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Unlocking the potential of SOA

A practical guide

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August 2006

A recent research study carried out by Freeform Dynamics in consultation with MWD was used to gather feedback from 1,332 business and IT professionals around the world on activity and progress with service oriented architecture (SOA). The results revealed that many in the Western European and North American mainstreams are getting to grips with SOA – and that the organisations furthest along in their use of SOA have learned some important lessons.

This report explains why SOA is so important, and puts the lessons that we learned from talking to these experienced SOA adopters in context.

Macehiter Ward-Dutton is a specialist IT advisory firm which focuses exclusively on issues concerning **IT-business alignment**. We use our significant industry experience, acknowledged expertise, and a flexible approach to advise businesses on IT architecture, integration, management, organisation and culture. **Freeform Dynamics** is a research and analysis firm that tracks the **business impact** of developments in IT and communications through in-depth primary research.

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Summary

Understanding the broad view of SOA is critical for success	SOA is about much more than developing software. If all you do is see SOA as a way of defining and developing IT systems, you only have a partial view, and will be likely to miss out on many of the potential benefits.
SOA can bring two distinct types of benefit	If you pursue your SOA initiative with the right perspective, it's possible to gain "top-down" benefits (related to more effective communication between the IT department and its "customers"), as well as the more often talked-about "bottom-up" benefits (related to more effective, efficient and flexible legacy systems integration and new systems developments).
Getting the best value out of SOA initiatives means balancing tactical and strategic concerns	Focusing too much on getting tactical projects completed can make SOA initiatives difficult to scale in the medium term. Likewise, too much focus on strategic issues can make it difficult to convince sponsors that there is value in SOA. To get the right balance, start with some lightweight strategic work to define the overall SOA opportunity and some high-level "rules of engagement", but follow it quickly with a set of short, focused tactical projects. These projects should deliver quick wins, and also yield experience which can be used to refine your first-cut higher-level assumptions.
Talk to your software suppliers about SOA support in their products	You may find you already have the necessary technology in place to get started with SOA, because most solutions vendors have been building the relevant capabilities into their offerings for a while. If not, your suppliers are probably able to help with most requirements by simply upgrading or extending what you already have.
Governance, standard development and management practices, and security are the biggest challenges	Getting your first SOA project off the ground isn't difficult – but what is much more challenging is extending early efforts in a way that delivers maximum benefit. The watchword here is "consistency" – in terms of technical project standards, communication with key business stakeholders, and approaches to risk and security management.

The business context for SOA

The business environment has evolved extremely rapidly over the past decade. Globalisation, fuelled by the Internet and other advances in media and communications, has increased both the level of competition and the pace of change most businesses have to cope with. Simultaneously, organisations have become highly dependent on their IT systems for business execution, and developments in technology have been equally dynamic.

IT is a brake on business…

The challenge that has resulted is keeping the capabilities of IT and the requirements of the business balanced. All too often, technology that was put into place to enable and enhance business automation in the past becomes a future constraint to both IT and business change. The business moves on – priorities, strategies and even business models evolve – but key IT systems cannot change rapidly enough to keep up, often leading to major business inefficiencies and risks. Worse, the drag represented by existing IT systems actually prevents the business moving forward in the manner and at the speed it would ideally like.

Conversely, organisations often find it difficult to take advantage of technology advances that could deliver incremental business value. The problem is that IT departments are so busy (and their budgets are so focused on) running existing systems and keeping up with day-to-day tactical change requests and problem-solving, that little time (and budget) is left over for more strategic initiatives that might deliver significant incremental value.

And all of this is against a background of business processes and associated automation increasingly crossing company boundaries, integrating business activities with partners both upstream and downstream in the value chain.

… just as business needs flexible, open IT more than ever

One way of dealing with globalisation and the increased pace of change in local markets is to put systems and processes in place which allow a business to react quickly to external events. If a competitor makes a move to steal marketshare or a new entrant comes into the market with a disruptive approach, the time it takes to adapt to the new business environment can be the difference between continued success and failure.

This is a mantra we hear constantly from consultants, analysts and IT vendors, but this survivalist mindset isn't always the best to adopt. Of course, an organisation needs the ability to defend itself when unexpectedly threatened, and this requires operational agility. The smarter companies, however, are the ones doing the threatening. Rather than keeping the pace, why not set it? Rather than adapting to the new game, why not make up your own rules and make others play by them? From our work with organisations, we see more and more CEOs looking to pursue aggressive market strategies.

