Perspectives

Building Competence for IT Transformation

TATA

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Experience certainty.

Greetings

I am very pleased to announce the launch of *Perspectives*, TCS Consulting Journal. Through this Journal, we share insights derived from both our research and through the experiences of our consultants on issues that matter to you.

I hope you will find the Journal a valuable resource in pursuing your organisation's business transformation.

S. Ramadorai
CEO & MD

TCS has grown to its current position as the largest IT services firm in Asia based on its record of outstanding service, collaborative partnerships, innovation and corporate responsibility.

TCS is a learning organization. For the past 40 years, our teams of industry experts, engineers and consultants have worked to solve our clients' most challenging business and technology problems.

Through the articles in this journal, TCS shares its insights, so that our clients may benefit from our learning. We do this also to create a continuing dialogue about what we are discovering in our work. It is our sincere hope that the knowledge harvested for this inaugural issue of Perspectives will help you, and your organization to reach higher levels of skill in IT transformation.

N. Chandrasekaran
COO & Executive Director

The launch of Perspectives is a great pleasure for me and the team at TCS. In our work with clients around the world, we continuously learn and discover new ways of transforming businesses. We share this learning with you through our biannual journal.

In this first edition of Perspectives, we chose to focus on the subject of IT transformation because in project after project, it has become clear that the process of managing and effecting change requires a separate skill, which if absent leads to failure and if present, is a foundation for success.

The authors have relied on their wealth of practical experience gained in thousands of customer engagements, as well as feedback from peer reviews. In addition, they have incorporated our own research on key issues, and a close study of industry best practices and benchmarks. The process of understanding and capturing the lessons of this experience has been a tremendously exciting task. We believe that this enthusiasm is evident in the articles created.

Thank you for being a very important part of this learning. In turn, we hope that these insights will help you to understand and accelerate your journey towards becoming more successful.

J. Rajagopal
EVP & Head, Global Consulting Practice

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IT Transformation: The Inevitable Challenge

For most companies, projects in the inbox are piling up, and most of them are not merely incremental adjustments to existing processes and systems, but rather substantial leaps forward. The drivers for change come from every direction as the modern enterprise grows in complexity and scope. Value-creating processes within companies are more complex. More and more activities happen outside companies in extended business networks. Demands for increased compliance and better financial returns seem only to increase. The pace of change is faster than ever.

The first challenge is to organize this complexity into a context that sorts out the issues at hand, presents a strategic hypothesis for success, and defines initiatives to carry out the strategy. At the end of this process, the hurdles become execution, organizational change, and IT transformation.

In this inaugural issue of Perspectives, Tata Consultancy Services presents articles that examine key competencies for IT transformation. IT transformation is an amorphous subject, one in which the beginning and end state and the goals are difficult to define. Many roads can lead to an improved ability to change. The key question for most firms is which path to take? What specific skills should be developed that will improve our game when it comes to moving our IT infrastructure forward? Based on the challenges we have faced in thousands of engagements with clients, we at TCS are confident that we have identified several competencies that if improved will lead to greater success in IT transformation. Each article in this journal provides analysis that should lead to deeper understanding as well as specific guidance for improvement.

The IT Transformation Cycle

IT transformation, the ability to understand business needs and adapt technology to meet them, is the key skill, the sine qua non for success in the modern world. Given the role that technology plays in virtually every aspect of business, it is the rare strategic initiative, significant tactical change, new partnership, or product launch that does not have a technology component.

In other words, no matter what practices or techniques are employed to master change, whether it be improved performance management, advanced business process management, or formal quality programs such as Six Sigma, at some point the effort will turn into a project in which the existing IT and application infrastructure must be transformed. In this sense, the struggle to transform IT is indeed inevitable.

In most companies, the need to improve the transformational capabilities of IT is overwhelmed by the cost to operate and maintain existing systems. More than three-quarters of a typical IT budget is dedicated to the maintenance and upkeep of infrastructure, leaving little for new investments. The TCS prescription for the IT transformation cycle addresses this bias in spending head on and identifies four stages
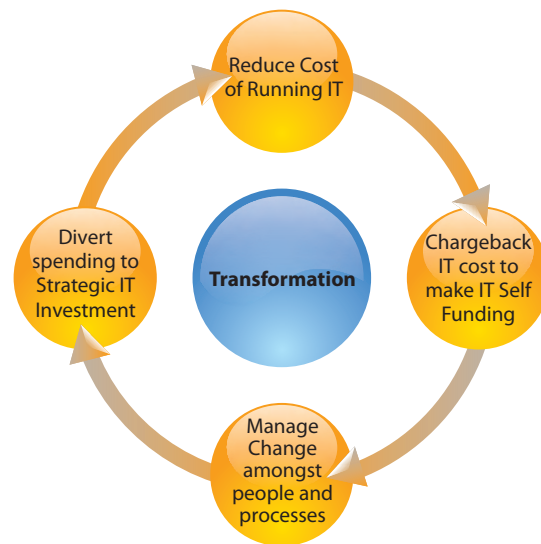
that will move a company away from a maintenance-dominated position toward innovation, self-sufficiency, and greater alignment with business objectives.

Each of these four stages contain many different areas of competence that are the foundation for successful IT transformation.

- A focus on reducing the cost of running IT provides pressure to constantly seek opportunities to lower costs and shed systems and infrastructure that are no longer needed.

- By taking savings and diverting spending to strategic IT investments, new capabilities are created without requiring expanded budgets.

- To phase out the old and bring in the new, IT departments must increase their skills to manage change amongst people and processes. Otherwise great ideas do not produce any business value.

- Finally, alignment with business needs becomes assured when departments are able to charge back IT costs to make IT self-funding. Business leaders are far more motivated to demand quality, more clearly express their real requirements, and press to retire systems when they bear direct costs.

IT transformation is a discipline in its own right in which skills, abilities, and knowledge must be consciously and purposefully pursued. The articles in this issue of Perspectives provide guidance in key competencies that touch on one or more of these transformation stages. Each of the articles is based on experience gained in the field by TCS consultants, garnered from their experiences in working with customers from all parts of the world.

The Methodical Quest for IT and Business Alignment

The articles in this first section address the broad theme of how to improve business and IT alignment. In order to achieve any sort of progress in IT transformation, it is vital to have an understanding of where you are and where you are going. Most often, creating such a roadmap takes place under the rubric of enterprise architecture.

The article Enterprise Architecture: Interception and Intervention points out how the modern practice of enterprise architecture too easily falls into the trap of being an academic exercise that is not used to guide IT transformation projects.

Enterprise Architecture(EA) aims to map the structure of the processes and supporting systems in a company. Too often, however, this activity takes place at such a high level that it provides little useful assistance when transformation projects are executed at the level of tactical systems. Companies that have spent much time and money find that they have little to show for it. When enterprise architecture does provide adequate direction, project managers and business owners frequently ignore it and instead pursue local optimizations.

To be effective, enterprise architecture must provide specific guidance about business, information, application, and technology architecture. To address these challenges, this article recommends adjustments to enterprise architecture practices to create more specific guidance and communication programs so that the benefit of global optimizations can be understood. Armed with recommendations, enterprise architects can then intercept design processes that should be informed by their knowledge and then intervene to improve the design of processes and systems.

Enterprise Architecture: Interception and Intervention
Key Takeaways:

- Enterprise architecture proposals are sometimes considered too idealistic for adoption.

- Ambitious EA guidelines are often overridden by practical concerns to keep projects moving forward.

- One way to get started with EA is to implement the most important recommendations in tactical areas where they will have the most impact.

Probably the most important single element of IT at most companies is the ERP (Enterprise Resources Planning) system, the system of record and the primary automation engine for business transactions of all types. The article ERP Selection: Finding the Right Fit argues that ERP systems are perhaps held in too high regard. ERP is such a powerful engine for process automation that companies overestimate its capability to automate their unique business processes. ERP implementations fail more often than they should because the unique processes of a business are shoe-horned into standardized forms of automation. To make the most of ERP, it is vital to carefully distinguish between processes that are truly standardized and those that may require best-of-breed software or custom solutions.

This article argues that a combination of ERP and best-of-breed software should be strongly considered when selecting or expanding applications of ERP. The automation of financials, order management, and purchasing processes hits ERP's sweet spot, and most businesses find success with ERP in these areas. Best-of-breed software seems well-suited for areas that have dynamically changing requirements such as Customer Relationship Management (CRM) or Business Intelligence(BI). The article then describes the shape of a due diligence process that can lead to identification of unique processes and selection of the most appropriate solution.

ERP Selection: Finding the Right Fit
Key Takeaways:

- Best-of-breed software may be better suited to unique processes.

- Improving your understanding of the unique business processes in a company leads to selection of solutions that are a better fit.

- Software-as-a-Service(SaaS) solutions should be part of the due diligence process for ERP selection today.

However, having the ideal ERP system by itself won't guarantee successful IT transformation. IT transformation requires not only a consistent approach to enterprise architecture but also a high degree of transparency. This can be achieved in part through allocating and charging each business process for the IT resources it uses. While virtualization and Service Oriented Architecture(SOA) are key elements in this vision, a new source of information provided by SOA analytics is required to complete the task.

The article SOA Analytics: Aligning Dynamic Processes with Dynamic Resources argues that virtualization and SOA make IT infrastructure more fluid and granular. This makes it possible to do a far better job of avoiding under- or over-allocation of IT resources to business processes. Policy-based orchestration of virtualized resources can describe demand curves that match the shape of resource usage, increasing and decreasing allocated resources as needed. SOA provides a large suite of reusable, granular services that can be tracked in a Configuration Management Database (CMDB) and allocated as needed. But in order to achieve the optimal allocation, a much more accurate picture of resource usage must be compiled.

The article provides guidance on how to provide dynamic processes with dynamically allocated resources. With the proper level of information, true activity-based costing of IT resources can be achieved, which is the final step needed to implement the long sought after vision of utility computing.

SOA Analytics: Aligning Dynamic Processes with Dynamic Resources
Key Takeaways:

- Although questions about the economics of SOA adoption have arisen, SOA analytics can provide a highly granular view of resource usage for each process.

- The increasing popularity of virtualization makes resource allocation dynamic.

- Combining SOA (dynamic processes) with virtualization (dynamic resources) provides an effective way to charge each business unit for the specific resources used.

Reshaping the Application Portfolio

Although IT transformation has frequently been equated with major changes in computer architecture, in a downturn, the way to fund new projects is to optimize the existing architecture. This means taking a fresh look at legacy systems, which are usually thought of as fossils that should sit untouched on the shelf. The article Legacy Optimization: Making the Most of What You've Got points out that legacy systems are a key component of most IT infrastructures but are seldom the focus of effective optimization efforts. While virtualization has paved the way for better resource allocation, it is possible to optimize both the cost and performance of legacy systems through systematic data gathering used to create a performance warehouse.

Legacy systems often have unique licensing and operational characteristics that make optimizing costs quite challenging. It is important to understand licensing models and then tune resource usage to reduce costs. When optimizing performance of legacy applications, applying the theory of constraints to find the leverage points is recommended as a best practice.

The article describes an approach to help determine the right focus for optimization, whether cost or system performance. The article then describes how a performance warehouse can be used to provide a statistical foundation for system optimization.

Legacy Optimization: Making the Most of What You've Got
Key Takeaways:

- Since transformation of legacy systems may be untenable in an economic downturn, legacy optimization is worth revisiting.

- Many performance improvement projects fail to estimate business benefit before delving in.

- Creating a performance warehouse increases the depth of data available on IT infrastructure.

- Performing detailed financial analysis of cost and performance characteristics increases skills for evaluating systems.

Application Rationalization

When implementing new systems, a sharp focus is maintained on the fit of the application to the processes being automated and supported. But once in place, that sharp focus dissipates. In addition, IT departments seldom take a step back and look at the fit of an enterprise wide collection of application functionality to their present needs. Advocates of application rationalization argue that there is a big payoff for doing so.

The article Application Portfolio Rationalization: Rules of Thumb to Reduce Application Costs broadens the focus from legacy applications to the nature of the entire application portfolio. A persistent challenge facing CIOs is that they intuitively know that the complexity of their application portfolio is costing them significant amounts of money, but benchmarks for understanding the big picture are hard to come by. Few firms have even a moderately reliable application inventory, let alone a rigorous way to link an application to its supporting labor costs, license costs, or hardware costs.

Instead of waiting for better data to arrive, the article suggests a program of analysis in which various patterns of redundancy, needless complexity, and costly support are identified. The causes and remedies for specific patterns are set forth that will help a CIO find opportunities for consolidation, reunification, report rationalization, data exchange standardization, business process management, and partly retired systems.

The general remedy for analyzing applications falls into three categories: retire, reengineer, or rearchitect. To drive greater efficiency, CIOs can look for applications that duplicate functionality and retire them. The article provides guidelines for reviewing the application portfolio.

Application Portfolio Rationalization: Rules of Thumb to Reduce Application Costs
Key Takeaways:

- Reducing complexity is a potential new frontier for IT cost management.

- Measurements and benchmarks for application portfolio complexity do not exist, so related problems and opportunities are hidden and discovered only when it is too late.

- Measures of complexity should include duplication, dependencies, support skills, and functional similarity within business units and across geographies.

- Modern packaged applications can replace many generations of technology for reporting workflow, with general-purpose configurable tools.

Improving Transformation Skills for People and Processes

IT transformation involves planning and technology, but success or failure is primarily determined by the people involved. The final set of articles in this issue of Perspectives focuses on how to better manage people and the processes they carry out.

The article Strategic Resourcing: The Network Delivery Model Has Come Of Age — Has Program Management? points out that as the sourcing and outsourcing of resources through distributed and globalized partner networks grows in scope, gaps in definitions of roles and skills consistently appear. Systematic analysis of outsourcing programs can reveal these gaps and make sure they are addressed, helping to achieve the goals of network delivery.

Too often, companies see network delivery of outsourced resources as a matter of labor cost arbitrage. In reality, network delivery is a new management practice that requires roles to be carefully defined and skills to be present in the people playing those roles.

The analysis presented demonstrates that X-zones, that is, gaps in roles and skills, can be systematically identified using techniques such as RACI analysis and other methods. An analysis of skills is especially important as new specialized roles are adopted as part of ITIL or ISO methodologies.

Strategic Resourcing: The Network Delivery Model Has Come Of Age — Has Program Management?
Key Takeaways:

- In the network delivery model, management of outsourcing programs risks overlooking new roles that emerge.

- Program managers can learn from the cross-functional skills of enterprise architects; project planners can learn from the modular approach of application designers when putting together geographically dispersed teams.

- Using best practices like RACI helps in defining roles that lead to a strong foundation for network delivery.

The article Change Management: Look Before You Leap — Assessing Readiness for Change explains that change management is a soft discipline, but not as soft as many people think. Through surveys and other investigative techniques, it is possible to determine readiness for change as well as to confirm the transformation strategy itself.

Patterns of change in IT transformation are far better understood than most IT departments realize. Common approaches such as Agile development are associated with specific change management challenges.

