Log documents emailed outside the domain	Edits and sharing logged & notified to business

Threats from the User's Perspective

When a user has shared a personal Office Live or Google Apps folder with colleagues at work, they may fear intrusion into unauthorized documents that may violate business policies. They would typically handle this as shown in the *Table 6D*.

Table 6D : Risks Users Face with Online Sharing

Control Type	Traditional User Controls	Features for similar Checks on Microsoft Office 2010 or Google Apps folder
1 Preventive	Users define permissions on network	User allows permission for chosen colleagues
2 Preventive	Permitted files are supervised by office proxy	Folders disallows certain file types (like exe)
3 Detective	Application server logs file deposits	User notified on files added through email

In both perspectives, one may find that the proposed solutions compromise on true collaboration and real time threat mitigation. For example, in *Table 6C*, we find that detective controls, like logs, are not appropriate for sensitive data, since the data may leak before the business could react. Moreover, read-only access to users goes against the purpose of collaboration. In fact, current technologies have solutions to this provided the business undertakes advanced implementation of cloud services.

Future of the Workplace: Shared Workspace Integrated with Processes

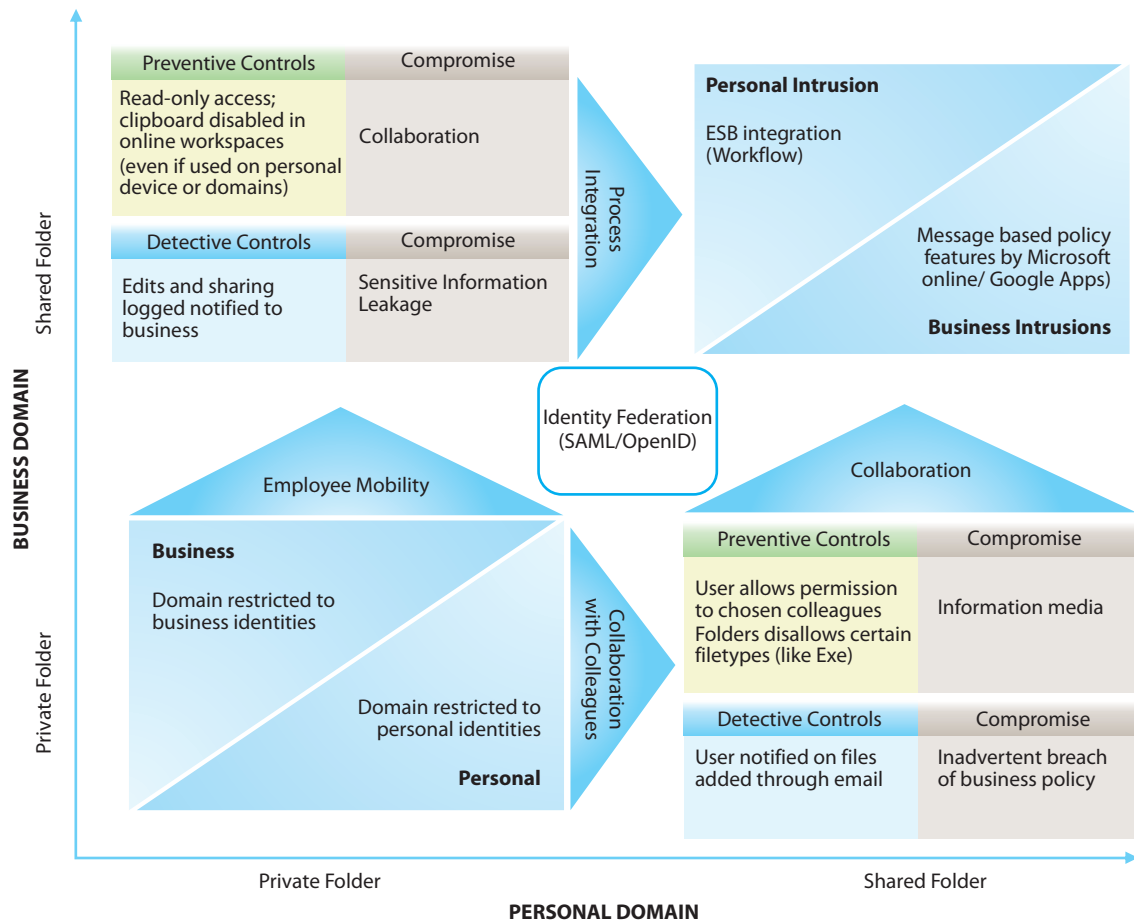
One may achieve true collaboration across devices and domains (business and personal) despite putting preventive controls on information flow. Integrating applications like Office Live and Google Apps with enterprise messaging middleware (typically Enterprise Service Bus or ESB) is one way to do this. For example, a business can drop a file to one's shared personal folder by asking for permission in a workflow. Such processes can be integrated with Role and Access Management systems and SOX middleware like Segregation of Duties matrix (Sec. 404 implementation).

In fact, the Microsoft ESB Middleware BizTalk Server (which is now also a cloud service) allows message integration with SharePoint and Office Live. It also has a HIPAA adaptor to handle specific regulatory controls under HIPAA laws; it helps integrating systems like SharePoint Live with medical information systems.

Google is rapidly coming up with APIs on Google Apps, which along with the Google

App Engine (the cloud development platform), allows community development. Message-based interaction with Google Apps is worth exploring. I am waiting to see a host of adaptors by ESB platforms like IBM WebSphere and TIBCO that would talk to Google Apps. This will make information security and business processes coherent (Fig. 6.1).

Fig. 6.1 : Different Paradigms in Shared Workplaces and Requisite Controls



Source: TCS Global Consulting Practice - Research Desk

Keep workplace applications simple, especially when dealing with data that is not highly sensitive. Simple messaging systems suffice in most cases. Security is always a trade-off based on priority and risks. There is no absolute security in any system or technology.

Product Lifecycle Management

To Reuse or to Innovate: That Is the Question

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Product development should
reuse assets without reducing
innovation, but not all
development activities can
adhere to this rule

Abstract

The idea of having an integrated suite to manage all phases of New Product Development (NPD) is always appealing, and Product Lifecycle Management (PLM) as a methodology promises better sharing and reuse of knowledge. However, most PLM efforts find it hard to move beyond traditional product design and engineering processes.

This article addresses this reality. It examines the question of where, and to what extent, reuse is actually important to innovation. Does a shorter time-to-market in product lifecycle always contribute to creating a unique product? Or, does the efficient reuse of product assets necessarily shorten the time-to-market? This article explores when the objective of reuse in PLM is practical.

Is It a New Business Model, or Just a Break-Through Product?

It's been said that "innovation process" is an oxymoron, which makes the job of selling PLM solutions especially difficult. The speed of innovation may come at the cost of its effectiveness because our quest for churning out quick products distracts us from finding truly unique ones. The methods used for continuously improving existing products as opposed to creating discontinuous new products are very different from each other. The former reuses knowledge and assets; the latter eschews what one has and may require totally new assets. This ideological contradiction is at the center of business innovation today.

Even when discontinuous NPD yields a successful product, a new product may be quickly emulated by the competition and risk becoming a commodity. At this point, the players try to differentiate themselves on their business models by making similar products appealing to the customer in different ways. So here's the question: How wise is it to emulate others' business models? When online stores try to get out another Kindle, or mobile companies try to make an iTunes of their own, or home improvement retailers try to be like Home Depot, it becomes clearer that one can only find a business model when one is different.

Hence, creating a unique product is always the best strategy. The business model follows suit. The products that withstood new markets are ones that are so unique that the brands have become a de facto name for the commodity (Band Aid, Post-It, Coke). These products seem eternal.