In business terms, this translates to the need to innovate. In organisational terms, this means breaking down artificial boundaries and allowing the source of innovation – people – to work together effectively with an emphasis on business objectives and processes, rather than on departments, cost centres, profit centres and other structural artefacts.

Interestingly, ERP implementations were a first step towards this. Sometimes unwittingly, organisations found themselves taking an end-to-end view of processes on the operational side of the business as part of the blueprinting exercise that is a necessary precursor to adopting something like SAP. But the ERP activity of the 90's was mostly about inwardly focussed efficiency initiatives, with an emphasis on how to improve what the company did already. In most cases, organisations have ended up with far better visibility of processes across structural entities, but the old departmental boundaries are still pretty firm and the business is still managed as a collection of silos.

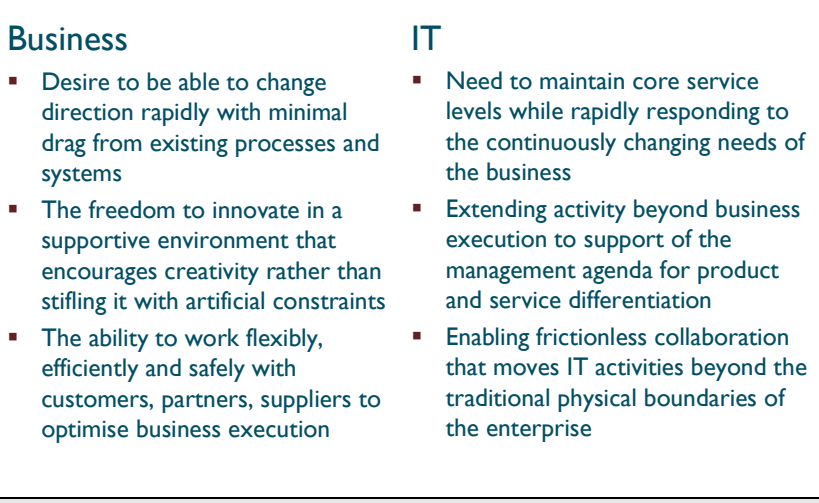
For organisations to innovate at the rate that will be required in the future, they need to go further. The smarter ones are already looking beyond traditional innovation sources such as internal R&D and planning departments, to the broader employee base, suppliers, partners and even customers. So, while structures may persist, the boundaries between them must and will become porous.

Enabling this shift requires not only flexible IT systems, but ways for IT and the business to work together effectively and keep everything aligned.

Business and IT are intimately intertwined

Like two people locked in a small box, for an IT department and its "customer" to get comfortable, they both have to coordinate their actions so that neither gets an eye gouged or a foot stuck in an awkward place. Business and IT are intimately intertwined, as illustrated in figure 1.

Figure 1: Business and IT: intimately intertwined



Business and IT organisations are interdependent, and both sides want to move forward.

As we have said, however, alignment between IT and business activities can be very difficult to achieve, and frustrations are frequently expressed by both camps. On the one hand, it is common to hear business management express a wish that the IT department was able to do more with less and be more flexible in the way they deliver services and respond to business requirements. On the other hand, IT departments often complain that business teams make it difficult for them to deliver strategic value, with ever-changing priorities that are communicated too late in the game for systems-related work to be designed and delivered in an optimum manner.

As older IT applications and infrastructure gradually drift out of line with the way in which the business is evolving, the disconnect is accentuated, with business management focused on the shape of current and future processes, and the IT department focused on the shape of an existing systems landscape that is more aligned with the way the business used to be.

It is against this background that we consider the relevance and practicalities of Service Oriented Architecture (SOA).

What is SOA?

A word of warning before answering this question. Experienced IT professionals reading descriptions of SOA typically pick up on a number of elements with which they have been familiar for years. This can easily create the impression that SOA is simply a rehashing of old ideas, whereas advocates, on the other hand, often position it as a radical new way of doing things.

The reality is that from a technology perspective, SOA does indeed build on a series of tried and trusted practices such as object-oriented software development, distributed component-based architectures, wrappering of legacy systems and so on. But this view of SOA is only partial, and anyone pursuing SOA with this perspective in mind is likely to miss many of the potential advantages that it can bring.

When looking at the practicalities of SOA, a useful starting point is to review the few simple principles that underpin it. These are encapsulated in the following definition:

SOA is an approach to delivering IT capabilities that is based around their presentation as open, composable services which operate according to well-defined contracts.

Crucially, as our definition implies, the concept of *service* isn't just the foundation of how IT capabilities are defined and constructed: it's also the foundation of how those capabilities are operated, monitored and managed. Just like in the real world, in IT a "service" is something that you experience.