The article recommends an analysis framework with three phases - awareness, acceptance, and adoption - that can be used as part of a systematic program of change management. Surveys based on the Likert scale and applications of stakeholder analysis can be used to surface change-readiness issues. The creation of a communication desk, the appointment of change champions, and the use of a readiness scoring scale are recommended as best practices. The guidance offered warns against premature declarations of victory and suggests change management analysis can be used to validate that change has effectively occurred.

Change Management: Look Before You Leap — Assessing Readiness for Change
Key Takeaways:

- IT transformation will fail without effective change management.

- Assessing the impact of change and readiness for acceptance can be done using a methodical approach.

- Stakeholder analysis can be used to determine readiness of key participants; not all participants are equal when assessing the change readiness of the organization, but readiness of key stakeholders must be assured.

- Participants who are enthusiastic can be brought on board as change champions for their respective groups.

The article Software Quality: CMMI® for Services Is On the Way presents the ideas of Eileen C Forrester, senior staff member of SEI (Software Engineering Institute at Carnegie Mellon University), the inventors of CMMI®.

Software Quality: CMMI® for Services Is On the Way
Key Takeaways:

- CMMI® practices can complement new software development models like Agile.

- With CMMI® for Services, organizations can leverage CMMI® to improve their internal IT service management.

- CMMI® for Services is not limited to IT services but can also be used for managed or professional services.

In the interview, Forrester offers some surprising insights on how CMMI® is compatible with Agile development methods and with other frameworks like ITIL and SPICE*. She also gives a preview of the upcoming extension of CMMI® to professional services, a development that will likely pave the way to higher levels of quality in the consulting industry.

At TCS, we value advice and guidance only to the extent it can lead to taking the right action. Explaining that an investor should "buy low and sell high" clearly describes the nature of the right action, but does not provide much practical help. Our intention in writing the articles just summarized is to provide guidance that can lead our clients to find solutions by suggesting specific corrective measures. We are not just recommending these measures; we have assessed them and seen their benefits. Our hope in launching Perspectives is that it becomes a vehicle that will have significant and positive impact on any organization's ability to reinvent itself. We would love to hear your thoughts on the guidance presented in these articles.

Please email us at global.consulting@tcs.com

The Methodical Quest for IT and Business Alignment

Enterprise Architecture

Interception and Intervention

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Kay has contributed to the development of SOA concepts since their inception in the 90s, and to international standards in open architectures. Kay has an abiding interest in open source adoption in enterprise systems, Web 2.0 models and pervasive technologies.

Making enterprise architecture more practical can help achieve broader support

Abstract

Enterprise Architecture (EA) has a compelling value proposition, in spite of which it is facing tough times. The risk lies in architectural proposals that are perceived as unrealistic at an operational level. This article describes why EA programs often fail and what you can do to get your EA program off the ground.

A Problem of Perspective

What connection does the architecture of a building have with the interior design of an apartment? A good interior decorator can turn around any apartment, no matter the kind of a building it is in. However, a really good designer would leverage the building's architecture while choosing designs. Let us apply the same line of thinking to enterprise architecture. While a solution architect may design an application in isolation and find that it meets business requirements, the enterprise architect who takes a look at it from the top down, may want the application to serve a completely different purpose. The challenge today is to make these two perspectives meet.

Enterprise architecture emerged as an important discipline when IT adoption posed new challenges: proliferation of redundant applications, siloed sources of data, processes that cut across many applications, and agility constrained by monolithic legacy applications. It was difficult for the IT organization alone to rationalize this; it required a detailed understanding of business direction and changing operations. A guiding principle was needed, and EA answered that need. However, it is unreasonable to expect EA to save us from this ever-increasing complexity?

Failures in EA deployment suggest that the cohesiveness between business and IT is theoretical rather than real. The reality is that IT as a division will continue to be biased toward technology. Many solution architects want to understand business from an IT standpoint rather than IT from a business standpoint, and this problem must be addressed. Against this backdrop, EA is a pursuit, not a transformative intervention, with an element of idealism.

With business requirements changing rapidly, business agility stems from how well changes are foreseen and provisioned in the applications and processes. Let us suppose that you have applications that automate your processes. everything will run smoothly until the day you decide to start a new strategic business unit (SBU). The new unit will demand new processes and a new set of applications. During the process of integration with the mainstream enterprise, you will find multiple application interfaces, each with its merits as well as demerits. For example, the customer management application may not have a single source of customer master data since many applications maintain customer data separately. Similarly, the accounting system may not have the chart of accounts provisioned for the new SBU. Even though in this case business requirements are well captured and automated, it is not easy to make effective changes.

The role that EA should play includes:

- Building a common taxonomy of business and IT as a desired state.

- Defining a common roadmap for business and IT.

- Providing architectural constraints to help IT adhere to the roadmap. These constraints can take the form of templates, checklists, and governing metrics.

In this way, EA can help businesses adapt to unforeseen business strategies (like creating a new SBU or changing the approach to the supply chain) with minimal changes to the existing IT structure. At least, that is how EA should work in theory. In reality, however, EA blueprints often turn out to be relics rather than practical realities.

Adoption Challenges

Consider these facts:
- Almost 6 years after instituting a formal EA group, the CIO of a large retailer remarked, "Our EA program has not been a success; it has hardly any influence on the projects we run."

- A travel company deployed architects for its IT infrastructure. Very soon they lost sight of their purpose and were sucked into project firefighting.

- A financial services company appointed enterprise architects in its leadership team. However, the architects were measured against 20 tactical elements which caused them to focus primarily on operations. They digressed from the main issues they were called in to address.

- An airline company, having built a detailed EA, made little progress in getting the stakeholders to adopt the guidelines. While the recommendations were acknowledged by them as important, they deferred adoption.

While examples of failure in making practical use of EA are many, a number of these are attributed to challenges that are often overlooked in implementing an EA program. These challenges are explained in the following paragraphs.

IT implementations override EA guidelines that do not address implementation pitfalls
A project manager in a business unit needs to interchange data between the accounts receivable system and CRM (Customer Relationship Management). Both systems are local to the business unit. EA mandates that such an interchange take place through a centralized data interchange hub (an EA Integration system) in order to support centralized data mining for business intelligence. However, the project manager finds that this approach has a high performance overhead. He observes that it is faster to transfer data through a direct batch process. Since time is a constraint, the

project manager ignores the EA guidelines and his unit head approves the change. This is a common example of how IT overrides EA. However, it must be noted that the EA Integration system was not mature enough to support high-performance data interchange.

EA guidelines are not successfully communicated and fail to achieve stakeholder buy-in
It takes a long time to move EA successfully from concept to practical application. EA is a continuous process with iterations of refinement and alignment. While stakeholders such as division heads understand the purpose of architectural guidelines, stakeholders find it hard to relate the EA guidelines to their processes. For instance, EA may recommend a process change that does not necessarily improve efficiency for the specific division but for the organization as a whole. The process owner may override the change if he finds it doesn't directly benefit the division he operates.

EA blueprints often stop at delivering the desired taxonomy without a workable transition roadmap
Many businesses consider EA to be a "desired state" in which a consolidated vision of business processes and IT infrastructure is crafted. But the practical, everyday steps needed to reach that desired state are not considered. This often happens when external consultants are hired to craft an EA without having an internal EA transition team designated to manage the change. At this point, the EA blueprint becomes an idealized goal that is never realized.

Recognition of the challenges in EA have inspired a re-examination of conventional approaches. In the past, EA has been a top-down program, focusing on business strategy and attempting to foist its framework on to operations. This does not work. EA has to be nurtured at all levels simultaneously.

Intervention: Implement EA on the Ground

Typically, EA comprises the following architectural domains:

- Business architecture – emphasizes strategy, organizational structure, and high-level processes.

- Information architecture – focuses on data sources and data semantics.

- Application architecture – are categories of applications (CRM, ERP, point solutions, and so on) and the related software architecture.

- Technical architecture – covers infrastructure services and the technology lifecycle.

Each of these domains should have guidelines for various processes. For example, a common pitfall is implementing a sweeping EA framework without a better focus on certain processes. Processes should be prioritized to enable enterprise architects to intercept attempted violations of EA and then enforce architectural constraints. This approach helps drive EA deployment where it matters most, creating a strong EA foundation. It is also easier for enterprise architects to obtain buy-in from stakeholders when guidelines are more specific and work well within their processes.

The following illustration suggests typical processes where architectural constraints or guidelines can be introduced.

Some Contexts in which EA Interventions can be Planted Lower Down

Architectural Domains	Description	Financial System	Supply Chain	CRM	Enterprise Integration (EAI/SB)	BI	Document and Knowledge Mgmt.
Business Architecture	• Orgnization Structure • Business Functions • Business Processes (High Level)	• Chart of Accounts • Cost Centers	• Global Supply Chain Cosolidation • SIPOCs	• Line of Business Consolidation	• Workflow	• BSC	• Organization Structure • Communities of Practice • Workflow
Data/ Information Architecture	• Location • Master Data • Relationships • Interchange		• Inventory Master Consolidation • Vendor Consolidation • Costing Parameters	• Master Data Sources • Master Data Architecture		• Consolidation of Sources • Data Marts Mapped to Strategy and Organization Structure	• Single Sign-on Policy and Integration
Applications Architecture	• Application Classes • Lifecycle Stages • Modularity • Software Architecture	• ERP and Local Accounting Systems • Integration Channels	• GDSN Standards •Vendor System Policies	• BI and Sales Organization Integration	• Data Interchange Standards • Data Interchange Process Model		• Integration Interfaces with Workflow and Processes
Technical Architecture	• Infrastrucre Services • Technology Lifecycle Stages • Configuration	• Service Orientation • EDI Standards	• Hosted Model Opportunities			• Distributed Data Architecture and Policy	• Storage Policy and Technology

Source: Research – TCS Consulting Practice

For example, business architecture intervention in the financial system of a company may require a high level grouping of the chart of accounts, based on the envisioned organizational structure. Such a structure would facilitate easier consolidation of books.

Similarly, technical architecture intervention in the supply chain may seek use of certain web services in cross-enterprise interfaces to support standards such as Global Data Synchronization Network (GDSN) that facilitate cross-enterprise process automation.

The ultimate priority of architectural intervention depends on the business strategy and its feasibility.

The EA Imperative

Deferring EA can be costly, even if a company's EA initiatives have not worked out well in the past. The failure of EA initiatives is often attributed to proposals that are too theoretical and ambitious. At an operational level, EA is firmly tied to strategy and vision and runs a high risk of being futile. It makes sense to leverage EA by introducing it at a more tactical level and by prioritizing efforts. It then becomes easier to communicate to the stakeholders and get their buy-in. By taking a more tactical approach to EA, the company can effectively get its EA program off the ground.

ERP Selection

Finding the Right Fit

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Joginder has managed and led large programs in ERP implementations and IT Strategy. He has a strong interest in process design and modeling to improve industry standardization. Part of his career was spent in ERP research and development, particularly in Baan systems.

With the choices for ERP expanding, selecting ERP becomes a tradeoff between process standardization and business uniqueness

Abstract

Traditionally, ERP (Enterprise Resource Planning) selection has been influenced by the predominance of certain vendors in the industry. Businesses tend to overlook the uniqueness that lies in seemingly less important business processes, which are sometimes shown to be critical during implementation. Moreover, emerging dimensions in technology, like Business Intelligence (BI) and Enterprise Application Integration (EAI), have made the technology criteria in ERP more complex. The boundaries between these applications and ERP are becoming blurred. Instances of ERP implementations being scrapped or deferred in middle stages sound nightmarish yet are common. Quite often, it was just the wrong ERP package.

How can the selection process be neutral, insightful, and systematic to yield a better success rate, reducing the risk of a failed deployment? The answer lies in factoring in emerging dimensions and performing a holistic due diligence during selection.

A Travesty of Sorts

It is important to consider examples of failed deployments to ground the discussion and highlight how to avoid such problems:

• An auto component manufacturer chose to adopt a well-known ERP application to integrate its order management with production planning. During implementation, it was found that the ERP application mandated a predefined Bill of Material (BoM) for the items when orders are recorded. However, in the company, BoMs change with every production batch, based on raw material availability from suppliers. In the end, the company had to record orders in ERP and then manually prepare production plans in Excel.

• A global retail company selected an ERP solution based on the application's inventory management features, which apparently looked rich. However, in the middle of the implementation, the company found that the supply chain functionality did not support the existing method used for assigning items to their outlets. When attempting to customize, it ran into restrictions in the ERP design. Finally, it had to make additional investment in a specialized supply chain application.

• A financial services company selected a noted ERP package to integrate its financial and business performance management with a new enterprise portal. The portal would provide various business metric dashboards to the users. The ERP package was chosen based on its Performance Management features and built-in portal platform. However, after spending a good amount of effort and money, it realized that the built-in portal did not integrate with key mainstream financial applications. The cost of customization to fetch data from those applications turned out to be equivalent to the cost of developing a portal from scratch, without using the ERP platform.

What are the common elements in these deployment horror stories?
There are two important facets to note here. One, there is an increasing trend within ERP systems to provide technologies like business intelligence and enterprise portals which were not within the scope of traditional ERP solutions. The other facet is that there are niche functional domains, like plant automation and inventory optimization, where ERP solutions are expected to address unique requirements, sometimes challenging the capabilities of the best-known ERP solutions. These emerging factors have changed the parameters for ERP selection, increasing the risk and cost of selecting the wrong one.

ERP solutions offer standardized functionality that is flexible only within a certain range. Understanding the scope of implementation and the customization involved is a delicate process. Even an obscure business requirement can be a showstopper as new realizations unfold over the course of implementation.

Although ERP vendors tend to maintain that their systems provide benchmarked capabilities, which can be configured and customized to suit most business scenarios, it is common to see best-in-class solutions fall short of meeting critical requirements during implementation. The variance in requirements is further amplified by factors such as alignment with groups or parent companies, varying scales of operations and standardization within industries, not to mention compliance with regulations. Thus, while some standardized packages are better suited to larger firms, others are ideal for smaller ones. Moreover, an ERP package must show distinct merits over custom-built solutions, both in terms of requirements fit and cost. The candidate ERP system has to be selected within a reasonable timeframe while exerting business foresight.

Rapid Business Changes Complicate ERP Selection

ERP implementations today are more complex and ongoing because businesses are changing and continually adopting new operating models. For instance, supply chain consolidation is driving new systems to leverage cross-enterprise collaboration in the quest to become "globally lean". Globalization has made manufacturing assets more distributed. Organizations run multiple operating units, whose organizational structures are becoming decentralized, thereby impacting the financial structure and processes. This scenario underscores the need for business process management to support future strategic changes. As a result of this dynamic environment, ERP implementation is experiencing multiple cycles of overhaul. The off-the-shelf functionality of an ERP suite is critical, not only in terms of its suitability to current processes, but to the company's roadmap for change.