However, to make products as unique as possible, reuse should not be a constraint. So, in this article, I explore PLM purely on its promise of reuse. PLM has purposes beyond that, but the expectation of efficiency usually comes from reuse and repeatability. We will see to what extent reuse is desired and beyond which it is idealistic.

Innovation Process: An Oxymoron

The contradiction between innovation and efficiency caught the attention of business thinkers when businesses started adopting Total Quality Management en masse. The key element in efficient processes is that they should be repeatable. However, repeatable processes can be seen as stifling innovation. There's evidence of a philosophical shift in the writings of some gurus whose tune has changed over time. For example, Tom Peters' popular book from the 1980s, *In Search of Excellence*, is in subtle contrast to his more recent book, *The Circle of Innovation*. In fact, he is one of the main people who says that "orderly innovation process" is an oxymoron.

Applying this philosophy to PLM is not as generic as it may seem. PLM started with the vision of efficient NPD. It was a way to institutionalize and fully realize the potential of processes like Coopers' Stage-Gate (which entails sequentially funneling ideas into products). Stage-Gate saw "time-to-market" as an important metric.

Yet, firms that churn out more products are not necessarily the winners. In an age where differentiation rises above efficiency, "time-to-market" could easily lose to "change-the-market." This distinction is of profound relevance to how the entrepreneurial CIO sells his or her services to the business units.

PLM will no longer be the same. Processes will become looser, and people-productivity enablers will gain importance. PLM will include more tools and utilities to play with ideas, sometimes not considering what assets are reused. It will support more simulation and less emulation. In this regard, PLM is one of the least defined suites in IT since it's presently evolving into something quite different.

Source: TCS Global Consulting Practice - Research Desk

What Then to Reuse?

PLM grew out of Product Data Management (PDM), a system for authoring and tracking engineering and geometric artifacts and managing them. As the adoption of PDM grew, businesses saw the value of managing data across the entire product life cycle and business units, not just during the design phase, so the scope went beyond R&D. PLM was developed to connect knowledge and processes across product lines and suppliers. Yet there are still questions about whether the true potential of PLM has been realized, especially in collaboration, traceability, and reuse. Let's focus on reuse.

The usual idea of reuse in NPD relates to the reuse of physical parts. However, reuse in modern product development is not confined to proprietary IP and parts. With increasing globalization, companies reuse less themselves while their suppliers do more. For example, Aerospace is reducing model variants to bring down the time-to-market. They rely heavily on "engineer-to-order" suppliers that respond with designs faster by reusing old patterns. This frees a company to differentiate its product and play with ideas and lets the suppliers be efficient on reuse.

Intellectual Reuse - A Business Metric for IT

When the American Motors Company (AMC) introduced the Jeep Cherokee in the 1980s, it spawned two new product concepts at once. The first was the Sport Utility Vehicle (SUV), a new category of vehicle. Second was AMC's idea of using software to manage product development artifacts. This software came to be called Product Data Management (PDM), the predecessor of PLM. When Chrysler acquired AMC, it extended the scope of the software beyond product development to manage all of its product lifecycle information. Chrysler reportedly gained product development speed that benchmarked at only half of the industry average back then (*Sidney Hill, Jr., "How To Be A Trendsetter: Dassault And IBM PLM Customers Swap Tales From The PLM Front"*, retrieved on March 28, 2008). PLM has since become a product development essential.

If we look at the original promise of PLM (or PDM, back then), it started with the purpose of collaborative design and engineering. PDM became a common database of design and engineering artifacts. PDM thus supported concurrent engineering.

The purpose of a collaborative database wasn't the same as it is in Web 2.0 today. PDM systems were less about social activity (such as a wiki) and more about enabling traceability. The purpose was simply to reuse - reuse either historical data or current data coming from other modules or design centers. Using historical data makes it a database while using current data from outside sources makes it a collaboration suite.

For the CIO, this is an important point. Innovation processes are managed by people who come from the product units. The role of IT is to channel the flow of information for traceability and the reuse of knowledge. Hence, reuse is the primary business metric for PLM system integration.

PDM extended product lifecycle management with the intention of managing the product activity after development (for example, customer experience). It then included the important element of project management - especially funneling concepts, resource allocation, and budgeting. However, despite all the promise of modern PLM, PDM continues to be at its heart, with the simple goal of sharing and reusing intellectual capital.

Source: TCS Global Consulting Practice - Research Desk

Not all assets and knowledge are conducive to innovation when reused, however, the concepts of innovation and efficiency are fundamentally opposed. Innovation relies on people over processes, often overlooking what is repeatable. On the contrary, efficiency is about making processes repeatable in order to make them more economical.

Microsoft secured the highest value on US patents this year (Bloomberg Businessweek 2010) and when I look at their best innovations today (such as implementing DirectX in Xbox and Windows 7), they didn't start with the mindset of reuse. In fact, DirectX came from a team that was trying out things they were asked not to pursue!

This makes me think that the reuse strategy in PLM is often inappropriate, especially when a business hasn't decided whether its next product will be continuous or discontinuous. Ideally, a good business should always strive for discontinuous products and leave continuous ones to their supply chain. *Fig. 7.1* illustrates this, describing the knowledge we try to reuse in PLM along with the different approaches to NPD. Reuse is different for different NPD approaches as well as in different phases of product development.

Fig. 7.1 : Importance of Reuse in a Development Phase Depends on your Product Innovation Strategy

The first principles in architecting for PLM for reuse

- Reuse every where is not practical in PLM; it often contradicts our pursuit of uniqueness
- The phase of NPD requiring most reuse depends on your product strategy

PLM Reuse Strategy	Product Strategy	Discontinuous Innovation	Reuse of Core Competency		
		Business Model Innovation	Reuse of Constraints		
		SBU Formation	Reuse of Resources		
NPD Factors	Practical Reusable Form	Fuzzy Front-end	Construction	Productionize	
VoC	Segments	Where to position?			
Talent Management	Expertise	Who can we talk to?			
Simulation	Analysis	What has worked?			
Business Case	Cost Structures	What estimates are relevant ?			
IP Acquisition	Rights		Build, buy, recontract?		
Regulations	Standards		How did we comply?		
Concurrency	Interfaces		How did we divide work before?		
Supply Chain	Approved Vendor List			Which supplier is best of this?	
Kinematics	Batch Sequences			How did the schedules work before?	

Note: For simplicity of depiction, NPD phases are generalized. It does not strictly follow Stage-Gate or equivalent methodologies.

Source: TCS Global Consulting Practice - Research Desk

For the IT shop, this has implications on integrating business applications with PLM, especially in how one plans for Enterprise Applications Integration (EAI – the middleware that connects business applications so that they can exchange data). For instance, PLM talking to an ERP would exchange cost and production data for estimates. Similarly, Bill of Material (BoM) used to run the materials planning in ERP could help in devising the production model for a new product.

In reality, however, PLM integration has been strenuous since its information is context rich. Mapping PLM to other business systems is often fanciful, as we will show. Let's focus on what is practical today.

We will split the study into two important phases in the product life cycle: the fuzzy front-end, where concepts are developed, and productionizing, the phase that takes design to production.

Too Many Processes in a Fuzzy Front-end Is Not a Good Idea

The best product companies are known to foster an open sharing of ideas. They seek ideas from people outside R&D and from their customers. With this comes a few “best practices” such as idea management systems, which are often a part of Knowledge Management Systems (KMS). A KMS tracks and promotes ideas from employees, customers and partners. Such a system is usually made conspicuous to send the message that ideas are welcome from anybody. Many companies have tried out such tools, but empirical proof of their efficacy has proved elusive outside of a few sporadic instances of ideas turning out into products.