Bottom-up and top-down perspectives

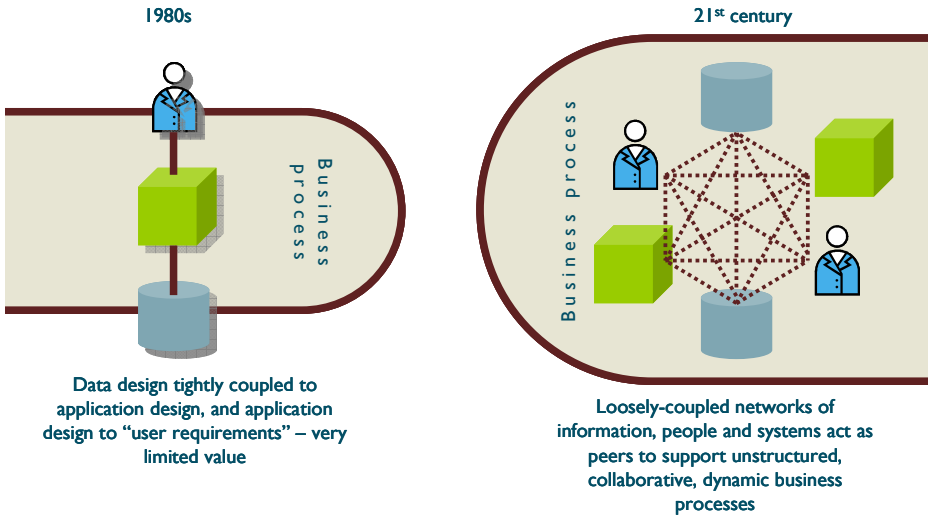
There is clearly a technology dimension to this definition of SOA, because its focus is the delivery of IT capabilities. This is the "bottom-up" perspective of SOA. But there is also a business dimension – the "top-down" perspective. Let's look at each of these in turn.

SOA bottom-up: creating open, flexible systems

The foundation of the "bottom-up" perspective of SOA is the ability of *service* and *contract* concepts to act as a framework for decomposing systems that would traditionally have been delivered in a monolithic and rigid manner, and instead delivering open, composable services that can be flexibly used and reused across multiple scenarios. Such services may be founded on capabilities provided by newly engineered software components and/or pre-existing capabilities from current systems, even legacy applications, which are presented as a standard set of reusable service libraries.

As figure 2 shows, the tight coupling which characterises many traditional business software applications, which were designed with very specific uses and users in mind, may have worked fine when the focus of automation was on structured, relatively static, business activities such as billing and accounting processes. However they are completely inadequate in supporting today's areas of automation focus – processes and practices which are dynamic, collaborative and relatively unstructured. In these areas the loosely-coupled services produced by SOA initiatives, which enable networks of information, people and systems to freely interact, are a far better fit.

Figure 2: SOA bottom-up: an architectural approach for today's automation focus



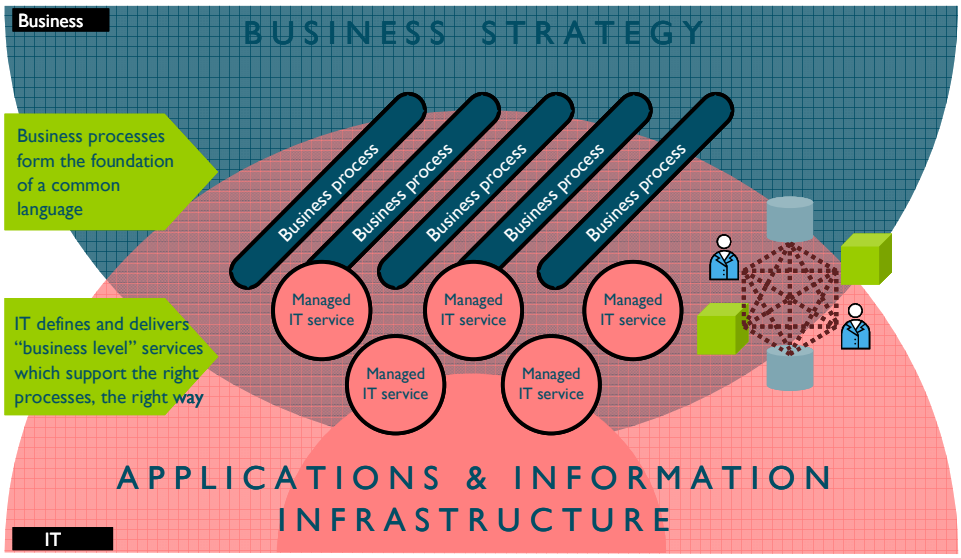
The focus of business automation today is best served by loosely-coupled services that enable networks of people, information and systems to act as peers.