Traditionally speaking, ERP systems integrate key business and management functions, particularly in the manufacturing, finance, and human resource areas. However, the boundaries of ERP are continually expanding with interfaces to areas such as Business Intelligence (BI), integration tools such as EAI, and applications such as Customer Relationship Management (CRM) and Product Lifecycle Management (PLM). Strategically important investments in BI, CRM, and Supply Chain Management (SCM), among others, are demanding changes to existing implementations, and sometimes requiring investments in new ERP systems better suited to the larger application landscapes.

ERP investments will continue to drive a large portion of IT spend. More often than not, they will take the form of enhanced ERP implementations that support changes in the business and enterprise application landscape.

Change in ERP adoption in various processes between 2006 and 2008
Increase in adoption found in Production Scheduling, Demand Planning and Human Capital Management, where BI and Performance Management tools are important.

The negative change is due to enhancements made by vendors, but not adopted by users.
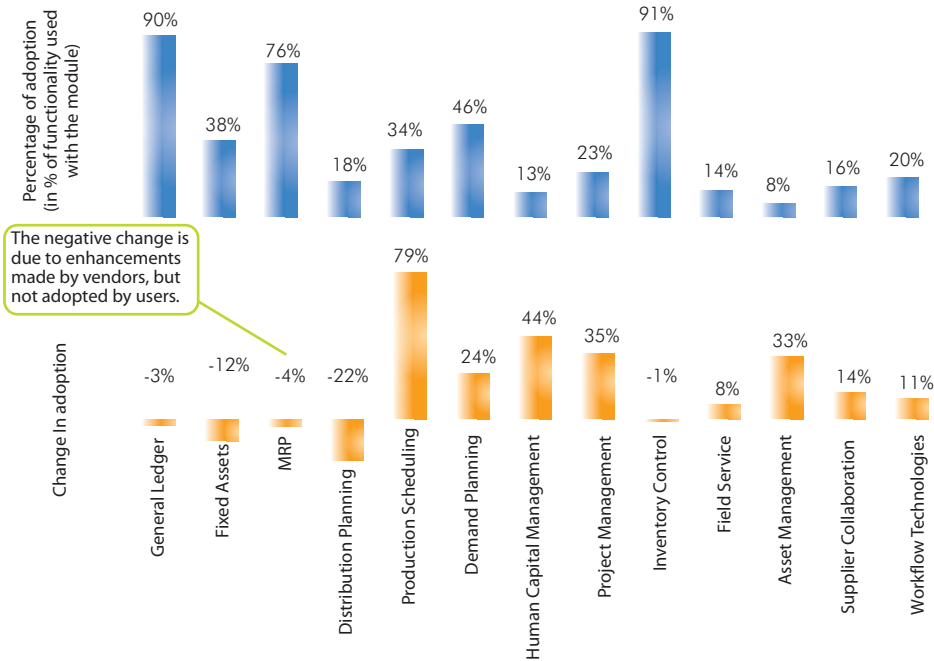
Source: Research - TCS Consulting Practice: Data sourced from Aberdeen 2006 and 2008

Another noteworthy trend is that businesses are finding increasing interest in best-of-breed solutions, that is, modules from multiple vendors that provide the best fit. Best-of-breed solutions, which are compatible with time-tested and matured applications, are attractive despite higher system integration costs. While the dominance of conventional vendors like SAP and Oracle continues, the modular adoption of niche solutions is beginning to show merits in cost of ownership and flexibility. To support this trend, emergence of better middleware tools, particularly in EAI, has made integration of modules from multiple vendors easier.

Best-of-Breed Trend
Best -of-Breed pursuit is an increasing trend as Enterprise Solutions Landscape gets more complex
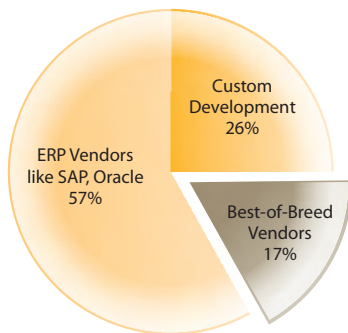
Source: AMR 2007, TCS Consulting Practice

These factors make the process of selecting an ERP package complex.

IN BRIEF

- Business changes in the form of application portfolio expansion, decentralization of organizational structure, and supply chain integration are driving new investments in ERP.

- The need to include more functional areas within the IT landscape (BI, CRM, PLM, and PIM) requires new interfaces with the ERP backbone.

- Heterogeneous compatibility and maturity across modules elicits interest in best-of-breed solutions.

Balancing Scalable Modules with Best-of-Breed

If we look at core business functions such as financial management, HR, purchasing, etc., we find that ERP implementations for these functions are more standardized. Factors in selecting these core modules include scalability across the organization, supporting industry benchmarks, and regulatory compliance issues (e.g., Sarbanes-Oxley, IFRS, FDA, HIPAA). However, in many instances, businesses find that their financial structure is not compatible with an established ERP solution, even with customization.

Orientations in Vendor Choices Depend on Business Uniqueness

Auxiliary Functions (BI,CRM, PLM)	• Support for technology standards • High configurability • Best - of - Breed multi-vendor landscape	• Custom built solutions and system integration directly on lower level platforms like database tools and portal platforms
Core Business Modules (Financials, Inventory)	• Functionality supporting benchmark processes • Enterprise and business group wide scalability	• Best - of - Breed • Cross - application interfacing support (like message based interfaces) • Custom built
	Standard Business Processes	Process Unique to the Business

Source: TCS Consulting Practice

In extended modules, such as CRM and BI, support for technology standards and flexibility in customization is desired. Even in the supply chain module, compliance with web services standards and features such as global data consolidation are increasingly important for cross-enterprise efficiency.

A relatively new option is SaaS (Software-as-a-Service) solutions for ERP. While SMBs (Small and Medium Businesses) have a high adoption rate of end-to-end SaaS ERP, even large enterprises are now exploring SaaS services for select functions. Sterling Commerce, an AT&T company, provides EDI (Electronic Data Interchange) solutions and business-to-business supply chain solutions as SaaS. The popularity of Salesforce.com in CRM is well known. SaaS adds a new dimension to ERP selection. It makes the implementation cost-effective since customers pay only for what they use and can try solutions before adopting them. This reduces the risk of high implementation costs. SaaS solutions also have added technology dimensions. For example, supply chain web services (like those that support RFID) can be plugged into existing ERP solutions,

enabling multiple suppliers to participate in the supply chain regardless of their installed systems. If SaaS options are not explored, due diligence for ERP selection will fall short of expectations.

Adoption of ERP Modules are Higher in Core Business Areas having Standardized Processes
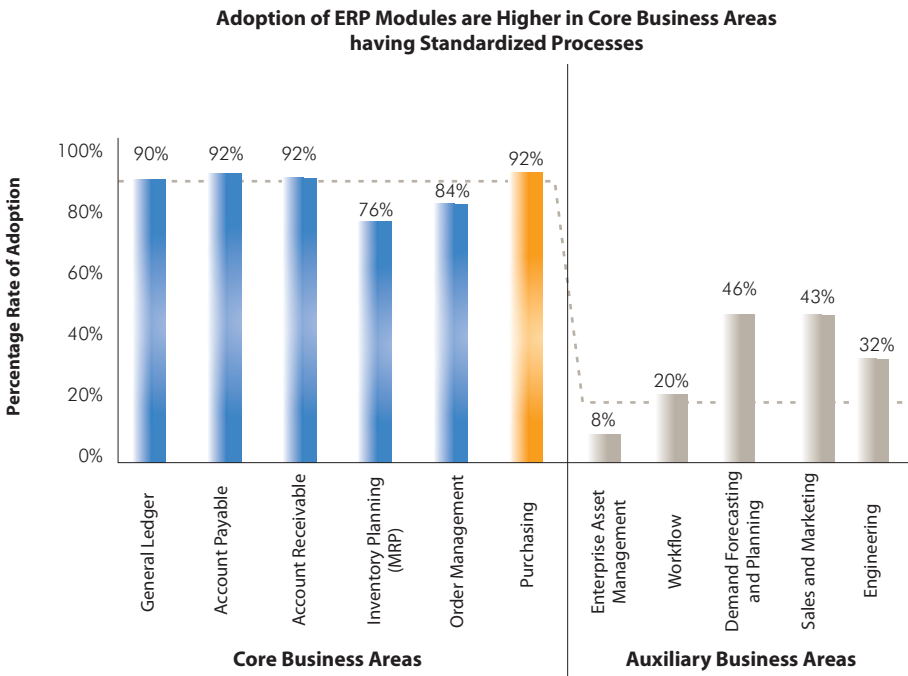
Source: Research - TCS Consulting Practice: Data sourced from Aberdeen 2008

IN BRIEF

- The ERP selection process can be biased toward the commonly accepted solutions and overlook the uniqueness of the target business.

- Core modules such as financials, order management, and purchasing can more easily rely on packaged solutions.

- Best-of-breed and highly customizable solutions are more attractive for evolving areas such as BI and CRM.

A Good Due Diligence Process Highlights Tradeoffs and Makes the Most of Them

Due diligence is always conducted under time constraints. Establishing a schedule reflects the strategic imperative to adopt the needed change. Contrary to the common perception, a good due diligence process for ERP selection should examine trade-offs. Despite the difficult work of information gathering and deliberation, along with the risk of overlooking critical requirements, there is a trade-off of time and effort. The selection process cannot incorporate a deep dive into the business. The quest can be endless and its scope as large as the implementation project itself. Therefore, the expertise involved in the due diligence process warrants a systematic approach with experience-driven business foresight.

The principles that play an important role are:

- Realization of benefits early enough in the project life cycle to build the confidence of the implementation teams and the organization.

- Business need-based evaluation of the legacy applications and the need to retain/retire/rearchitect them, if required.

- Emerging technology and standards along with their maturity levels.

- Environmental and regulatory compliance requirements.

- Internal organizational processes and cultures and their change management requirements.

- Adoption of target benchmarks, best practices in the industry, and pursuit of best-in-class applications.

- Flexibility to comply with frequently changing processes.

A good due diligence process for ERP selection performs continuous sanity checks against these factors while evaluating vendor solutions. It would also incorporate "build versus buy" considerations. The selection activity provides a primary baseline for implementation of the solutions. The parameters covered in the baseline would include:

- Reduced implementation costs.

- Low customization and process mapping costs.

- Reduced infrastructure and license costs.

- Increased project control.

- More efficient implementation process in the future.

- Easier and faster adaptation of the organizational culture to the new system.

Confirm Requirements; Don't Bend Them

One of the common mistakes in ERP selection is moving directly to process details. Perspective on process details can change significantly after devising the operating model and business vision. This translates to a high-level business process model and thereby makes success factors clearer. The following approach is suggested:

Five Phases of Selection and Assessment Process

DEFINE	DETERMINE	ANALYZE	EVALUATE	RECOMMEND

• Identify Imperatives
• Create Project Charter
• Execution Plan
• Refinement of Plan
• Kick-off
	• Business Process Modeling
	• CSF Study
	• Functional Requirement Finalization
	• Landscape and Adoption Roadmap
	• Customize Product Evaluation Framework
		• Vendor Evaluation Criteria
		• Develop RFP
		• Prepare Comparison Chart
		• Vendor Screening
			• Prepare Use Cases for Vendors
			• Process Mapping to Identify Demo Functionalities
			• Finalize Vendor Demo Evaluation Sheet
			• Facilitate Vendor Demos
			• Evaluate Demo Based on Criteria Defined
			• Gather Analyst Inputs
				• Finalize Recommendations
				  - Evaluations
				  - Analyst Views
				• Prepare and Present Implementation Roadmap

Adoption Phases — Assessment — Implementation — Management

Define: Set up a governance model and understand the organization's business. A project plan is prepared based on the charter.

Determine: In-depth study to drill down on business processes. The business architecture is established using process modeling. At this stage, the critical success factors (CSF) are better understood.

Analyze: Based on the criteria identified, the ERP vendors are evaluated. This includes sending out RFPs and consolidating responses for screening.

Evaluate: This phase maps use cases with desired functionality. Vendor demonstrations are requested for each use case to run and validate scenarios. They are quantitatively and qualitatively rated to ensure compatibility and define the scope of customization. Analyst inputs are also factored in. One important practice in this phase is taking feedback from peers running similar processes with the candidate ERP.

Recommend: The final recommendations are presented along with the implementation roadmap. These recommendations provide the essential baseline for implementation, and should be conclusive within the stipulated time and resource constraints. Business process understanding defines the level of granularity needed to define criteria and make a credible evaluation based on them. Business and architectural expertise of the selection team is frequently a differentiating factor.

Uniqueness Vs Standardization Trade-off: Salient Points

- ERP adoption will be ongoing and its boundaries are being continually redefined. Technology evolution has brought more factors into ERP package selection. Its role has changed from being the financial backbone to that of the core business platform that supports strategic IT adoption.

- ERP selection is more complex than ever. Enterprises can no longer be complacent with simply advocating compatibility with existing processes. They are also required to have the foresight to provision adoption of future technologies and the operating models that come along with them.

- ERP selection is often influenced by the predominance of a vendor within the industry. The actual factors are more complex than that.

- The range of options is better in core business functions like financials, purchasing and SCM, where processes are well defined. For auxiliary functions like BI and CRM, a best-of-breed mix is desired. In the latter case, instances of uniqueness are greater. However, this does not rule out show-stopping uniqueness in core functions.

- The selected ERP solution may not be a standalone system at all, but perhaps a best-of-breed multi-vendor solution. In fact, the latter is a growing trend today with varying specialization across vendors.

- The selection process has to factor in multiple dimensions. Furthermore, it can be constrained by time and range of effort spent. The trade-off between drilling down into the business process (along with the legacy applications landscape) and the affordable range of effort warrants a scientific evaluation framework with adequate participation from the necessary domain experts.

References

- AMR Research: Enterprise Resource Planning Spending Report, 2007

- Manufacturing Business Technology: A Global Mandate, Dec. 2006

- Aberdeen: Cost of ERP Functionality, 2007

- Aberdeen: ERP versus Best of Breed Decisions, Sep, 2006

- Forrester Research: ERP Applications 2007, Innovation Rekindles

- Forrester Research: Enterprise Applications Vendor Selection, Oct. 2006

- Aberdeen: Total Cost of ERP Ownership, Oct 2006

- Peerstone Research: ERP ROI-Myth and Reality, 2004

- Richard West & Stephen Diagle, California State University, 2004

- Techie Index: If You Thought Going for an ERP Package Was Easy…, 2003

SOA Analytics

Aligning Dynamic Processes with Dynamic Resources

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The right analytics can help
in properly allocating
IT resources
to business processes

Abstract

Business-IT alignment requires the ability to connect IT resources with processes, ensuring resources are available where it matters. Interestingly, recent technology developments have the ability to provide IT resources on demand and be more business centric. Widespread adoption of virtualization and better understanding of SOA (Service Oriented Architecture) have ushered in the concepts of dynamic resources and dynamic processes. However, when it comes to effective business-IT alignment, real time costing of business use of IT still remains a pipe dream.

To exploit these technologies effectively, a new discipline is required which we call SOA analytics. The potential to leverage the data from dynamic resource allocation and dynamic processes remains largely untapped, calling for new tools and practices to emerge in this area. While the technology to support on-demand business has come of age, analytics holds the key to unlocking this potential and realizing the vision of utility computing.