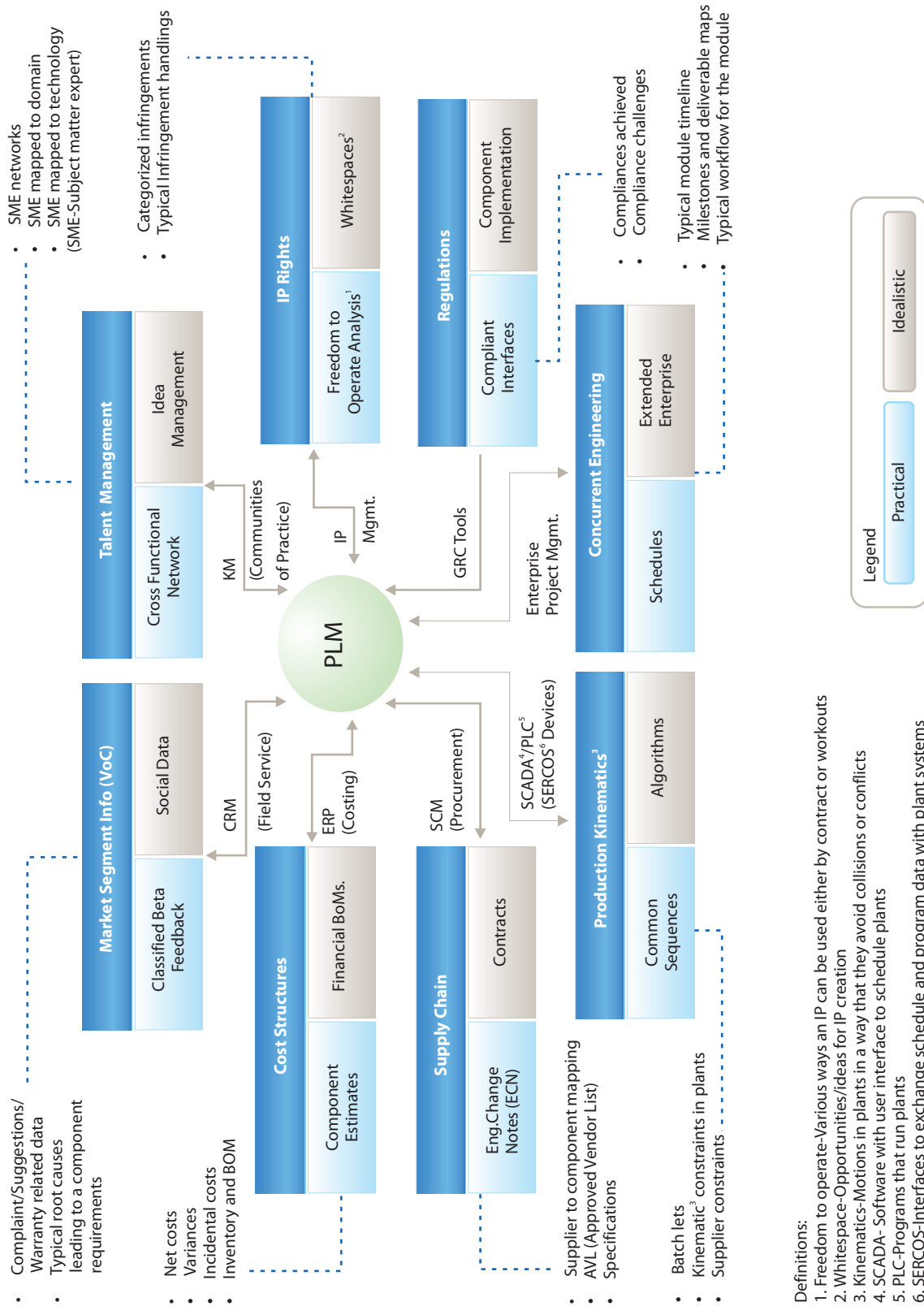
Idea management systems should not depart from the principles of ideation, which do not completely rely on software support. First, most ideas that take practical shape (and survive retrofitting) are not so strictly codified that they could be traced in software. Secondly, good radical ideas are always around; they don’t surface because they succumb to general perceptions about feasibility. The idea that eventually sees the light of day always has a champion to support it. Good ideas perish unless they are pushed.

Hence, PLM might be seen as a discipline to empower industrious people rather than a system for excavating ideas. After all, if people are empowered, the ideas will surface. Hence, idea management systems do not need explicit data integration with the PLM system; the link between the two is softer than that. Sometimes the best way to promote reuse of knowledge in a PLM system is as simple as continuously augmenting the network of cross-functional experts, leaving the information to reside in offline social channels. We saw this in P&G’s Connect and Develop program that uses empanelled cross-functional experts to try and test ideas.

These examples highlight the fact that information architects can easily seek very technical approaches in the context of reuse, and falter.

Hence, I divide all integration with PLM into two parts – practical and idealistic (*Fig. 7.2*). Obviously, it makes better sense to pursue the practical integration first.

Fig. 7.2 : Application Integration for Reuse Information Map



Source: TCS Global Consulting Practice - Research Desk

Reuse Production Data for Faster Time-to-Market

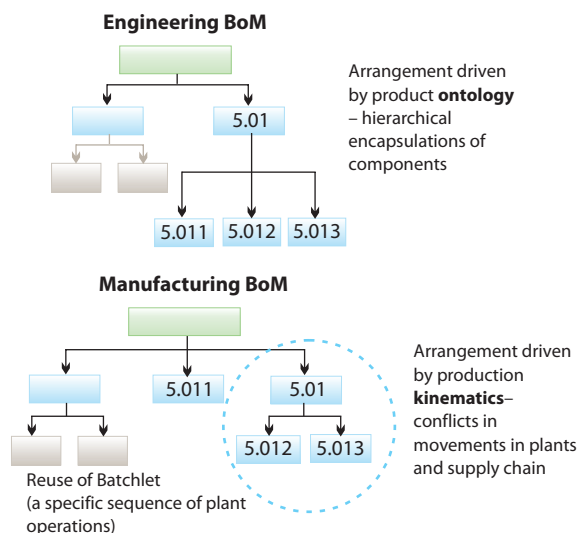
Having talked about the softer side of NPD, let's move on to the part where software plays the most concrete role. A significant part of the delays in launching a new product happens in the transition from design to production.

The setup for production is a design activity in its own right. It requires designing plant schedules and supply chains. It is important to act within constraints that come from existing plant setups and supply chain routes. For this reason, the hierarchy on components in design (called Engineering Bill of Materials or EBoM) is different from the order of assembly in production (called Manufacturing Bill of Materials or MBoM). When a new product is relayed to existing plants and supply chains, reuse is most productive by reusing proven patterns in MBoM.

The translation of EBoM to MBoM involves reordering components to meet the economics of production. The translation is tedious since it requires the transition of knowledge from product engineers to production engineers, who each speak a different language. The production design is driven by kinematics (the motion in plants for assembly) and make/buy decisions. Moreover, production with concurrent suppliers requires a supply chain that often differs from what was thought during product design. Hence, about half the time-to-market is spent in setting up the production.