SOA top-down: creating a common language between IT and business

The foundation of the top-down perspective of SOA is the ability of *service* and *contract* concepts to be understood by business people and used as the foundation of a common language to guide the alignment of IT and business.

As figure 3 shows, combining models of business processes with models of services can yield a common language between IT and business leaders for communicating investment and change priorities, expectations and performance.

Figure 3: SOA top-down: aligning IT and business



The language of services, combined with process models, is a great foundation for a common language between IT and business organisations.

Articulating the SOA concept

Although straightforward when explained in this kind of manner, IT professionals responding to a recent research study often referred to difficulties articulating SOA concepts to non-technical colleagues, including business managers.

Some with more experience of driving SOA within their organisation offered suggestions to help solve this problem. Here are some examples:

> *"Explain it like fast food delivery. There may be fifteen people in the back making different kinds of food, but all you need to know about is how to talk to the person at the cash register".*

> *"Explaining it as a pick-and-mix concept (while ignoring middleware) seems to get the basic idea over. Then provide a set of 'if this changes' or 'what if' situations to justify middleware".*

> *"Don't even attempt to articulate IT concepts as being business friendly. Start with business concepts and explain how these drive or are enabled / simplified through the adoption of SOA".*

> *"Speak to your audience in their own terms: accountants in savings, IT in systems integration, management in business processes".*

> *"Discuss SOA in the context of existing company issues/concerns/deficiencies (include financial, time, quality, inefficiencies) to back up the justification to adopt. Pick an initial problem area to illustrate how SOA could help - reinforcing the need".*

> *"Focus on what SOA can do for business performance, not on how the technology works".*

As we can see, the research shows that experienced adopters emphasise the need to translate the theory of SOA into practical business benefits and use these as the pivot for discussions with the business. It is therefore worth spending some time looking in more detail at the incremental benefits that SOA adoption can unlock.

SOA adopters find real benefits

Not surprisingly, our research indicates that benefits relate to both the bottom-up and top-down perspectives of SOA.

Bottom-up benefits

We would expect that any approach to software engineering and deployment that is inherently more flexible and tuneable to business processes would lead to a range of tangible benefits as follows:

- **Cost savings from more efficient delivery of IT**. Systems are delivered with more of a component and assembly approach, which facilitates an increased level of reuse and generally streamlines the development and maintenance cycle. Use of standard interfaces between systems also reduces the cost of integration, both within the business and across company boundaries.
- **Protection of past and future IT investments**. Services are delivered on a "black box" basis, so dependent parts of the system only care about what a component does rather than how it does it. Rather than replacing whole applications when some aspect of them no longer meets requirements, specific components can be swapped leaving the remainder in place. Both past and future investments are thus protected.
- **Improved operational service levels to the business**. Systems engineered in accordance with SOA principles tend to be inherently more robust, and are in particular less susceptible to disruption as a result of change, as components delivering services have fewer dependencies. Software based on SOA is also easier to optimise and tune from an execution perspective, especially in dynamic virtualised environments such as clusters and computer grids.
- **More rapid and flexible IT response to changing business needs**. The aggregate effect of many of the above benefits means that systems may be changed and/or extended much more quickly, efficiently and with less disruption. The streamlining of the development and maintenance lifecycle frees up IT resource to spend more time on value creation activities, and the assembly approach to engineering translates to swifter deployment.
- **Enhanced ability for IT to drive and/or support business innovation**. The service oriented approach allows new capability to be introduced into systems safely and quickly, removing the systems drag when implementing new business models and working practices, and allowing emerging technologies and ideas to be embraced and exploited much more rapidly.