The Confluence of Virtualization and SOA

Although virtualization and SOA have evolved independent of each other, connecting the two provides business and IT with new capabilities for allocating costs in real-time. Before describing their confluence, let's examine the recent developments of each of these technologies. A full understanding of virtualization and SOA will enable us to see the power of combining the two technologies in the service of utility computing, a paradigm in which IT resources will be made available on demand and charged to business cost centers based on actual usage (The word utility comes from utility services like water or electricity where the cost is metered, based on consumption).

Virtualization reaches the last mile with desktop and application virtualization
Virtualization as a concept was present in legacy systems like mainframes and midrange systems, but it became relevant only recently, with infrastructure consumption exploding and virtualization reaching into new areas. The cost of provisioning redundant resources for peak usage became much higher than the cost of actual resources consumed. Virtualization is about using what is unutilized, but not at the risk of capacity shortage. It makes provisioning straightforward—virtual resources can be dynamically allocated and even the amount of physical resources provisioned can be dynamically changed as needed.

This technology has swept across almost every element of the IT infrastructure. After storage virtualization and server virtualization, we now have desktop virtualization. This allows desktop resources to reside on the server; desktop files may even reside in multiple servers. The latest entrant is Application Virtualization, where a virtual runtime environment (like a virtual operating system registry and devices) is wrapped around a specific application. When all of these layers of virtualization are deployed, the system has access to fine-grained data on consumption at multiple points, such as network usage, desktop storage, server CPU and storage, and so on. In other words, utility computing - the ability to charge users for the resources they use - is now technically possible.

Virtualization tools today offer policy-based orchestration. In other words, they capture usage patterns and establish policies for dynamic provisioning of resources. For example, if email is used most during the first hour of the workday, that pattern can be captured so that more resources can be allocated to the mail server around that time. Policy-based orchestration can be extended to provide instantaneous analytics for more accurate forecasting and real-time provisioning. On the costing side, these tools could provide finer grained consumption patterns for more accurate chargeback to business users.

However, application of virtualization in costing requires a new dimension in the context of SOA. We will explore this facet later in this article. Meanwhile, we will discuss recent developments in SOA that make it more practically useful.

Defining Services to Promote Effective Reuse

Object-Oriented Analysis and Design (OOAD) changed the way software is written and increased productivity. With OOAD, blocks of code could be reused within a program, provided that commonalities in different parts of the program could be identified and encapsulated. For example, before defining a customer or an employee, it makes sense to define a person (with name, address, and contact number). The customer or the employee can then be an instance of person. The code for defining the customer and employee is then much less cumbersome. Furthermore, it becomes easier to add a new entity (for example, supplier) in the future (those familiar with OOAD will recognize the concept of inheritance).

The object-oriented paradigm has been both revolutionary and somewhat disillusioning. While reusing pieces of code is one of the purposes of OOAD, the goal was to reuse ready-made software components - pluggable compiled code. As applications grow, it becomes difficult to reuse existing components. This is because the design of earlier components did not support new requirements, which had not been anticipated. Staying with the example, if the upgraded software had to provision customers with a shipping address, one would have to change the definition of person, which resides in a legacy component.

Very few enhancements are able to capitalize fully on OOAD. Reuse becomes more complex as applications grow. In the world of SOA, the same pattern will be repeated. The metaphysics of SOA and OOAD are similar; many of their fundamental principles are the same. Just as objects are the building blocks for software, services are the building blocks for processes—both rely on encapsulations and interfaces to support new requirements. The dilemma of reuse surfaces again, this time in the context of services rather than blocks of code within a program.

Services are functions within or across the applications that execute a part of a process. A service may be a logical execution of functionalities from multiple applications. A process in turn would use multiple services. For example, consider the sale of a product: it would use a distribution service for logistics and an accounting service for billing. SOA is about using a set of services in dynamic combinations based on what the process needs at that point in time, often called orchestration.

Changing our sales process example, a new product could use a different distribution service if the product distribution model is different (such as direct shipment to the customer instead of shipment to the retailer). There are essentially two purposes that SOA serves: flexible processes and reuse of software functionality by encapsulating parts of those processes in services.

The challenge today is to define the right set of services. The service defined today may not be reusable tomorrow. Object-orientation used Unified Modeling Language or UML to promote reuse; Business Process Management or BPM plays a similar role for SOA.

Taking reuse into account can drive effective and practical implementation of SOA. Services should be made more granular to support reuse and flexibility. The approach to defining services should be both cautious and incremental. Having fewer architectural restrictions makes sense in the initial phases of implementation, when gaining experience of how services can be practically used in processes.
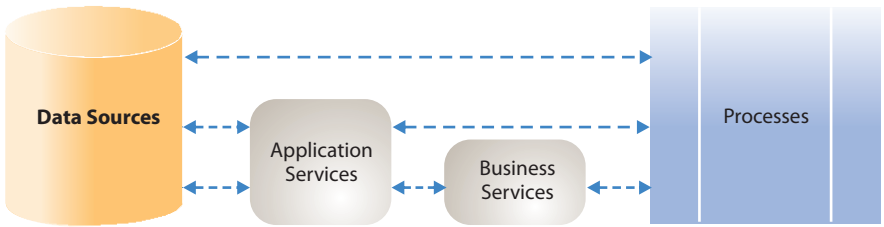
Service implementation may be incremental and bottom up initially

Now, with virtualization and SOA both gaining adoption, we will soon have both dynamic resources and dynamic processes. Let's examine how we can build upon this combination of technologies.

ITIL Version 3: Best Practices for Service Reuse

The Information Technology Infrastructure Library (ITIL) framework provides guidance to companies seeking to maximize the effectiveness of their use of IT from a business standpoint. ITIL has overshadowed CMMI®, though in fact they are complementary and useful in their own realms (CMMI® has a more direct application in software quality than in service management). Companies needed best practices for service management, which ITIL Version 3 has provided.

An important practice in ITIL is use of the Configuration Management Database (CMDB). CMDB is a database that describes all IT entities (software, devices, and so on, referred to in ITIL as "items") and the relationships among them. If there's a request to make a change in the infrastructure (for example, to increase server capacity), CMDB is used to analyze the impact of the change.

ITIL Version 3, published in May 2007, helps define best practices for service management, with an emphasis on agile service management. It emphasizes service strategy and best practices for designing services for processes that change frequently. For example, an organization may produce new products every quarter, each having a different set of processes (such as different distribution models). The new processes could use different IT processes and applications. In this age of agility, such scenarios are common. For example, 3M makes more than 60,000 products.

Service management relates to making IT infrastructure available to business processes. In the context of SOA, this means deploying SOA services to flexibly orchestrate processes. In other words, SOA services will soon be regarded as items of IT infrastructure within the CMDB.
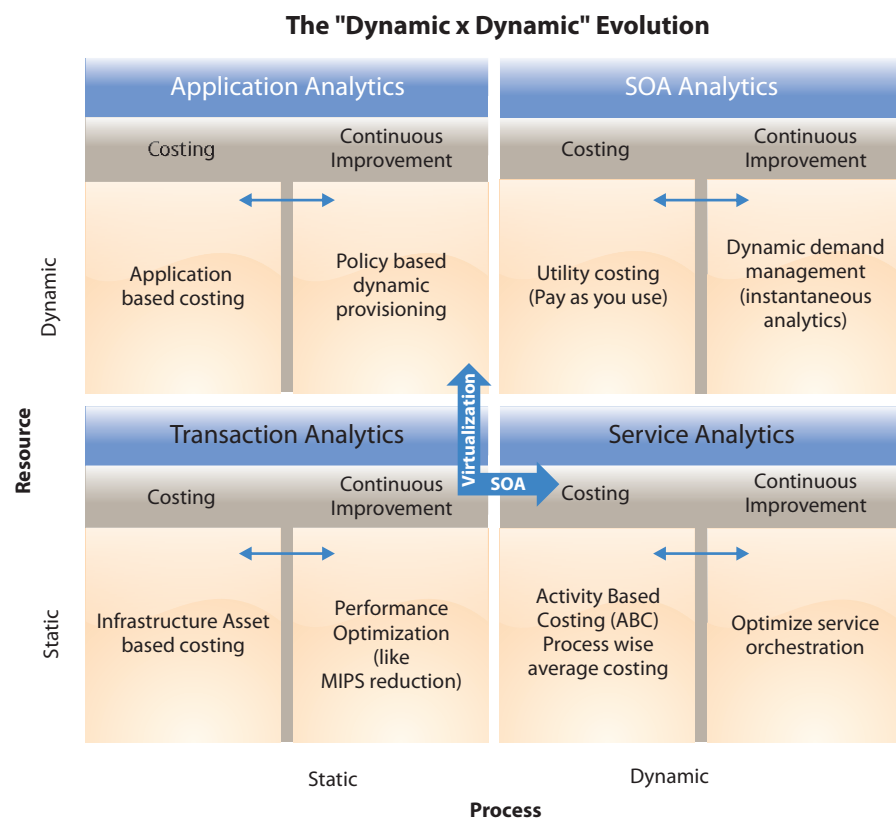
Virtualization and SOA, equipped with agile service management concepts from ITIL, leave just a few dots to connect to help answer the pressing question of business-IT alignment. This is where analytics comes in.

Costing Practices Change the Equation Between Business and IT

Virtualization provides dynamic resources while SOA enables dynamic processes. Interestingly, each of these transformations opens up new costing or chargeback techniques in its own right (see the quadrant diagram below).

Traditional IT costing is limited to IT assets falling under either depreciable or variable cost (CAPEX or OPEX). With traditional IT costing, we estimate average costs for each infrastructure item and allocate it to a business cost center or centers.

The "Dynamic x Dynamic" Evolution

Application Analytics		**SOA Analytics**	
Costing	Continuous Improvement	Costing	Continuous Improvement
Application based costing	Policy based dynamic provisioning	Utility costing (Pay as you use)	Dynamic demand management (instantaneous analytics)
Transaction Analytics		**Service Analytics**	
Costing	Continuous Improvement	Costing	Continuous Improvement
Infrastructure Asset based costing	Performance Optimization (like MIPS reduction)	Activity Based Costing (ABC) Process wise average costing	Optimize service orchestration

(Vertical axis: **Resource** — Dynamic / Static)
(Horizontal axis: **Process** — Static / Dynamic)
(Virtualization arrow vertical; SOA arrow horizontal)

With virtualization, you can calculate costs for each application. For example, the average application cost based on consumption of disk space, CPU, or network can be calculated and charged back to the application owner (although in reality even this is not enough granularity, especially when the application, like ERP, has multiple owners). A virtualized system extending from the user interface to the server would also have access to

consumption of multiple resources (network, CPU, storage, and so on) by an application. The role of analytics here is to translate application usage to infrastructure consumption. It would then apply averages to allocate the application costs to business cost centers. However, when the process traverses multiple applications (as it does in SOA), it makes more sense to charge the infrastructure cost to the process owner rather than to the application owner.

In an ideal SOA environment, an integrated process would consist of multiple business transactions, each of which in turn would use a set of services. To add to the complexity, the services in turn could traverse multiple shared applications. If the infrastructure involved in these services is not virtualized, the costing method would have to limit itself to broad estimates such as a weighted average cost of infrastructure item per process. This is essentially Activity-Based Costing (ABC). The role of analytics here is to break infrastructure cost into estimates for processes and subprocesses (the reverse of what we discussed for virtualization without SOA).

Synergy for New Analytic Techniques

There is synergy between these two costing methodologies, in which cost is allocated to individual processes, not with average estimates, but using information about real-time consumption. With SOA and virtualization implemented together, it is possible to arrive at a true "utility costing" model. With dynamic processes and dynamic allocation of resources through integrating virtualization with SOA, consumption cost can be determined instantaneously; the chargeback model then is as simple as "pay as you use." We call the analytics involved here "SOA analytics." It is a myth that financial restructuring is required to implement utility-based chargeback; all that is needed is a new breed of analytics. Today, virtualization tools and SOA middleware (like the Enterprise Service Bus, the hub that invokes and orchestrates services) are building capabilities to provide analytics support, although they still rely heavily on estimates.

Despite the promise of these technologies, IT processes have an important role to play. For example, service-level agreements (SLAs) for SOA services need to address frequently changing processes. At the same time, service management must incorporate managing change related to virtual and dynamic assets. (For example, consider a virtual CPU that changes its capacity every hour based on the consumption patterns of a service). To do this requires intelligent CMDBs where virtual assets with dynamic configurations are managed.
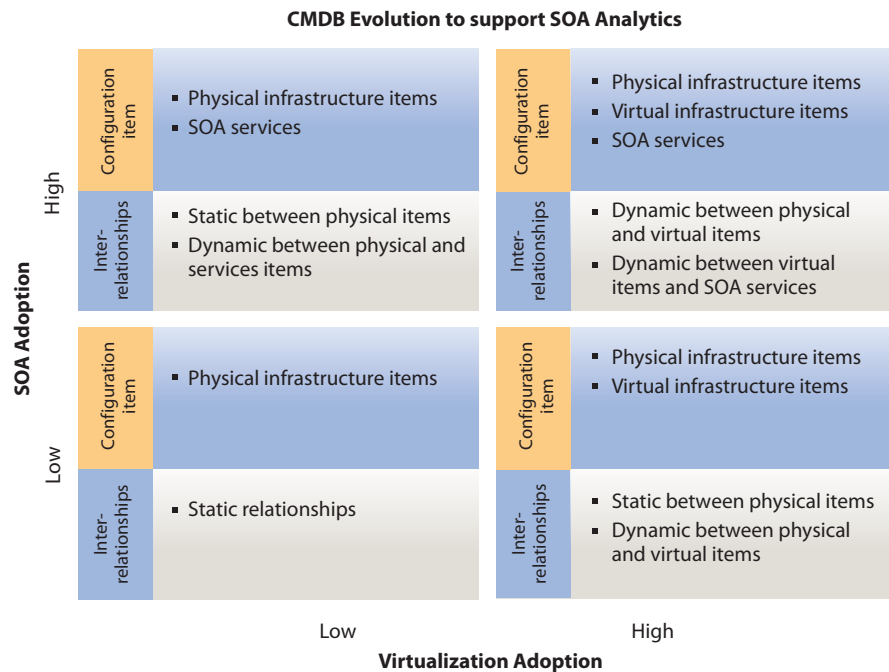
System Duality

For readers interested in an advanced understanding of such analytics, SOA analytics would rely on the mathematical principle of duality. Here we have two spaces of optimization, where one constrains the other, with transposed symmetry. For the sake of simplicity, this article refrains from using the mathematical representation.

In SOA analytics, the consumption of resources would be constrained by demand in services. Conversely, demand in services would be constrained by availability of resources. In an ideal form, instantaneous analytics would optimize within these constraints.

Analytics and optimization would rely on such models for instantaneous provisioning and costing.

CMDB requires data-mining capabilities from the systems to set configuration patterns. It would be interesting to see how many virtualization tools that support dynamic allocation based on policies evolve into such CMDBs.