Fig. 7.3 : Translating EBoM to MBoM

Reuse in MBoM should not affect product uniqueness



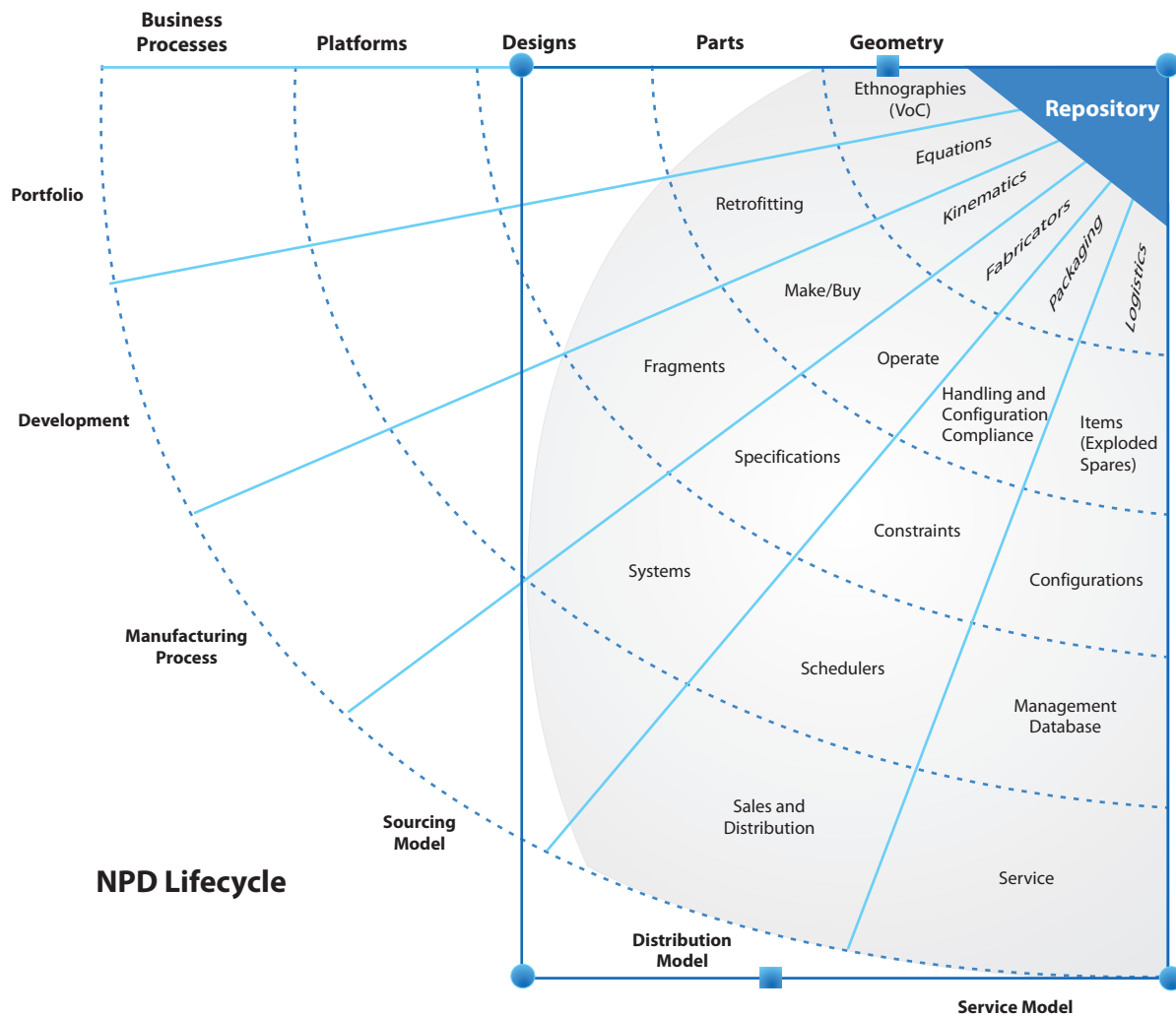
Source: TCS Global Consulting Practice - Research Desk

Recently, we are seeing the growing use of Enterprise BoM - an overarching reference BoM that embodies all the representations (including EBoM, MBoMs, and Service BoM). It is intended to help in contextually mapping reusable parts of the knowledge base and tracing these parts quickly.

However, it is difficult for an Enterprise BoM to include all types of PLM knowledge, especially since the metadata for reuse in engineering designs is usually weak. Hence, reusability is most productive for MBoMs.

Consolidating MBoMs of all products is a good way to start off the Enterprise BoM. In many cases, it is the best part of the Enterprise BoM that supports reuse for faster time-to-market. Fig. 7.4 shows the practical side of Enterprise BoM using the typical classification of artifacts at various levels of the product value chain.

Fig. 7.4 : Where Enterprise BoM Can Support Reuse



Source: TCS Global Consulting Practice - Research Desk

Go Top-Down on Design, Bottom-Up on Production

Reusing assets in the concept and design phases should be softer and social so as not to restrain natural innovation. This applies to your business if it believes in unique innovation as its guiding principle. Hence, reuse should first be implemented in areas that don't contribute to uniqueness. Yes, this goes against conventional wisdom. But in our pursuit of uniqueness, conventions are not the key factor!

There are phases in NPD where reuse is most critical, and such phases consume a significant part of the time-to-market, such as productionizing. Here, it makes sense to have areas outlined where reuse is practical and useful. An Enterprise BoM that is focused more on manufacturing processes is an example of this principle.

For a large part of prototyping and design, however, the role of PLM will remain confined to visualization and people collaboration - at least for now.



The CIO Hats

The Architect

Finding the Right Mix: On-Premise and Cloud-Based Computing

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Cloud computing and on-premise IT can and will coexist, but the question is, how?

Abstract

Charging for IT consumption based on usage, much like electricity usage, has always been attractive. While recent technologies make us think that this business model has come of age, there is a strong perception that utility computing will commoditize IT to the point that it will cease to play a strategic role in business. Rather, businesses would differentiate only on processes and business models.

Not only is this thinking idealistic, but its logic is flawed. It doesn't seem possible that businesses can have unique processes without unique IT systems. It is more practical to infer that the differentiating part of IT catering to processes that are unique to the company may exist at least partly on-premise. On the other hand, commodity applications such as email may move to utility services in the cloud.

This presents an interesting duality, where a business decides which part of IT to standardize as a utility and which part is unique to its business model. It all depends on how the company differentiates itself from its competition.

Enterprise architecture, a discipline that is sometimes seen as impractical or at best theoretical, can be quite practical when determining the right mix of cloud computing and on-premise computing. This article shows how enterprise architecture comes in handy when making such decisions.

Are Electricity and IT Really the Same?

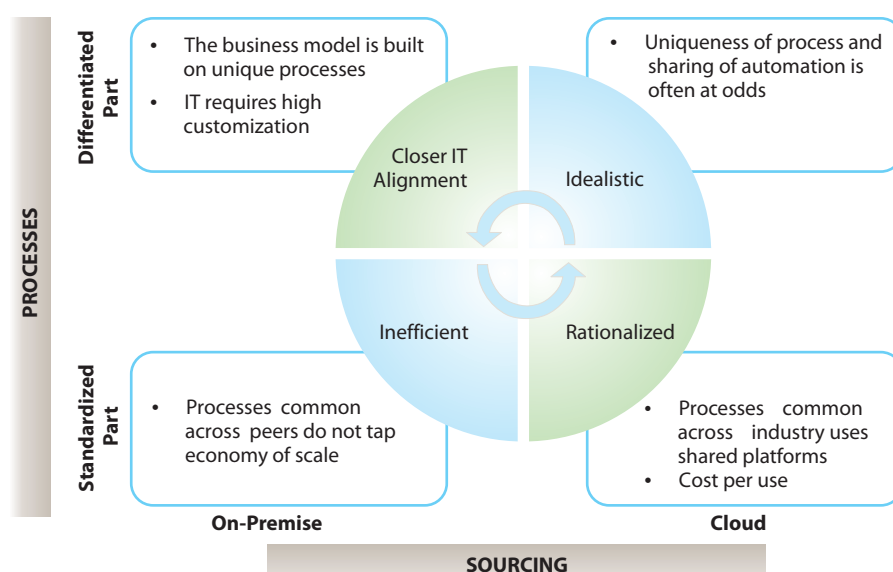
In his book on utility computing, *The Big Switch* (2008), Nicholas Carr, Harvard professor and best-selling author, attacked the current state of IT, comparing it with generator-run factories of a century ago, which consumed administrative manpower and resources to maintain on-site power plants. Comparing IT with electricity as a utility is not a novel idea. It was foreseen by John McCarthy, the father of artificial intelligence, in 1961. But Carr ruffled the feathers of many technologists who didn't like the idea of IT being a lackluster commodity like electricity. Carr argued that IT would become a non-strategic commodity that wouldn't require a role as distinguished as a CIO.