CMDB Evolution to support SOA Analytics

SOA Adoption High	Configuration item: ▪ Physical infrastructure items ▪ SOA services	Configuration item: ▪ Physical infrastructure items ▪ Virtual infrastructure items ▪ SOA services
	Inter-relationships: ▪ Static between physical items ▪ Dynamic between physical and services items	Inter-relationships: ▪ Dynamic between physical and virtual items ▪ Dynamic between virtual items and SOA services
Low	Configuration item: ▪ Physical infrastructure items	Configuration item: ▪ Physical infrastructure items ▪ Virtual infrastructure items
	Inter-relationships: ▪ Static relationships	Inter-relationships: ▪ Static between physical items ▪ Dynamic between physical and virtual items
	Low	High

Virtualization Adoption

A New Methodology for Utility-Based Chargeback

With data feeds both from virtualization and from SOA, it should be possible to implement an analytics model that can make utility-based chargeback a way of life in business. This would eliminate concerns about expending the IT budget on less profitable processes at the cost of constraining more profitable processes. One possible term for this is on-demand budgeting.

Chargeback needs a different breed of analytics, not costing. Costing as a discipline is about estimates. Technology is taking us to a paradigm where estimates are immediate, accurate, and traceable. This approach could change traditional ways of looking at the business value of IT. It has implications for IT budgeting and IT governance. This new breed of analytics will make traditional IT disciplines with regard to costing look antiquated. Making this important shift will require some additional maturity in terms of the technology, but also in developing best practices for costing dynamic resources and dynamic processes.

Reshaping the Application Portfolio

Legacy Optimization

Making the Most of What You've Got

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Vaidyanathan is an accomplished practitioner in optimizing legacy systems and transforming infrastructure platforms. He specializes in costing models and resulting technical approaches for transitioning legacy systems.

Optimizing costs and performance of legacy systems can help drive self-funding IT

Abstract

Transformation of legacy infrastructure and systems like mainframes and midrange systems typically requires a high capital investment. Even with the promise of a good Return on Investment (ROI), tightened budgets make legacy transformation projects less attractive to many organizations. With workloads and costs increasing, system optimization is worth another try with the right approach. Is optimization about cost or about system performance? How can analytics help in pinpointing areas for effective optimization? This article answers these questions for stakeholders and transformation program managers who would like to understand legacy optimization from a business perspective.

Optimize Costs First

Legacy systems like mainframes and midrange systems run the bulk of mission-critical software at many companies. Despite their age, these systems are still more efficient than many modern systems when it comes to scalability for older software. It is true that such systems are less adaptable; they don't easily interface with newer architectures, like Service Oriented Architecture (SOA). Despite their drawbacks, however, midrange systems and mainframes may need to stay in place when investments in IT are at an ebb.

Most legacy transformation programs today leverage virtualization, in which resources are dynamically shared for better utilization. The cost benefits of virtualization are better for Intel-based legacy systems, in which a plethora of servers can be reduced to a smaller number of more efficient servers. For midrange systems and mainframes, capital investment for virtualization may take more time to pay off. For these systems, it is worthwhile to try another round of optimization, using a fresh approach.

In every attempt at optimization, the principal goal is increasing cost effectiveness. Optimizing costs versus performance requires some tradeoffs. Performance could be improved by allocating more resources, but only if that can be cost-justified. Further, rationalization is not always about system performance optimization; it could relate to simply reducing costs. The author proposes analyzing this question using the "Financial versus System Optimization" four-quadrant diagram.

Financial Versus System Optimization Trade-off
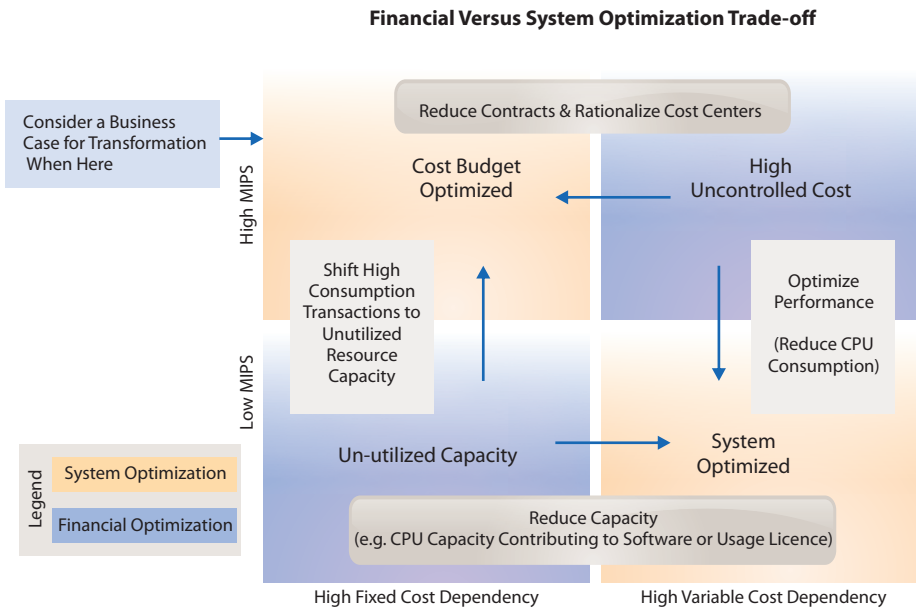
Source: Research TCS Consulting Practice

Before examining that diagram in detail, let's consider the question of processor consumption (consumption of Central Processing Unit, commonly referred to as CPU) by workload processing as a cost parameter. In most cases, CPU consumption is the primary variable and it contributes significantly to IT operating costs. Software license and maintenance costs are often based on the number of CPUs used by the system (for example, database server software is often licensed per CPU). The variation of cost can be even higher in mainframes, where software license pricing is related to millions of service units (MSUs), a usage metric defined by IBM. The customer has to pay more license fees if MSU consumption is high. The definition of MSU can be different for each mainframe model. Even two models with the same performance levels can show different MSU consumption based on IBM pricing policy and metering algorithms. Therefore, the first target for optimization in mainframes should be to reduce MSU consumption or contain the existing levels when consumption is increasing.

Despite IBM's use of MSUs, for the purposes of measuring CPU consumption across models, MIPS (Million Instructions Per Second) is still the best parameter to use. MSU correlates with MIPS consumption and it is fairly linear. The correlation between the consumption and the cost structure can help in setting the target goals for optimization and also aid in determining when transformation is necessary and optimization is no longer an effective option. After doing this analysis, customers may find that cost rationalization has nothing to do with throughput at all, but simply relates to how resources are allocated. They may be paying high fixed costs against low CPU consumption; such costs would have been better structured as variable costs.

For instance, when paying a high fixed cost for unutilized capacity as illustrated in the lower left quadrant of the diagram on the previous page, there is a case for resource optimization. In such a case, divert high consumption transactions to unutilized resources. On the contrary, with high CPU consumption and highly variable costs (upper right of the diagram), the best approach is to try to level out costs and pricing to make them more predictable and budgeted.

Optimizing System Performance: An Analytic Approach

If cost parameters are well optimized, system performance optimization is the next step. This is not always as daunting as it may sound. One would think it means delving into monolithic code and finding needles in haystacks. Analytics, a field that is much more sophisticated today, can help pinpoint areas to optimize.

The consumption of CPU and response times depend on transaction size (in MIPS) as well as on the business process in question. For example, a transaction made up of well-optimized atomic transactions (the smallest logical part of a transaction) may still face performance challenges when the overall business process is not well optimized or coordinated. For example, if a sales process updates inventory and accounting at the same time, the interrelationships may affect performance even though each transaction is optimized. The larger business process must be considered, and this analysis can be

intricate since it depends on all the processes involved, the distributed servers, and the system layers traversed by the process (the layers could be application servers, database systems, and user interface systems). It may also depend on human interaction with the system; for instance, certain working hours may represent the peak time for a day.

It is a common mistake to leap into transaction optimization before performing adequate analytics. Without analytics, it is possible to make costly changes with little impact. One needs a tool that captures snapshots of consumption of CPU at various system layers, mapped to the processes in time scale. This helps in uncovering consumption patterns that lead to the root of the performance/cost bottleneck. The snapshots point out the particular areas where the transaction exceeded preset thresholds. Sophisticated tools are available for such analytics, many from independent vendors. Some of these tools provide just single snapshots, which are useful only for monitoring. More advanced tools store periodic and context-driven snapshots in a database. This data helps in forecasting consumption and potential overruns. It can also aid in estimating the effect of optimization. The author refers to this database as a Performance Warehouse (see illustration).
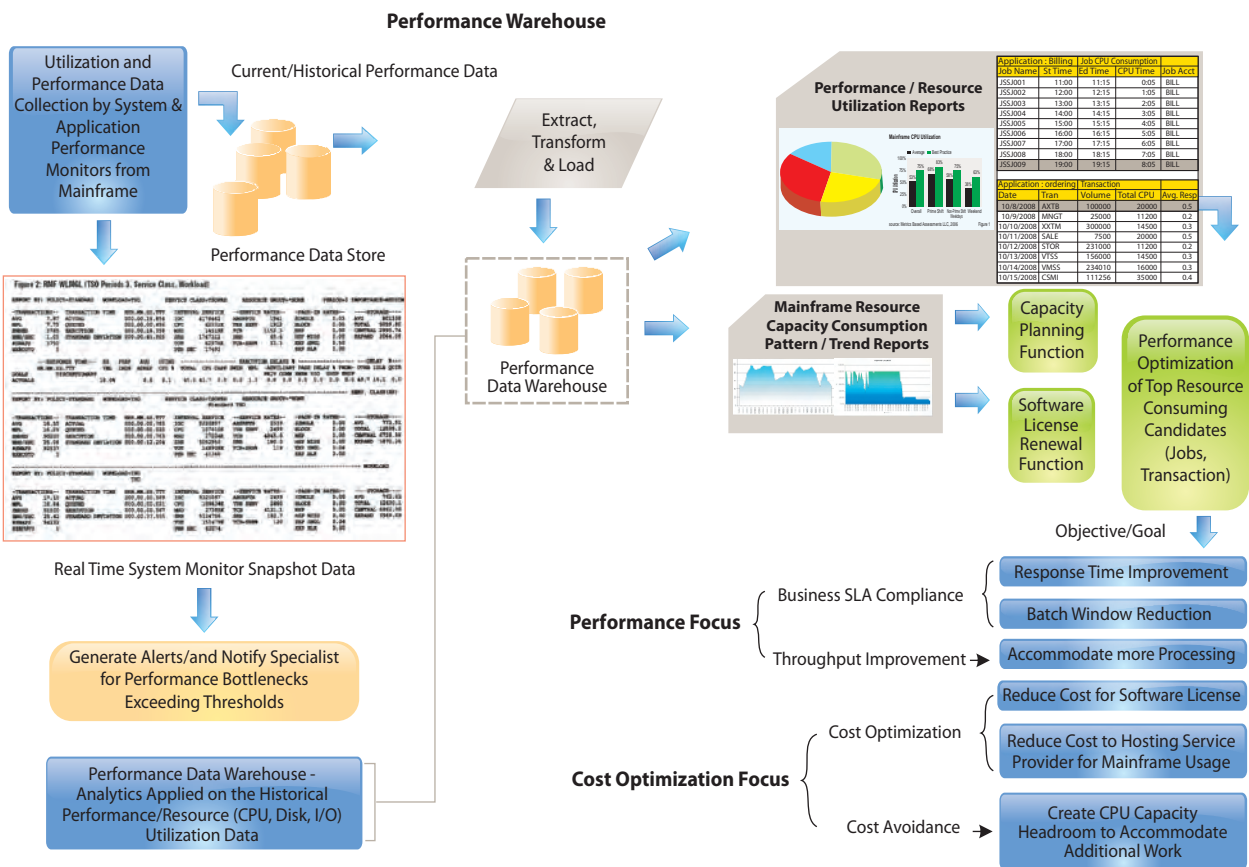

Source: TCS Infrastructure Consulting Group

Optimize Effectively: Estimate First

Optimization efforts that begin without an attempt to estimate their impact fail prematurely. Such optimizations are unlikely to be very effective, and it then becomes difficult to deal with the expectations of apprehensive stakeholders who are disillusioned about optimization as a result of earlier, less effective approaches.

Estimation has two stages. The first stage involves analyzing the root cause of performance problems and thus pinpointing where optimization should be applied first. The second stage entails forecasting the effect of elimination of the cause (or reducing the occurrence or impact). Eliyahu M. Goldratt's Theory of Constraints (as outlined in his 1984 book, The Goal) can be very useful here.

The Theory of Constraints methodology suggests analyzing a system, which may have multiple bottlenecks in its subsystems, to find those areas that will provide maximum benefit. In all probability, the net benefit of eliminating the lesser bottlenecks will be marginal if the primary problems are not addressed. The elimination of the bottleneck that yields the maximum net benefit is called the Point of Leverage. This process of improvement is iterative; that is, once the primary bottleneck is eliminated, another bottleneck with relatively less impact becomes the next Point of Leverage. The following diagram shows a logical representation of this strategy.

Transaction Components in a Business Transaction With Performance Profiling
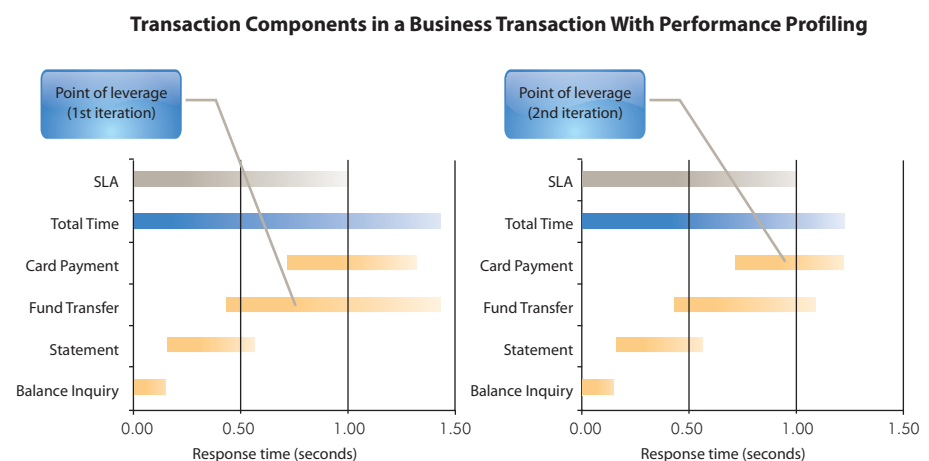
Source: Research – TCS Consulting Practice

One should estimate the effect (and analyze the cost and benefit) of the improvement in a Point of Leverage before system tuning. The estimation techniques and the data in the Performance Warehouse play an important role here. The capability of the analytical tools used to monitor legacy performance is critical. Choosing the right tool is an important aspect of due diligence.

The Road to Self-Funding IT

Transformation of legacy systems is an attractive proposition, and the cost benefits of virtualization are proven. However, many enterprises are deferring capital investments amid slowdowns. Further, legacy applications are often complex and require expensive preparation for migration to new infrastructures (in many cases, the enterprise applications are rationalized or even reengineered in tandem with the transformation of the infrastructure). Therefore, more modest initiatives must be explored. IT can be, at least in part, self-funding through reducing ongoing IT costs in order to fund new investments. Optimizing legacy systems can be instrumental in reducing costs. If past optimization attempts have not yielded the desired results, it may be worth taking a second look. It could pay off with surprising results.

Application Portfolio Rationalization

Rules of Thumb
to Reduce Application Costs

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Examining the application portfolio systematically can help pinpoint redundancy and help CIOs cut costs

Abstract

Delivering applications to business users is the key function of IT, yet the full cost of applications is not readily visible in a typical IT budget. CIOs intuitively view complexity in the application inventory as a major factor driving up IT costs. This article discusses the challenges in providing clear benchmarks for application costs and suggests practical strategies for simplifying application portfolios in large organizations.

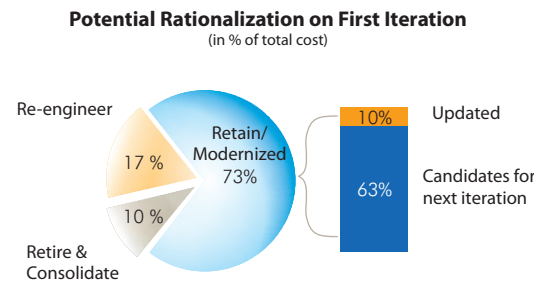## Understanding the True Cost of Applications

The current financial crisis and its broader economic impact have only increased pressure on IT budgets. CIOs are taking short-term steps: delaying purchases, renegotiating supplier contracts, and cutting discretionary projects. Unfortunately, the reality is that short-term savings opportunities in a large IT budget are often limited. Thoughtful cost restructuring programs must blend short-term cuts with long-term structural improvements. While good methods and tools are available to help the CIO with productivity, process, hardware, and other elements of IT infrastructure, little is available to help the CIO reduce costs that stem from complexity, obsolescence, or other drivers of unnecessary cost in the application portfolio, an area that may be the new frontier in IT cost management.

Consider the contrast between the CIO's view of the IT shop and the CFO's view. The CIO understands that the business' need for applications is the ultimate driver of IT cost. Hardware and, indeed, all IT infrastructure costs, including labor, simply enable the business to run applications. Most labor in the shop is for application development, integration, maintenance, and support. By comparison, the CFO views

TCS' experience suggests that, for many organizations, the potential benefits are much greater.

Potential Rationalization on First Iteration
(in % of total cost)

Source: TCS Consulting Practice: Data sourced from Gartner, 2008

application costs through a narrow prism. Hardware cost is easy to identify, and although mechanisms exist that allow costs to be allocated to applications, most commonly they are allocated to the departments that use the applications rather than to the applications themselves. The same is true for labor. Software license and maintenance fees are often, but not always, connected to identifiable applications and might, or might not, show up that way in the budget. Applications are typically not line items in the IT budget, which is primarily dominated by hardware, software, and labor. Many organizations have a large base of custom application code that is clearly a major intellectual asset. Yet few firms have even a moderately reliable application inventory, let alone rigorous ways to link an application with its supporting labor costs, license fees, or hardware costs.

The difficulty in measuring the linkages between applications and costs at the firm level is exacerbated by a serious lack of benchmarking data in this area. An organization can look at its labor costs relative to a variety of internal and external benchmarks. For example, a CIO can benchmark the percentage of labor supplied by employees versus labor supplied by various types of lower cost and higher cost contractors, labor percentages in higher and lower cost locations, and relative compensation levels for IT

labor. A firm can also benchmark hardware costs in various ways: hardware costs as a percentage of revenue, the number of servers supporting a business compared to the same data for a similar division in the same company or in a different company. Yet allocating costs for individual applications is difficult because expenses are not tracked for individual applications.

How important is this? Consider two examples from the author's personal experience. A few years ago, the author knew of a major multi-divisional organization that spent approximately $20 million to replace a mission-critical legacy application. The system successfully went into production in one division but was removed from production when the firm calculated the full cost of interfacing the new system with all incompatible feeder and receiver systems in other divisions across the firm. The firm's highly redundant application portfolio made it so costly to implement a new application across the enterprise that the effort was abandoned. More recently, a major bank was looking at a consolidation of its vendors as a way to gain better volume discounts, increase use of off-shore labor, and allow the vendors to optimize their service delivery. Target benefits for the vendor consolidation were $50 million, but getting the program off the ground has proved extremely difficult even though it had been promoted as "low hanging fruit." At the same bank, which is a product of a number of major mergers, a high level estimate of the benefits of an application rationalization and modernization program suggested benefits of $150 million per year.

Retire, Reengineer or Rearchitect?

Here are some factors that suggest unnecessary expense in the application portfolio. CIOs can consider the following examples of fragmentation and duplication:

- To what extent are there systems that do exactly the same thing? For example, are there duplicate operational or corporate systems left over from mergers that have never been consolidated?

- To what extent are systems doing the same thing in different geographies, and do most of the functions overlap?

- To what extent are there systems that support the same basic functions for different products? Could they be combined? For an insurance company, could policy administration systems be combined across a broader array of products? For a manufacturer, could the same supply chain systems be used across product lines?

- To what extent are applications fragmented by layers of technology? A customer mentioned recently that it has a client-facing web application that still relies on the original Mosaic browser. The customer keeps a cadre of specialists on staff just to support this application. This example may seem extreme but similar cases occur in most large IT shops with legacy applications still in place from 30 or more years ago.

Most CIOs for large legacy IT organizations will recognize their shops in this list. For those who do, what are the paths to consider?

- Can applications that are clearly redundant be retired?
- Can applications be reengineered to simplify the range of technologies supported?
- Can applications be rearchitected to make them more agile and adaptive so that the improvements of today do not become the problems of tomorrow?

A CIO with the latitude to make investments may look at many aspects of the application portfolio, examining which applications are duplicative, which are oldest, and which require unique support skills. In today's difficult climate, a CIO may want to concentrate on the first of these points, retirement of the most redundant systems, with a goal of reducing costs as quickly as practical. The following table provides examples of patterns a CIO or division IT CTO can use to identify opportunities and strategies.

Scenario	Typical Symptom(s)	Approach	Typical Decision Parameters		
			Complexity	Timeline	Cost Benefit
Consolidation	Different systems performing similar functions, such as financial settlement for different products, geographies, or customers. Such systems may result from mergers, head office versus region technology platforms, "temporary" systems for new products, or packages acquired for only part of a function	• Select survivor based on best functional capability and technology • Use reverse engineering tools to analyze all functions in retiree system(s) and define gaps in survivor system • Determine functional and technical coverage approach for gaps, e.g., tools-based migration • Replicate all retiree interfaces • Determine single versus multiple instance production strategy	Medium-High	Long Term	High
Re-Unification	Original system "cloned" for multiple purposes	Similar to consolidation case but generally simpler	Medium-High	Medium	High
Report Rationalization	Multiple generations of reporting capabilities, e.g., hard-coded reports, an early information center or Business Intelligence (BI) tool. Most reports are sourced from mix of production databases, ETL (Extract Transform Load) warehouses, data marts or backend systems	• Develop logical database covering entire report set • User survey and system log analysis to determine regular report usage • Implement BI tool for limited set of standard reports and support user based ad hoc drill down	Low	Quick Win	Medium-High
Data Exchange Standardization	Usually there is limited understanding of the extent of use. Numerous one-to-one interfaces between systems. Mechanisms may include multiple generations of technology, e.g., hard coded, custom consolidation code, EAI (Enterprise Application Integration)-based tools (often driven by platforms like Tibco, Websphere, or BizTalk)	• Similar to report rationalization • Logical design for standardization of data • Log-based analysis of data usage • Selection of EAI tools for consolidation	Medium (Projects are usually scalable. Changes that require selective application redesign can be put on a roadmap)	Medium Term	Very-High
Business Process Management	Multiple workflow capabilities hard coded within legacy systems, combined with a proliferation of workflow tools	• Similar to data exchange standardization • May require SOA (Service Oriented Architecture) enablement to open legacy code for integration with BPM suite • Usage of reverse engineering tools for identification of potential services	Medium High (Important to find pockets of low hanging fruit)	Medium/Long term	Very-High
Partly Retired Systems	Packaged or custom system retired for new transactions but still available for inquiry or investigation. More often than not, the software maintenance and other costs for such systems are out of proportion to their value	• Develop logical database covering potential information retrieval needs • Port data for retrieval to new database using data migration tools • Retire • This is often most valuable for packaged software	Low	Quick Win	Medium

For starters, remember that third-party applications, if they fit, are usually more cost-effective than in-house applications. Hence, an area for the first level of investigation is whether the current inventory of in-house code can be shrunk in favor of purchased software. Thinking about this problem, remember that the current definition of an "application" may no longer apply. Consider reporting and workflow as key examples. Older systems were often built with preprogrammed or "canned" reporting and workflow capabilities. Today, the trend for reporting is Data Warehousing and Business Intelligence applications that replace multiple generations of custom reports. Similarly, workflow, if it existed at all in older applications, was a built-in capability. Today, the trend is toward general purpose workflow tools that invoke application components as needed to complete a defined end-to-end business process.

Case Study

Consolidation of Reporting Systems in a Consumer Lending Company

Business Situation

A large consumer lending operation, built through mergers, has three application suites supporting its core business, with each suite composed of older generation bank software products supplemented by extensive custom integration and reporting. The bank plans to replace these with a single suite of hosted applications offered by a major banking provider. The bank engaged TCS to look at its reporting functions and to focus specifically on delinquency and default reporting. Across the three suites, the bank has more than 2,000 reports just covering delinquency and default information. The new system cannot be implemented without a robust reporting capability but it was obvious that the current reports were highly duplicative across the three suites, and replicating these would be extraordinarily expensive.

Technology Infrastructure

The reporting today represents a mix of "production" reports produced directly by the various processing systems. Reports were produced from a central data warehouse but mixed with data extracted directly from the underlying systems. The underlying systems included databases residing in PC databases, downloads from the data marts residing in BI systems, and even custom reports saved as snapshots. The software is a mix of third generation programming languages, early stage data warehouse, information center tools and PC-based tools. Analysis of use patterns indicates that many of the reports are used to handle infrequent but recurring situations, so simple elimination of the report was not practical without an effective alternative solution.

Progress to Date

A logical data model of a few hundred elements was developed by studying the reports. A business intelligence tool kit was built over the data model to support a very limited range of custom reports with user drill down capability to produce anything available from the current suite of 2,000 reports. This required an analysis of every item on every report, done by a small team over a few months. Implementation of the solution will create a modern and agile information structure, enabling the bank to run the operation

at a fraction of the cost associated with the legacy systems. The overall strategy allows for replacement of the current suite with the business intelligence toolkit having less fragmentation in the system.

Without good benchmarks, one should rely on rules of thumb

To summarize, our industry needs better research on how to understand and benchmark an application portfolio and its relative efficiency or inefficiency. CIOs also need better tools to guide decision making about application portfolios. While better and more rigorous solutions are being developed for this area, the concepts outlined in this article can help CIOs generate practical ideas for quick cost savings.

Connecting People and Processes

Strategic Resourcing

The Network Delivery Model Has Come Of Age - Has Program Management?

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In this article, he is supported by Sankalan, who has worked with him on building IT governance methodologies for TCS.

Network delivery requires new skills and a fresh approach to management

Abstract

With network delivery gaining ground, outsourced programs have to deal with a different style of governance and a set of new delivery parameters. Looking deeper, our understanding of emerging roles, and the proficiency they demand, challenges our ability to leverage the network delivery model.

How are roles being redefined? How is our understanding of proficiency in skills a critical skill in its own right? And how are cross-functional skills like enterprise architecture management finding new uses? This article highlights a new way to look at the basics of program delivery in terms of the emerging roles needed to effectively manage the complexity of global network delivery.

Is the Promise of Network Services Delivery Being Realized?

With outsourcing to low-cost countries saturating, the network delivery model for professional services took center stage. Under this paradigm, projects were not outsourced to just one country, one firm, or one location. Instead, a broader network of professionals was brought to bear from many different locations. Yet network services delivery has not been consistently delivered on its promises. Businesses still clamor for resources from India and China. With the talent pool drying up, other destinations are only compromises in cost. The merits in network delivery, however, weren't just the labor arbitrage. It was about having hub-and-spoke centers of service delivery, where resourcing needs to strike a balance between the breadth of knowledge and niche skills. Today, it is time to find out whether or not the once foreseen benefits are actually being realized.

A loosely executed network delivery has its pitfalls, namely low value services delivered from high cost locations or niche engagements provided by inexperienced practitioners.

Consider this - a bank offers a large deal to outsource its insurance underwriting activities. This comprises
- Business Process Outsourcing (BPO) for transcribing insurance applications,
- software development for automating underwriting rules, and
- consulting for business process improvement.

All three of these activities belong to different levels of the value chain. The deal is executed from multiple countries - BPO in Vietnam, development in India and Hungary, and consulting purely onsite in the U.S. A problem arises when each of these is executed in isolation. The BPO team follows rules that often fail to comply with newly defined processes defined in the consulting engagement. The automation project, at the same time, is caught in a vicious circle of frequent requirement changes coming from the BPO team, thereby shifting delivery dates. Analysis reveals more than just program management deficiency. The task of maintaining effective communication between the consulting team and the BPO team was a low priority and was staffed with inadequately skilled personnel. While the role was identified, it was perceived as mere stewardship, putting a warm body in place rather than thinking through the strategic nature of the role and evolving it to meet the challenges.
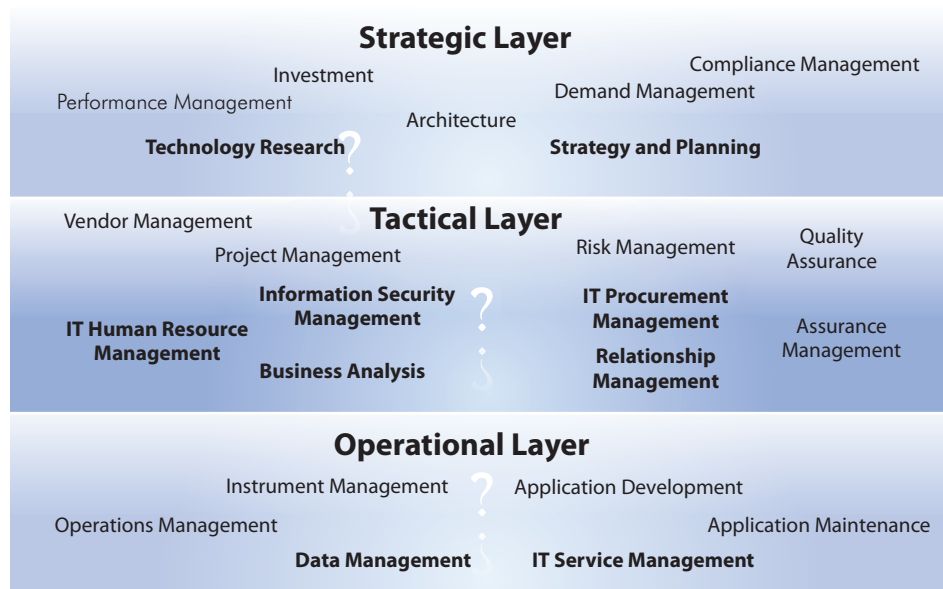
Outsourcing in the network delivery model provided a remedy for talent shortages and decreasing arbitrage. Yet it has also posed new challenges to the traditional understanding of roles and competencies.