While IT as a utility is a genuine trend, the idea of commoditized IT stretches the credulity of people like me who have spent years sympathizing with customers about how their unique processes require customization of even the best software products. It's hard to see how those products would meet each company's unique requirements, especially if they became utilities used by many companies.

I sound conservative. On the contrary, I know cloud computing is the direction IT is headed, but I think it is not the only direction. There can be a mix of cloud and on-premise applications. This mix will be different for every business, blending unique processes and shared practices. This blend will reflect the company's very business model.

IT is not as homogeneous as electricity. In a few years, IT infrastructure (hosted hardware and network services) will become a truly homogeneous commodity represented by byte streams. Amazon Web Services' mission to sell infrastructure in the cloud is being realized. However, the metaphysics fails when we go beyond infrastructure. Applications such as ERP systems still require heavy customization, some of which is impossible in the cloud

Fig. 8.1: Where IT as a Utility is Idealistic



Source: TCS Global Consulting Practice - Research Desk

since these systems still rely too much upon on-premise components. In fact, your business model and your IT department will rarely be aligned if you try to standardize IT beyond a point.

Having said this, this article explains how IT can exist as a mix of cloud and on-premise computing by choosing between various forms that meet the needs of the business. We address the subject from the perspective of enterprise architecture (EA).

EA can be a transformative tool for IT consolidation, but I have always been conservative in my approach to EA. EA programs have the pitfall of not being actionable, especially when the methodology is too theoretical. Therefore, I have a mixed opinion on the success of EA in general. However, with the advent of cloud computing I find that the definition of EA is changing as an interesting duality unfolds between standardized and custom IT.

To explain the duality, I won't use any EA methodology. Rather, I will use standard definitions to help business architects understand some basic guidelines.

Is the Service Catalog an Alternative to Enterprise Architecture?

In a previous edition of *Perspectives* (vol. II 2009, p 19), we suggested using a service catalog as an alternative to creating an enterprise architecture.

The common view is that a service catalog falls within the domain of IT service management (processes for rendering IT services) while EA is relevant for aligning business and IT. Actually, if a service catalog is well implemented, it can achieve many of the same goals as EA.

But how does a business decide when to use EA over a service catalog to achieve business-IT alignment? Implementing a service catalog is simpler than implementing an EA framework, since it is one-dimensional. At the same time, a service catalog is easier to understand. For example, in a service catalog, first-level business processes are usually shown as links in the enterprise application's portal (since most of them are web-based), and they are in a business language.

EA, however, can help with the broad categorization of application classes based on process and technical constraints. Many firms do not have the IT traceability needed to leverage EA and hence pursue EA in a way that is too theoretical to be of benefit. For such companies, using a service catalog is a better way to start.

Source: TCS Global Consulting Practice - Research Desk

Enterprise Architecture: Theory versus Practice

In the 1970s, John Zachman helped the US Department of Defense (DoD) come up with a framework to consolidate a sprawl of mainframes and other monolithic systems. The essence of the framework was a taxonomy, or the logical categorization of all system artifacts to make them coherent with DoD business goals. Over time, the framework evolved into the Zachman Enterprise Architecture Framework. Zachman created a new discipline and, since then, there have been several EA models including The Open Group Architecture Framework (TOGAF) promoted by The Open Group. TOGAF introduced simplified architectural domains:

- Business Architecture – Business structure and processes outline
- Applications Architecture – Applications portfolio
- Data Architecture – Information sources and channels
- Technical Architecture – IT infrastructure

Arguably, Zachman is still the most logical framework due to its system architecture roots. TOGAF, however, is simpler (see Afterword).

EA became a new framework for business-IT alignment. Enterprise architect became a fashionable job title in IT, but one rarely knew what core competencies suited it best. Analysts hyped EA and later found it hard to defend many of the predictions to which they were mistakenly led. CIOs often found that the EA blueprints that looked so good on the drawing board were fanciful in practice. The recommended changes to processes and technology looked too idealistic to operational people. I would say marketers have misused EA. While EA falls into the context of business-IT alignment, the true value of EA lies in deriving actionable changes in the IT department. Our pursuit of business-IT alignment often ignores the impact on IT while talking about business goals.

Now that corporate IT is splitting into cloud services and on-premise applications, EA can strike the fine balance between these models. There is no approach better suited to this task, as I will show.

The Cloud/On-Premise Duality in Enterprise Architecture

There are four broad categories of cloud services - Software as a Service (SaaS), Infrastructure as a Service (IaaS), Platform as a Service (PaaS – a development environment rendered in the cloud), and Platform BPO (Business Process Outsourcing). I include Platform BPO since I believe it's a native form cloud service. For those not familiar with the trend, Platform BPO is BPO services rendered along with hosted software. We see an increasing trend toward Platform BPO using cloud applications; one example is outsourced customer analytics using CRM systems such as Salesforce.com.

Fig. 8.2 shows 12 architectural states showing tradeoffs between cloud and on-premise applications and infrastructure. The states are created by crossing enterprise architectural domains with the four cloud service categories. The goal is to decide which architectural states can help in differentiating the business.



Fig. 8.2 : Architectural States on the Road to Cloud Computing

On-Premise Architectural Domains		Quality	A	B	C	D
			Business Process as a Service (Platform BPO)	Software as a Service (SaaS)	Platform as a Service (PaaS)	Infrastructure as a Service (IaaS)
1	Business Architecture	Process/Structure	Business Process	Application	Platform	Infrastructure
			Business Process	Business Process	Business Process	Business Process
			Examples	SaaS knowledge management connected to on-premise workflow (internal processes retained)	On-premise CRM analytics on social network data (custom analytics on cloud data)	On-premise service management on cloud infrastructure (for internal security controls)
2	Application Architecture	Interfaces	Business Process	Application	Platform	Infrastructure
			Application	Application	Application	Application
			Examples	Internal product document management (PDM) linked to procurement Platform BPO (standard competency outsourced)	Open source cloud development, production on premise (privacy)	On-premise email client with servers on Amazon EC2 (for high availability)
3	Data Architecture	Normalization	Business Process	Application	Platform	Infrastructure
			Data	Data	Data	Data
			Examples	SaaS BI using analytics online analytics algorithms on data marts on-premises (due to custom open source algorithms)		Data storage Amazon S3 with data marts within VPN (for storage cost and security)
4	Technology Architecture	Environment	Business Process	Application	Platform	Infrastructure
			Infrastructure	Infrastructure	Infrastructure	Infrastructure
			Examples	MS Exchange Live integrated with on-premise Windows Active Directory (for mobility on legacy data)	Azure development with on-premise storage using iSCSI (cloud development with high legacy integration)	

Standardization ↓

↑ Differentiation

- Probable architectural qualities in brackets

Cloud Component  On-Premise Component 

Source: TCS Global Consulting Practice - Research Desk

The tables below show how this works in action. The tradeoff between on-premise and cloud computing can be seen by comparing cells on the diagonal in *Fig. 8.2* and reviewing the mix of cloud versus on-premise solutions chosen to fit the use case in question.