Governance for Role Mapping – The X-Zone Syndrome

Program governance rarely delves into the intricacies of projects; it relies on metrics and dashboards in the strategic context. For example, higher offshore to onshore ratio in FTE (Full time equivalent) can represent how much arbitrage is being leveraged. It is also common to track what percentage of senior resources is being retained within a project over a period of time; this metric represents the knowledge retention in large programs. This reliance on metrics has its pitfalls. Large deals today are composites of heterogeneous projects. Network delivery faces the risk of inadequate understanding that new definitions are required for many roles. While we ensure adequate diligence is shown in sourcing skills required by the projects at hand, we often tend to overlook the emerging roles that support network delivery itself. Because such roles are not adequately staffed, important decisions are either neglected or delayed. If we go back to the example we discussed earlier, the role that would communicate the new processes to and from the consulting engagement to the BPO team would clearly need to be staffed by someone with a good understanding of work environments in BPO and the cultural factors of the location in question.

A mature sourcing model should standardize roles at strategic, management and operational levels. This would act as a stencil that reveals the blind spots where a specialized role or skill would matter. We call these blind spots the "X-Zones." This is because they are not easily discerned using a traditional understanding of outsourcing programs.

Organizational Function Structure

Strategic Layer

Investment
Performance Management
Compliance Management
Demand Management
Architecture
Technology Research
Strategy and Planning

Tactical Layer

Vendor Management
Project Management
Risk Management
Quality Assurance
Information Security Management
IT Procurement Management
IT Human Resource Management
Assurance Management
Business Analysis
Relationship Management

Operational Layer

Instrument Management
Application Development
Operations Management
Application Maintenance
Data Management
IT Service Management

Source: Research - TCS Consulting Practice

If Roles have not Changed with Network Delivery, You Need to Worry

Adoption of standards (like security ISO 20000 and ITIL) and compliance requirements necessitates new roles and responsibilities. For example, the role of Incident Manager or Release Manager is well-defined in the ITIL library. If adoption of standards causes us to redefine roles, surely a paradigm shift such as network delivery should prompt us to take another look at most of these roles from a distributed responsibility context. Clearly, it makes sense to apply RACI (Responsible, Accountable, Consulted and Informed) to chart roles in an IT organization.

Network delivery highlights the importance of hitherto unrecognized factors like multi-touch-point customer proximity, diversity, and partner alliances. RACI can be the stencil to find the X-Zones and the new facets of conventional roles.

For instance, look at the role of the information security manager, a role that has to deal with geographically dispersed delivery centers that need to comply with different information security regulations. This role ensures that data centers for disaster recovery are cross-located in multiple locations and that data is appropriately shared over the Internet and VPN (Virtual Private Network) with partners, vendors, and customers using complex sharing criteria. The role must handle the fact that each country has its own set of standards and regulatory requirements.

Similarly, a project manager today must achieve higher levels of skill and performance to manage globally dispersed programs. If the network delivery ideology is as demanding as the "follow the sun model", he may have to make a delicate call on when the sun can be allowed to set. Collaborative development is now a buzzword and it is easier said than done. It requires project management and architecting skills to partition complex projects for multiple cross-located teams, with the hidden cost of challenged traceability. Traceability here means finding the knowledge source, which becomes complex over the lifetime of the project.

Amidst this, another critical role that emerges today is that of the enterprise architect. Enterprise Architecture (EA) has been talked about in the context of business-IT alignment. However, translating enterprise architecture into operational benefits and controls is a challenge and EA is often accused of being utopian. In a program governance context, though, EA finds a direct application by providing a "reference architecture"- a set of architectural guidelines and constraints that ensures integration of distributed and isolated projects while they are in a development or maintenance phase.

The enterprise architect in this context would focus more on the scope of individual projects and their inter-relationships.

Layers	Strategic			Tactical				Operational		
Functions	**CIO**	**Enterprise Architect**	**CQH**	**Business Relationship Manager**	**PMO**	**Security and Compliance**	**Solution Architect**	**Delivery Manager**	**Business Analyst**	**Developers**
Services Portfolio		A Cross Project Reference Architecture	A Varying Quality Standards (CMMI®, ITIL, ISO)	R Globally Distributed Touch-points	A Global Sourcing Forecasts to Opportunity Mapping	A Different Security Compliance Levels & Criteria in Different Locations			C Cultural Proximity	I Varying Mix of Skills at each Service Line
Application Portfolio							R Modularity for Collaborative Service and Develop-ment	C Collaborative Development Methodologies and Tools		
Infrastructure Portfolio		A Information Architecture								
Maintain IT Budget	R Near-Shore Cost Benefits									
Decide Strategic Investments	A Distributed Innovation Centre and Labs									
Communicate Business Value to Stakeholders				R Change Management Dimensions - Cultural Diversity, Multi-dimensional Organization Structures, Diverse Communication Mechanisms						

R - Responsible   **A** - Accountable   **C** - Consulted   **I** - Informed

Source: Research - TCS Consulting Practice

Changing facets of otherwise traditional roles demand skills of a very niche nature. Skills, if we look at their generic definitions (developer, solution architect, relationship manager), don't change. Rather, the application of those has changed in the network delivery paradigm. Sometimes, the skills demand a new level of proficiency.

Same Skill, New Application

Application of a skill demands evaluating the skill based on different parameters. For instance, a strategic planner cannot stop at being a portfolio planner. He must apply intricate analytic skills to explore multiple delivery modes that emerge in the network delivery paradigm. These could be near shore, offshore, multi-sourcing, captive centers, joint ventures, and so on. The selection of the portfolio would largely depend on the business' capabilities in these areas because each brings in new cost-benefit dimensions. Such changing scope of the role demands a new level of proficiency. Our understanding of skill and evaluation of the proficiency needed is now a competency in its own right, which is equally difficult.

Changing Application of Skills

	Classical Delivery	Network Delivery
Business Skills		
Business Case Development	• Direct Communication • Direct Costing	• More of Stake Holder Analysis • Analytics Driven Costing
Strategic Planning	• Portfolio Management Skills	• Portfolio Planning Skills from more Intricate Deployment Perspectives
Budget Management	• Simple Organization Structure Translation	• Complex Organization Structure Translation
Visioning	• Business Strategy and Application Portfolio	• Enterprise Architecture
Specific Core Skills		
Business Modeling	• Requirement Analysis on 'As Is' and 'To Be' states	• BPM and BPR
Data Design	• Single Instance Databases and Dedicated Datacenters	• Distributed Databases, Dynamic Datacenter
Application Design	• Functional Modeling	• Project Modeling
System Integration	• Niche Platform Knowledge	• Multi-Platform Architectural Skills

Source: Research - TCS Consulting Practice

More Boundaries, but Lines are Blurring

Network delivery has posed more challenges for program governance, if not for the beneficiary organization itself. The focus on cost reduction leads to an obsession with arbitrage, and execution strays away from the much-touted merits of ideal network delivery. How much skill diversity are we actually achieving? In our pursuit of globally optimized sourcing, we have been oblivious to the hidden cost of having a classical delivery execution within the network delivery model. The model fails if labor arbitrage is seen in isolation, and the new breed of skills and responsibilities are ignored.

Program governance needs to focus on the sourcing map using a new stencil. The skills are the same, but the application of the skills depends on a different type of proficiency. The evolutionary nature of these roles demands a new breed of competency. For instance, project modularity in network delivery has to be supported by application modularity. Sources of knowledge that are dispersed globally need new project and knowledge management techniques to achieve better traceability. Program management has to instill architectural sanity across multiple projects, beyond just delivery governance.

Our understanding of the new skills in the new delivery paradigm is inadequate. Enterprise architects turn out to be better program managers because of their cross-functional skills; project planners become better application designers because of their talent for modular design. These are radical and perhaps weird thoughts that both plague and inspire us today, blurring the lines in a more federated world, but holding out hope that network delivery can deliver on its promise if we pay close attention to the new roles and skills needed to manage the process.

Change Management

Look Before You Leap — Assessing Readiness for Change

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Ashok has been a consultant change manager in large business transformation programs for TCS' clients. He brings over 16 years of experience in consulting for Organization Change Management (OCM) in various business contexts, including M&A and organization-wide restructuring.

Determine the readiness of stakeholders for IT transformation and implement best practices for change management

Abstract

IT transformation will happen in many phases. Each phase will impact how people perceive and participate in it. The effectiveness of the transformation largely relies on how all the stakeholders, including process participants, are aligned and how they perceive the change. With transformation sweeping across roles and lines of business, change management is complex. How can IT gauge the readiness of participants for the next phase of rollouts and proactively manage how the change is perceived?

Change Cascades

Transformation of IT has a far-reaching effect on business processes and people's roles in them. The source of change may reside in the new technologies, operating models, or the systems adopted. In fact, change in any one of these areas could have cascading effects on the others. For example, in the case of technology, virtualization of infrastructure means reduced maintenance staff for legacy systems because the number of such systems would be reduced. On the other hand, virtualization requires people with new skills such as virtualization policy administration. From a change management perspective, many people who have been proud of their ability to maintain legacy systems will find their knowledge becoming obsolete. They either would have to be trained in virtualization skills or be transitioned to other IT departments. A change in operating models can have an even greater impact. What if entire sections of IT departments (like Service Management) are outsourced to offshore locations?

Transformation has a nonlinear impact on people. A seemingly innocuous technology can change the way people are utilized and can disrupt how people view themselves and perceive their value to the organization.

Change Management (CM) is a relatively new discipline in IT (in fact, virtualization, the subject of current hype, is much older than CM). Yet CM deals with the very basics of business management, and with some fundamental principles of managerial interventions. For instance, most successful CM programs have relied solely on communication strategy and planning. However, CM has become more complex today due to the sheer complexity and frequency of change. IT transformation is no longer the exception; change, ironically, is a constant. Various areas in an IT organization have their own characteristic cultures. The following illustration shows how work cultures change across various functions in IT.

Change Management - Look Before You Leap: Assessing Readiness for Change

Transitions in Work Cultures in IT Organizations
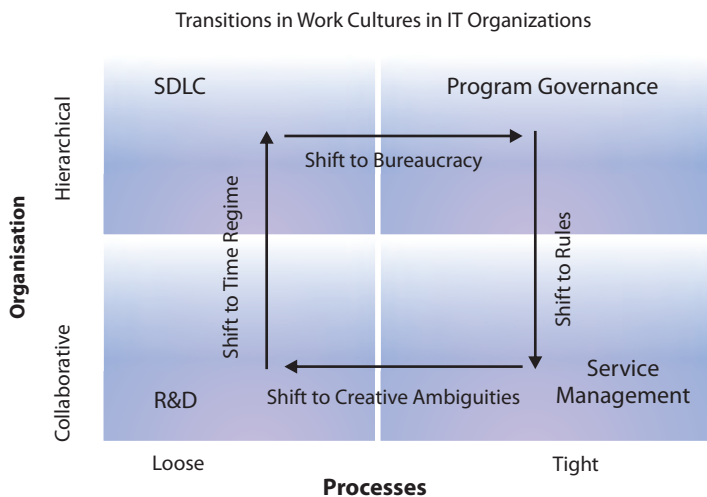
Source Research - TCS Consulting Practice

In a large-scale IT transformation roadmap, all the transitions depicted in the diagram shown earlier would be incidental. The effectiveness of the transformation would largely rely on how we manage these transitions in terms of people's expectations and readiness. For instance, the transformation might plan to incubate new IT infrastructure options shifting Infrastructure Service Management people to R&D. This might be especially true for an organization that is in the process of adopting virtualization where the R&D would need resources from Service Management to advise on processes. The people transitioned would find it strange to move out of a Service Level Agreement (SLA) regime to a free, creative workplace. Instead of liking the challenges, they might find the situation daunting.

Similarly, a common syndrome in transformation is seen when the application development is outsourced and people are shifted to program governance. In such a case, one would find a new hierarchical environment where a person would alternate between the CIO office and the vendor groups for routine matters. The person may also feel like a victim of outsourcing and fear losing the job.

With these kinds of shifts among departments, change management is sometimes perceived as a human resources problem. Change management is in fact much broader than that. CM is about achieving the overall business objective by aligning people with the change and getting their buy-in. Redressal is not in scope for good CM programs. To understand the real role of change management, let's examine it in the context of the most common IT transformation scenarios.

Phased Transformation Relies on Change Readiness Indicators

The most common scenarios for IT transformation include introduction of new technology, new processes like Agile Development, budget reductions that defer important initiatives, and new operating models such as off shoring. Employees tend to respond to these scenarios with a number of classical syndromes. For example, off shoring leads to a rise in "pink slip phobia", as workers' fears regarding job security rise.

The CM program needs to foresee such syndromes at each stage of the transformation roadmap. The next phase of transformation will depend on the current level of adoption and the readiness for the next phase.

Readiness for change is gauged at three progressive levels. The first level is awareness, in other words, how successfully the purpose and impact of the change has been communicated to stakeholders. The second level is acceptance, the extent to which the stakeholders believe in the purpose of the change. The third level is adoption, the extent to which stakeholders have participated willingly in the change.