Table 8A : Email Implemented to Align with Business Priority

Business Priority	Availability	Security / Regulations
Chosen Architectural State (See Figure 2)	Cell D2	Cell B4 (the opposite to D2)
Implementation	Storage and server hosting on cloud Infrastructure (like Amazon WBS), with desktop clients	The converse implementation, where email is SaaS solution accessed on browser and the storage in on-premise (like MS Exchange Live integrated with on premise storage and single on)
Cloud Part	Email servers	Email client (SaaS)
On-premise Part	Email client (Lotus Notes)	Email storage and Active Directory
Architectural Quality	Cloud elasticity contributing to availability	Easier security compliance

Source: TCS Global Consulting Practice - Research Desk

Table 8B : Differentiating on Software versus Process

Business Priority	Process Differentiation	Tool Differentiation
Chosen Architectural State (see previous duality table)	Cell B1	Cell A2 (the opposite to B1)
Implementation	Standard hosted knowledge management system integrated with internal processes residing in workflow middleware	A part of the product development process (like analytics given to BPO provider) is outsourced. The tool is internally hosted, since its functionality is unique to the business.
Cloud Part	Knowledge management software (Microsoft SharePoint Live)	Platform BPO for business processes
On-premise Part	Integration with internal business processes via Microsoft Azure BizTalk	Product Data Management software
Architectural Quality	Backward compatibility with internal processes	Compatibility to low cost process sourcing

Source: TCS Global Consulting Practice - Research Desk

We see that there is a continuous cloud vs. on-premise balance reflected in the architectural decisions described so far. The technical issues do not detract from the business issues. On the contrary, these decisions are driven by how IT can help the business effectively perform its unique processes and commoditize the rest. The rationale must never fail to consider the company's business model, even though the actions seem to be based on purely technical considerations. In other words, it is a technical solution to a business problem. This is the very essence of enterprise architecture.

The Utility Analogy Is Overused

Allow me to return to the electricity analogy that made us think that IT would cease to play a strategic role in business. Would the IT that runs Dell's made-to-order supply chain be identical to that of Nokia? If so, these benchmarked firms may well lose their identities. A significant part of IT is a reflection of a firm's differentiated processes, if not its business model. IT is strategic and cannot be 100% commoditized.

In fact, we see a continuous tension between cloud and on-premise computing. This duality will always exist. It is driven by existing applications as well as business opportunities in the cloud. For example, if a business differentiates itself on highly mobile field service to customers, it can rely on existing CRM systems to reuse its custom processes. On the other hand, another business in the same industry may differentiate on "zero-touch" services (no direct support) and rely on OEMs to support customers. It may then use a SaaS CRM that leverages customer communities on social networks and online services.

Given this duality, any company planning a pure utility model for its enterprise in the long term should ask, "Are we ignoring our strategic differentiators?"

Afterword: A Critique of Enterprise Architecture

This article asserts that the traditional Zachman model is more logical than other popular frameworks. This section explains that assertion and criticizes the recent evolution of EA.

Despite a sound basis for the discipline, EA is as much a subject of interest to IT strategists as it is a subject of ridicule for system architects, who think the only thing that EAs can do is draw half-baked diagrams and get away with charging hefty fees. Why is there confusion around EA when it seems to be the only discipline aligning IT with business goals? We blame the plethora of "processes" and "methodologies" that have diluted the purpose of architecture in general. To understand this, we need to delve into two domains. One is how to find a logical basis in EA frameworks. The other is an understanding of architecture in general, the essence of which has been lost as consortia and analysts have been framing the arguments surrounding EA.

The Problem with Generic Frameworks

How do we determine whether a framework is logical? Karl Popper, arguably the best-known modern scientific philosopher, came up with a principle about when a theory or model can be regarded as science or non-science (*Logic of Scientific Discovery*, Hutchinson & Co., 1959). His logic was simple - anything *falsifiable* is science and *unfalsifiable* is non-science. At a first glance, it seems the opposite is

true. Popper argued that a scientific theory would stand on assumed axioms (which can be interpreted as constraints) so that they are testable. When those are shown to be wrong, the theory collapses.*

We find that most popular frameworks and methodologies that have become common ways to communicate in the consulting world are not logically verifiable. The business is overwhelmed with frameworks and methodologies that have little logical constraints or basis; instead, they are anecdotal handbooks and loose metamodels that provide no conditions of falsification. These methodologies or frameworks gain credence when consultants take advantage of the latest IT theories, not caring about any notational or logical sanity.

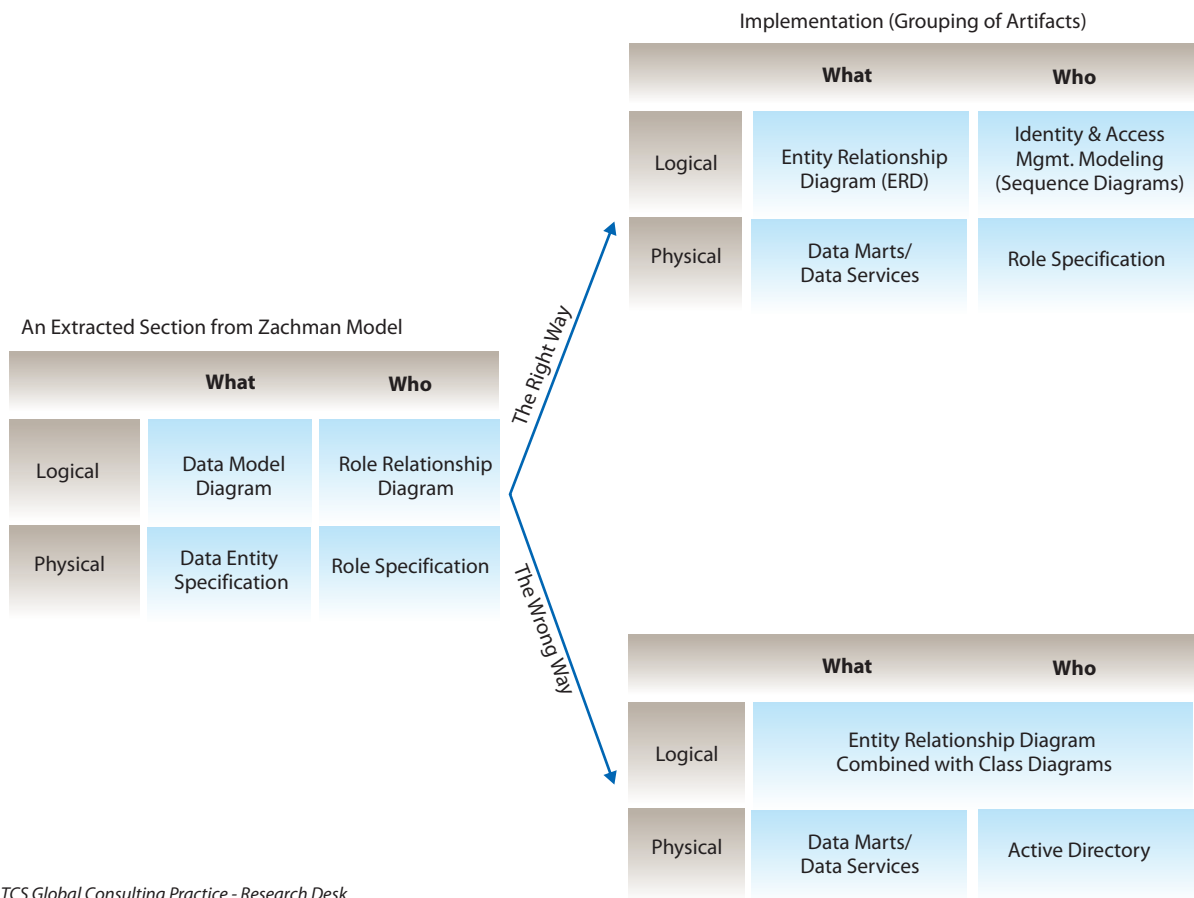
For the CIO, this comes at a heavy price. Even if an EA consultant delivers an EA blueprint claiming to be TOGAF compliant, the CIO has little basis to validate it. Worse, when consortia or makers of frameworks put in liberal clauses that allow architects to define very basic parameters, such statements can make the frameworks meaningless. These “frameworks” or methodologies are peppered with what Karl Popper called a tautology (a statement that is necessarily true and hence pointless).

With time, the skills for enterprise architects were redefined amid such tautology. They digressed from the goal of consolidating enterprise architectural knowledge. Rather, EA became a way to justify IT governance by using it for mere high-level metamodels.

The question is, was EA always a fallacy? Not when it was originally created.

Zachman forced concrete constraints that made sure that only true architects (a rare breed) could use it, and anyone else could not get away with tautology. The primary constraint that Zachman imposed was that any artifact should be confined to the level abstraction and semantics defined in the specific segment of his matrix (see the diagram on the next page showing an example). Hence, an artifact would not overlap the notational and logical boundaries defined within its context. This is a basis for the CIO to validate the sanity of EA blueprints. There are very few EA frameworks, unfortunately, that provide such concrete rules to validate EA.

*Popper took the example of Newton's laws falsified by Einstein through refuting the axiom of constant space and time. Hence, Newton's law is genuine science. On the contrary, Popper cited astrology as non-science because it has no axioms and one can never falsify it (he also classified Freud's psychoanalysis as non-science). Nasim Nicholas Taleb, the mathematician turned popular business writer, cited Popper's principle in his recent best-seller *The Black Swan*, and went to the extent of saying that anything unfalsifiable is not just non-science but nonsense!

Fig. 8.3 : How Zachman Model Constraints Help Check Sanity of Artifacts

Source: TCS Global Consulting Practice - Research Desk

How Far Does a Process Go?

Enterprise Architecture got worse when it split into two schools: taxonomy and process. The taxonomy school believed in the logical categorization of artifacts (like Zachman). A genuine system architect who attained business-architecting skills would subscribe to it outright. It simply asks for artifacts to be grouped into logical compartments, each representing common notation and levels of abstraction. The other school is the process or methodology school. TOGAF has a flavor of this though it is evolving fast toward taxonomy.

Architecture is a discipline of assemblage; the essence has always been that of construct (*The Need for an Analytical Theory of Architecture*, Professor Bill Hillier and Dr Julianne Hanson, et al., University College London, London, England, 1997, and *The Problems of Philosophy*, Bertrand Russell, 1959, p 56). Whether designing a building, planning a city, or masterminding enterprise IT infrastructure, the architect sees building blocks that should fall into place. An

architectural framework says what should fit where and with what interfaces (relationships). The important part is that an architect is not bothered by sequence in this thought process. Rather, two things drive such a person - the architectural qualities of the elements and the architectural patterns (reusable forms and ideas). All you need is a framework that provides rules to document these qualities and patterns at various levels of abstraction. These rules should act as constraints to impose sanity instead of being generic clauses.

The process school views EA as a process. When did architecture become a process? Unfortunately today, many believe that it is a process. One was the Meta Group (which was acquired by Gartner in 2005). Gartner then brought these practice perspectives into EA, emphasizing the fact that it is competency more than a process. However, testability has always remained an issue in EA. I strongly believe, if there is a part of EA that is pure process, it should belong to the task of the project manager, not that of the architect.

Selecting a Method to Use

Let us credit Zachman for imposing constraints to the extent that an architectural work can be tested for sanity. I think CIOs should take renewed note of this. Today, the sanity of work is the first question that dogs those working in EA initiatives.

The analysis below (*Fig. 8.4*) shows how Zachman's framework blends remarkably well into the current IT ecosystem. In most cases anything more generic than this does not make sense.

Fig. 8.4 : Applying the Zachman Framework to Current IT Practices

A Version of the Zachman Framework

	Why	How	What	Who	Where	When
Contextual	Goal List	Process List	Material List	Org. Unit & Role List	Geographical Locations List	Event List
Conceptual	Goal Relationship	Process Model	Entity Relationship Model	Org. Unit & Role Relationship Model	Locations Model	Event Model
Logical	Rules Diagram	Process Diagram	Data Model Diagram	Role Relationship Diagram	Locations Diagram	Event Diagram
Physical	Rules Specification	Process Function Specification	Data Entity Specification	Role Specification	Location Specification	Event Specification
Detailed	Rules Details	Process Details	Data Details	Role Details	Location Details	Event Details

Source: Wikipedia, reproduced under GNU license

Implementation in Today's IT

How CIOs Can Validate EA
A Translation of the Zachman Framework into Current IT Practices

	Why	How	What	Who	Where	When
Contextual	Business Reference Model	Change Management (Stakeholder Analysis)	Balanced Scorecard	Segregation of Duties (SEC 404)	Supply Chain Marketplace	BCG Matrix
Conceptual	Service Catalog (Portfolio)	Business Process Modeling (BPMN/EPC)	Class Diagram	RACI (Under CoBIT)	Business Network Topology (B2B, B2C, C2C)	Risk Appetite & Risk Tolerance (COSO)
Logical	Service Level Agreements	Business Process Execution Language	Entity Relationship Diagram	Identity & Access Mgmt. Modeling (Sequence Diagrams)	Network Domains	Enterprise Process Chain
Physical	Service Desk/ PMO	Enterprise Service Bus	Data Marts/ Data Services	Active Directory	Network Layout	Rules Engine
Detailed	CMDB/KMS	End Points (Services)	Databases	LDAP	Virtual Private Network	Risk Controls
↓	↓	↓	↓	↓	↓	↓
Mapping with IT Ecosystem	Program Management/ Service Management	SOA	Information Management	Role-Based Access Management	Network Management	Enterprise Risk Management
Essence	Alignment	Agility	Performance	Structure	Globalization	Portfolio

Source: TCS Global Consulting Practice - Research Desk

The Changing Role of the CIO

"The whole question of alignment of IT to business is passé..."



Interview with Dr. Peter Weill,
*Chairman, Center for Information Systems Research (CISR)
& Senior Research Scientist, MIT Sloan*

Tête-à-Tête

When we at TCS considered whom to interview about "the entrepreneurial CIO," Peter Weill's name came up immediately. Since the time TCS sponsored MIT Sloan CISR research projects, Peter has been a familiar face to us. As a senior research scientist, his interaction with a wide range of global firms gives him a view of IT that is subtly different from what we see as practitioners. His books, published by the Harvard Business School Press and writings in outlets including the Wall Street Journal, have influenced many CIOs. In 2008, Ziff-Davis recognized Peter among the top 25 on its list of the Top 100 Most Influential People in IT.

Of late, Peter has been studying the changing role of the CIO, especially how CIOs can drive business change. He has identified a persona he calls the "Embedded CIO" - a role he sees emerging from his study of 1,500 companies.

However, he believes that non-IT leaders have an equally important role in exploiting IT. Peter's new book with Jeanne Ross, *IT Savvy: What Top Executives Must Know to Go From Pain to Gain* (HBS Press, 2009), highlights the CIO's need to be a change agent within the firm.

J Rajagopal (Raj), the EVP and global head of TCS' consulting practice, and Peter discussed the changing role of the CIO.

It's great to talk to you again, Peter. The business role of the CIO has been a subject of keen interest to us both. First, when we say that CIOs are entrepreneurial, what challenges do CIOs face in that role?