Change Management Framework
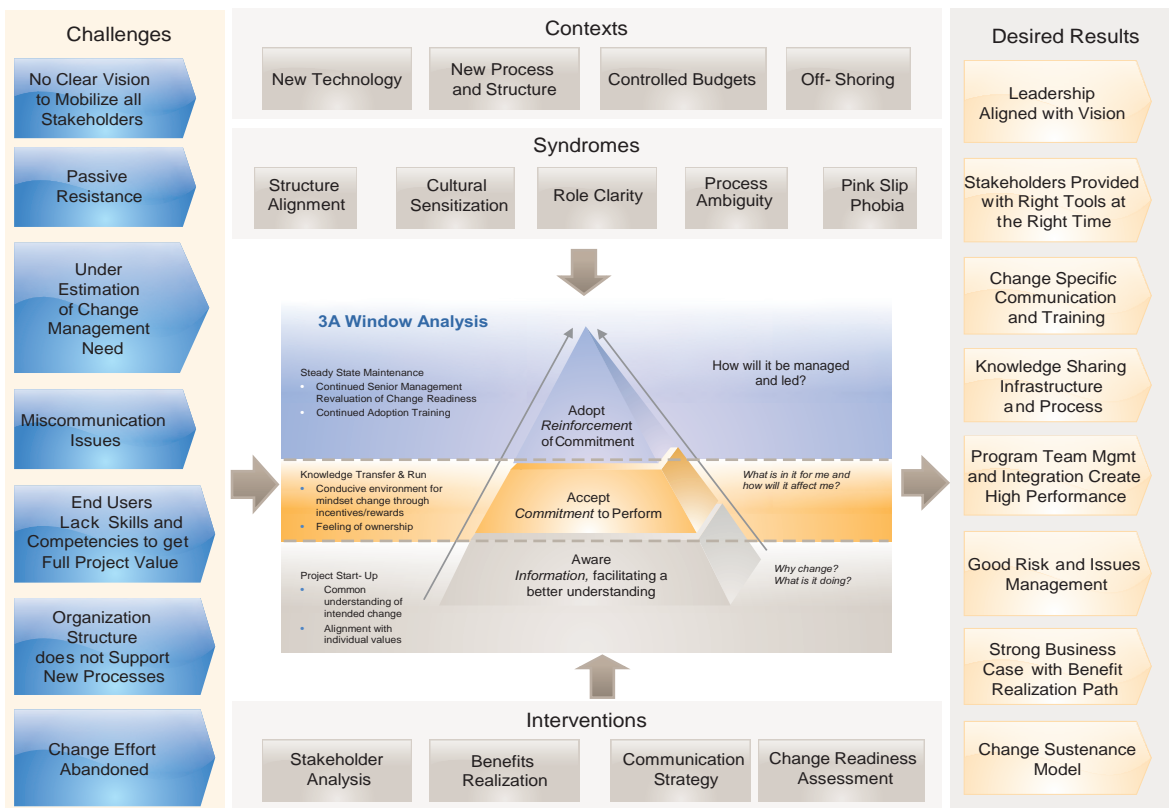
The level of readiness required varies depending on the stakeholders in question. For instance, readiness for new processes requires adoption by direct participants in the process while customers of the process may require just awareness. The desired level of readiness at each phase of transformation should be broken down for each group of stakeholders. Stakeholder analysis comes in handy here to understand both the current and the desired readiness level for each stakeholder. Stakeholders are mapped in a Likert scale between "strongly disagree" and "strongly agree". This is done for both the current state and the desired state to analyze the gaps. A detailed discussion of Stakeholder Analysis is beyond the scope of this article, but interested readers can find many sources for this analysis in the Six Sigma literature.

Transformation programs conduct such change readiness assessments in tandem with the deployment of new processes, structures, or technologies. The goal is to achieve a score that indicates readiness for the rollout of the next phase of transformation.

Typical Pattern in Stakeholder Analysis when a Process is Accepted but not Adopted

STAKE HOLDER	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Process Owner			ACTUAL		DESIRED
Process Participant		ACTUAL		DESIRED	
Executive Sponsor			ACTUAL	DESIRED	
Process Customer			DESIRED	ACTUAL	
Process Facilitator (Eg. Auditor)			ACTUAL		DESIRED

Source: Research - TCS Consulting Practice

Increasing Readiness for Change Management

Although there are admittedly variations, context for change and patterns of resistance to change fall into a few main categories (refer to illustration in the previous section). Therefore, most successful CM programs rely on the principles outlined below.

Consider a Communication Desk
Since communication is key to successful change management, it is a good idea to have a communication desk to handle this critical function. Since change is continuous, with businesses changing processes and systems frequently, the need for communication is ongoing. The communication plan should be structured to help spread information about the strategy and the reasons for change rather than allowing rumors and reactionary miscommunication to slow the acceptance of changes in progress. Such miscommunication can be costly. Such a department or role would keep track of rollouts by working with change champions and stakeholders. It should also have access to necessary communication channels (senior executives, designated spokespersons, and change champions). The communication desk should keep an inventory of all context-driven communication plans. Every communication plan should include the five Ws and an H (who, what, where, when, why, and how).

Make Process Participants Change Managers
Process participants often resist change. For example, the organization may decide to follow an Agile development model, in which design and development happen in parallel. For developers who are used to freezing the design before starting development, this change may be uncomfortable and create confusion. In such cases, one of the process participants who is enthusiastic about the change can be actively involved in the CM program, right from the initial stage, so that the person can champion change within the team or group. This person, as a part of the process, can better empathize with other people and communicate the purpose of the change.

Moreover, such a person will have a higher level of credibility and acceptance with their team or group.

Avoid Premature Proclamations

Buy-in from participants is important, but even more critical is support from sponsors and management. Many change rollouts fail by prematurely proclaiming their success. This raises questions about the maturity of the rollout and can even put the program in jeopardy. For instance, Service Oriented Architecture (SOA) deployment may look successful when implemented with prototype processes. However, for live processes with more realistic loads, SOA performance could degrade and thus deter adoption.

Consider What Not To Do

While it is common to list the things one should do before a rollout, in their enthusiasm, change management teams may fail to consider common pitfalls, even though many change management mistakes are classical in nature. For example, certain rollouts like off shoring have different sensitivities across stakeholders. It would be a mistake to have general communication for all the roles in situations where each role requires communication with different connotations.

Maintain and Communicate a Readiness Score

The readiness score is an important metric to decide when to move to the next phase of rollouts. Developing this readiness score is not entirely a democratic exercise. The score matters most to people who have a better understanding of the vision for the change. Therefore, the Change Manager needs to identify stakeholders with whom the readiness should be discussed. This group would typically include sponsors and may include process participants who have contributed as change champions.

Readiness Score Against Change Parameters

Dimension	Maturity Scale					
Score	5	4	3	2	1	Wt.
1 Process Participant	Staff have been fully briefed on the Rollout.	Staff have been briefed on the rollout but may not have received detailed information.	Staff have been briefed on the Program, but not very much on the specific rollout.	Communication have been restricted to senior staff or have been generic in content.	Minimal communication on the Program.	4
2 Stakeholder	All stakeholders can relate the changes to their work processes.	More than 85% of users understand the change to their work processes.	Less than 85% of users understand the change to their work processes.	Less than half the users understand the changes to their work processes.	Less than a third of the users understand the changes to their work processes.	2
3 Influence	The influencers actively support the change and will work to facilitate the change.	The influencers support the change, but may not be instrumental in facilitating the changes.	Some influencers are unsure of the benefits of the changes, but do not actively oppose.	Some influencers do not understand the changes. There is weak support and some opposition.	Some influencers actively oppose the change.	2
4 Change Areas	The areas likely to be affected by the change are identified, a rollout plan is developed, and responsibilities are assigned to individuals.	The areas likely to be affected by the change have been identified and a roll out plan has been developed.	The areas likely to be affected by the change have been identified.	The areas likely to be affected by the change have been identified.	Identification of the areas likely to be affected by changes has been started.	4
5 Organizational Changes	It is likely that the business structures will be unchanged.	It is likely that the business structures will undergo minor changes, with most users minimally affected.	It is likely that the business structures will undergo minor changes affecting most users.	It is likely that the business structures will undergo significant changes, but few users would be affected.	It is likely that the business structures will undergo significant and difficult changes affecting all users.	4
6 Capacity for Change (retrospective)	Staff readily adopted a major business change within the past 24 months.	Staff adopted a major business change within the past 24 months, but with some difficulty.	There has been a major business change in the past 24 months.	A major business change in the past 24 months has still not been fully accepted.	A major business change in the past 24 months is still actively resented by a number of staff.	1

Source: Research - TCS Consulting Practice

Readiness Confirms IT Transformation

Readiness along the transformation roadmap is not simply about alignment and achieving buy-in from stakeholders. It also helps to confirm the strategy of the transformation program itself. If transformation activities fail to achieve buy-in from key stakeholders, it is prudent to question the sanity of making the change. In other words, the clarity of the business purpose of IT transformation is reflected by how well people see the benefits. Sometimes a well-executed CM program may fail to achieve personnel buy-in; in this case, the IT roadmap needs to be reconsidered. A well-executed CM program can help predict the acceptance and success of the transformation. Although Change Management is often perceived to be a way to push a predetermined change after the fact, it is actually an effective way to validate change in advance.

CMMI® for Services Is On the Way

Eileen C. Forrester
Interview with Eileen C. Forrester, SEI Lead for CMMI® for Services

Tete-a-Tete

The Capability Maturity Model Integration (CMMI®), developed by the Software Engineering Institute (SEI) at Carnegie Mellon University, has been the de facto standard for software quality for nearly 25 years. However, of late, IT processes have seen interesting new techniques, such as Agile development. Understandably, this has led to a debate about how such techniques could be relevant to IT maturity frameworks like CMMI®. In the context of these developments, Perspectives connected with Eileen C. Forrester to find out SEI's roadmap for CMMI®, in relation to and beyond software quality.

Eileen is the co-chair of the International Process Research Consortium and the SEI lead for CMMI® for Services. She is the developer of TransPlant, a transition-planning process, and the editor of the IPRC Process Research Framework. Her current research area is in process-oriented approaches to service delivery, technology change, risk management, and emergent system types. Eileen has spent 30 years in technology transition, strategic planning, process improvement, communication planning, and managing commercial and nonprofit organizations. Eileen has worked with SEI on the International Process Research Consortium to create the Process Research agenda for the next 5 to 10 years and is a member of the advisory board for CMMI® for Services.

Eileen was interviewed by Nidhi Srivastava, Global Head for IT Process and Service Management at TCS. Nidhi has worked closely with SEI on the International Process Research Consortium and has spent the last eight years in advising and guiding process transformation efforts for TCS clients.

SEI has made an important contribution to the industry in IT quality and software engineering. What's next for SEI?

We will be releasing CMMI® for Services in March 2009. If we develop another CMMI® constellation, the focus most requested by the community is manufacturing.

The SEI process program is also focusing on adaptations for small settings and environments that use multiple models. Outside the process arena, the SEI is doing some exciting work in security, systems of systems, and ultra-large systems.

CMMI® remains the de facto framework for software process, according to Gartner, which said earlier this year that it has not found any challengers to CMMI®. In your opinion, where does CMMI® stand in relation to overlapping frameworks within the ISO® series?

CMMI® overlaps several of the ISO® standards, and we are glad to witness an increase in the efforts to see these as complementary and reinforcing, rather than competitive. More organizations are using both ISO® and CMMI® to good effect. We have noticed an increase in the number of SCAMPISM Lead Appraisers SM who are also certified ISO® auditors. We applaud this effort and have participated in several community efforts to strengthen the connections. A number of our CMMI® partners offer tools that make it easier to apply and appraise ISO® and CMMI® together. Such tools often assist in application of other frameworks as well, such as COBIT®, ITIL®, and SPICE®.

In the last few years, we have witnessed several interesting trends in software development, including Agile methodologies like Scrum and Extreme Programming. While CMMI® is independent of the development model or type, there are growing questions on how CMMI® can be better aligned to the specifics of these new development models. Where do you think CMMI® will focus over the next few years, in terms of evolving for the next generation of software development?

Unfortunately, the adherents of CMMI® and Agile often see themselves as unavoidably at odds with one another. We're coming to the conclusion that much of this is based on misperception and that the software development community can benefit from using both CMMI® and Agile appropriately. Our CMMI® architect, Mike Konrad, has been collaborating with Agile advocates inside and outside the CMMI® user community, and a report on CMMI® and Agile is available on our web site. We think that the two communities can obtain business benefit by learning more about each other, and in time this will lead to better alignment. We are routinely seeing presentations at CMMI® conferences reporting on alignment, best use of each method and opportunities for synergy. In Version 1.3, we expect to add some informative material to the CMMI® constellations to assist CMMI® users who are also implementing Agile.

One of the challenges faced in Agile software development today is the ability to measure and monitor in quantitative terms. Agile models are low on measurable monitoring and high on tacit feedback mechanisms. There is confusion among many practitioners on how Agile models can help high-maturity organizations. What is SEI's perspective on this?

Even large, high-maturity organizations face the demand for system development with dynamic, emergent requirements calling for flexibility and continuous engagement with the customer. I suggest that Agile methods are well suited to these conditions and are worth a look in this context. I also think it's a mistake to assume that this style of development can't be amenable to measuring and monitoring.

CMMI® for Services appears to be an exciting new development. Do you see it competing with ITIL® or complementing it? Can CMMI® for Services appraisals be a closing of the loop for ITIL® adopters, who didn't have an appraising body for service management in general?

As we developed the CMMI® for Services, we deliberately set out to be as compatible and complementary with ITIL® as possible. We don't see them as competitive at all. The SEI has several ITIL® champions and certified ITIL® individuals in our CMMI® for Services team. We do note that CIOs and CTOs have reported in the past that they enjoy the benefits of ITIL® but would like more organizational support and a known improvement path. Of course, these are some of the characteristics most positively associated with CMMI®. In an IT context, we find that ITIL® and CMMI® for Services can be effectively used together. CMMI® for Services is also meant to cover many other services besides IT, so the two models cannot be completely aligned. But we've been pleased by reports from early IT users of CMMI® for Services that they've found them compatible - and even more complementary since the release of ITIL® Version 3.

Will it be easier for enterprises that mature in terms of using CMMI® for Development to adopt CMMI® for Services?

CMMI® for Services and CMMI® for Development, like all CMMI® constellations, share a common core of 16 process areas. As we built CMMI® for Services, we estimated that the common content varied between 75 and 80 percent, depending on the changes we contemplated. Enterprises that are mature against CMMI® -DEV have a terrific foundation to build on and can retain benefits from the large investment they've already made. In fact, current users of CMMI® -DEV, who also do service delivery, first approached the SEI about building a model for service delivery.

Service management practices are being adopted in areas beyond IT, such as managed business process services. Do you think CMMI® for Services can play an important role here?

We designed CMMI® for Services for all kinds of services, so we certainly believe so. We are hearing exciting early use reports for services such as human resources, customer relations, logistics, healthcare, facility operations, and a number of very small services (lawn mowing and book shelving, for example). We hope that the model will be useful to a wide range of service providers.

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About TCS' Global Consulting Practice

TCS' Global Consulting Practice (GCP) is a key component in how TCS delivers additional value to clients. Using our collective industry insight, technology expertise, and consulting know-how, we partner with enterprises worldwide to deliver integrated end-to-end IT enabled business transformation services.

By tapping our worldwide pool of resources - onsite, offshore and nearshore, our high caliber consultants leverage solution accelerators and practice capabilities, balanced with our knowledge of local market demands, to enable enterprises to effectively meet their business goals.

GCP spearheads TCS' consulting capacity with over 1,000 consultants located in North America, UK, Europe, Asia Pacific, India, Ibero-America and Australia.

About Tata Consultancy Services (TCS)

Tata Consultancy Services is an IT services, business solutions and outsourcing organization that delivers real results to global businesses, ensuring a level of certainty no other firm can match. TCS offers a consulting-led, integrated portfolio of IT and IT-enabled services delivered through its unique Global Network Delivery Model™, recognized as the benchmark of excellence in software development.

A part of the Tata Group, India's largest industrial conglomerate, TCS has over 143,000 of the world's best trained IT consultants in 42 countries. The company generated consolidated revenues of US $6 billion for fiscal year ended 31 March 2009 and is listed on the National Stock Exchange and Bombay Stock Exchange in India.

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