The entrepreneurial CIO is an interesting title. At the MIT Center for Information Systems Research, we just completed a study of how 1,508 CIOs in 60 countries spend their time. We found that CIOs allocate their time to fulfilling four different roles - services CIO, embedded CIO, customer CIO, and the enterprise process CIO (see sidebar for an excerpt from this study).

A CIO can be entrepreneurial in all four roles, but for me, the key is to help the firm become more agile. When we asked CIOs' senior management colleagues (typically CEOs, CFOs, and COOs) from the most agile companies in our study, they said they would like to see their CIOs spend double the amount of time with external customers. That would mean helping to sell and deliver the firm's products and services.

CIOs have a tremendous opportunity to help their firms by nurturing the CIO-to-CIO peer relationship with their customers. I think nurturing this relationship to help sell and deliver the firm's products is key to being an entrepreneurial CIO.

How Other CIOs Think CIOs Should Spend Their Time

(excerpted from P. Weill and S. Woerner, MIT Center for Information Systems (CISR) Briefing Vol. X No 1, Jan 2010)

- Services CIO (42% of CIO time): Managing the IT organization and its people to ensure delivery of IT infrastructure, applications, projects, vendors, and related services across the enterprise at the desired cost, risk, and service levels
- Embedded CIO (36%): Working with non-IT colleagues, both enterprise-wide and within business units, addressing issues such as business strategy, business process optimization, new product or service development, regulatory compliance and risk, and IT investment prioritization
- Customer CIO (10%): Meeting with the company's external customers, partners, and colleagues as part of the sales or service delivery process, including providing electronic linkages with customers
- Enterprise Process CIO (11%): Managing enterprise processes and the associated digital platform including shared services, product development, operations, corporate responsibility, green IT, and a range of special projects

What are the challenges CIOs face in spending more time with customers? It seems like most CIOs spend all their time keeping the IT shop running.

It's a great question. Most CIOs on an average spend 44% or so of their time running IT services. Now to change that and spend more time in the other three areas, particularly with customers, the CIO has a couple of important levers to use.

One is to help the team step up and take responsibility for some of the activities that CIOs are currently doing today - whether provision a new service or oversee a project or anything else. On an average, CIOs spend only 4.8% of their time mentoring and developing the team. When I show that statistic to CIOs, they nod sadly and say, "Yes, we need to do more" and "we can't bring our team to the next level without that investment."

The second lever is governance processes such as prioritization, business case process, and post-implementation review. These processes need to work systematically and without the CIO spending his or her time in shepherding them. We found that, in firms with good IT governance the core processes like prioritization work relatively well on their own without CIOs personally pushing those processes.

Do you see the CIO's reporting structure as a determining factor in what role he or she plays? How much does the CIO's boss's role matter?

George Westerman and I did a study a couple of years ago. We looked at the impact of the CIO as assessed by peers or bosses, typically the CEO, the CFO, or the COO, as well as at CIO performance as directed by their boss. Surprisingly to many people, we saw no significant difference in performance of CIOs or the overall contribution of IT to business value based on the role of the CIO's boss.

That seems to go against conventional wisdom.

It does. It works in companies where the CIO reports to the COO or the CFO and that person is engaged and understands the issues. It might go against conventional wisdom, but in some ways having a CFO as the manager also has benefits if the CFO is supportive of technology and understands how companies need to digitize. It often helps in getting infrastructure investments approved.

In other firms, particularly in banks, there is a trend to combine operations and IT. At the Commonwealth Bank of Australia, where Michael Harte is the CIO, he has both IT and Operations in his group - he is the CIO, but also effectively the COO, and he reports to the CEO.

So I think it's very much the responsibility of CIOs to work with the structure that they have. We see effective CIOs with all sorts of different reporting structures.

There are always questions about the business value of IT. Showing measurable performance beyond SLAs has been challenging for the CIO. What are the top metrics the CIO should use to show business value? What difficulties do you see in those being both measurable and reflecting strategic contributions?

IT will become more important but more dispersed across the firm. Hence, there will be less focus on the IT budget and the IT unit and more focus on coordinating all the digital assets across the company. For example, BMW CIO Karl Probst has created a governance model that coordinates all digital assets, including robots, CAD, traditional IT systems, IT in sales, and in-car IT. With this and many other changes, BMW can now produce completely customized cars in six days - amazing!

Managing new projects, IT costs, and SLAs: these are the base metrics for proving high-quality and cost-effective IT. But other more business-oriented measures are also important, including time-to-market, reuse, and percentage of sales (or delivery online). For BMW, one very effective measure was the number of cars not produced each month due to an IT issue.

Given the example of BMW, would that mean CIOs should articulate SLAs in business terms?

The metrics should bring everybody in the organization together, breaking barriers between IT and the rest of the company. In IT-savvy companies we see very little distinction between the two. It's hard to identify who is an IT person and who isn't. Having common metrics and a common language really helps.

IT will be forever under pressure on cost. However, measuring IT in percentage of revenues makes less and less sense to me. Rather, I would like to see IT unit cost per service, as they do at Proctor & Gamble. CIOs should have structures that push down run cost and unit cost every year. For example, BMW managed to get the run vs. new percentages of its IT budget to about 50/50, which is leading edge.

We often find that reuse of IT assets across business units reduces run cost. How are CIOs achieving that?

We just finished a study of reuse with over 1,000 companies. I think "reuse" is a word that everybody in the company understands - whether it is reuse of green resources like water or recycling or reuse of any other kind of physical resource or capital. We found that reuse is highest for technology and lower for data and business processes. But the impact on a firm's performance from reusing business processes and data is greater than the impact from reusing technology.

The lesson is that CIOs need to have a governance model (with a catalogue of reusable services and incentives) with their colleagues around business process ownership and data to encourage reuse in these high-impact areas. This is particularly important at the component level, such as a bank reusing credit scoring or customer acquisition across all lending products.

The common perception about business-IT alignment is that IT is being asked to follow business. What is the downside to that?

Frankly, I think the whole question of alignment of IT to business is passé. Trying to align IT to business strategy is too little too late and leads to IT spaghetti that is expensive and not flexible. We think success in a digital world will be about creating and reusing digital platforms of business processes, data, and technology. For example, UPS uses a single digital platform for package delivery in around 180 countries and territories worldwide. The platform provides high-quality reliable service, benefits of scale, and a common foundation to which new innovations can be added.

IT budgets are once again being consumed by new regulations. The costs just keep coming. What is the best way for IT systems to adapt to regulatory changes?

A great approach to managing the cost associated with increasing regulation is to focus on reusing your compliance systems. For many companies, the compliance requirements vary from country to country but the core information is the same. So the firm should work on getting that core information - financial, privacy, disclosure, and the like - into a single platform or data warehouse so that it can be reused and tailored for each compliance need.

Your book on enterprise architecture says CIOs need to find a way to have all business units discuss IT with a common terminology. You believe that businesspeople should be IT aware, if not IT savvy. How can the CIO help achieve this?

In IT-savvy firms, all people think digitally. They ask questions like: How can we handle that process digitally and more effectively? How can we analyze that information to better segment our customers? How can we join up the company digitally so that we deliver a better customer experience? How can we collaborate more effectively? How can we free up time for innovation by automating repetitive processes?

CIOs can help by showing their senior management colleagues examples of IT-savvy companies in their own industries and elsewhere. Then CIOs can help create and reuse digitized platforms.

Finally, what is the top characteristic you see in the entrepreneurial CIO: astute businessperson, evangelist, or architect?

Entrepreneurial CIOs, like all entrepreneurs, need to have a mix of all three: businessperson, evangelist, and business architect. But they need one more quality that we also find in successful entrepreneurs - they need to have great persistence and to learn quickly from any missteps and the courage to follow their convictions.

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