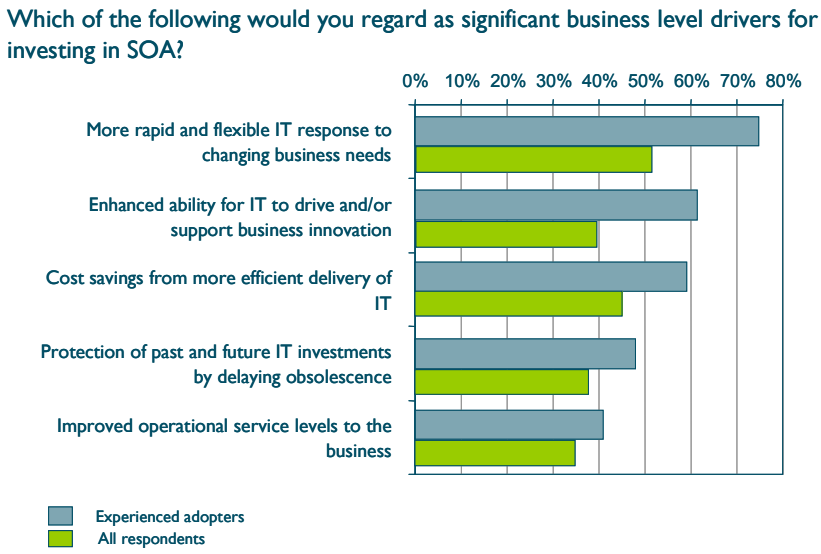
In theory, therefore, the technology-related benefits of SOA are wide and varied, with potential positive impact in both the IT function and within the business.

But how well does this potential translate into practice, and how important are these benefits relative to each other?

We can again look at the research to provide us with some guidance here, and this tells us two important things.

Firstly, the level of benefits reported by experienced adopters is significantly higher than that perceived by the general population. To put it another way, those with less familiarity of SOA tend to under-estimate its benefits. Secondly, according to those with experience, the motivation to invest in SOA is more about delivering incremental business value than about cost saving and efficiency, even though the benefits with regard to the latter are strongly recognised – see figure 4.

Figure 4: SOA is a way to square the circle of balancing innovation and efficiency



Experienced SOA adopters demonstrate a strong belief that SOA can help drive both flexibility/innovation support, and increased operational efficiency.

If we remember back to some of the frustrations we discussed earlier, this benefits profile clearly addresses the common business wish for IT to deliver more for less and in a more flexible manner.

Top-down benefits

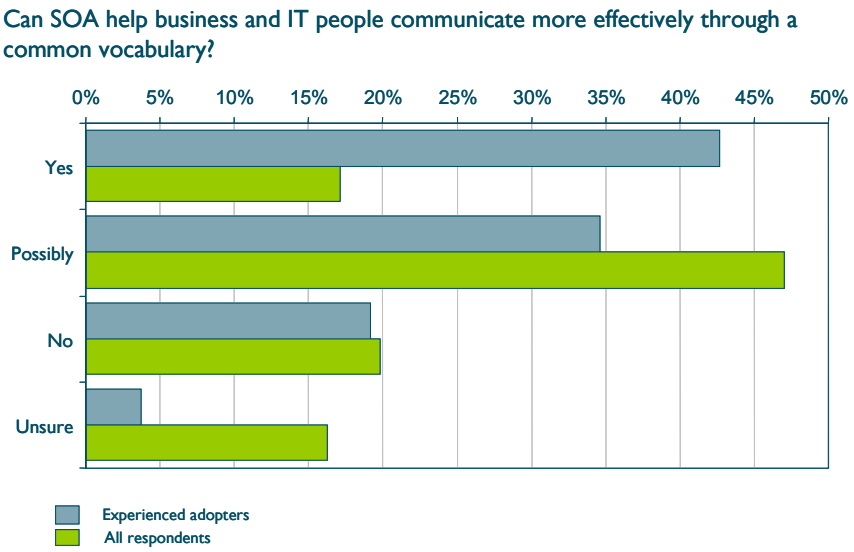
But what about the plea from IT for the business to help them deliver more strategic value? Much of the time, it is communication challenges that lie behind this complaint. Parochial prioritisation of what's important, coupled with simple miscommunication as a result of differences between IT and business vocabularies, can stand in the way of effective dialogue.

This leads us to the benefits related to the top-down perspective of SOA. The concept of "service" is something that is already very familiar to most business people. Departments such as accounting, procurement, legal, IT, logistics, etc all provide services to other departments, including each other. Furthermore, many business managers have been involved in centralisation initiatives based on the concept of "shared services", which has been a hot topic in management circles over the past few years.

With the IT department now thinking about and constructing IT systems in a similar manner, the discussion of systems evolution can become a natural extension of business development discussions and vice versa. IT services, as per the SOA concept, simply become a subset of the total set of services required to run the business.

The ability for SOA adoption to grease the wheels of communication between IT and the business is again something that is clearly confirmed by the research (as shown in figure 5).

Figure 5: SOA as a catalyst for clear communication



Experienced SOA adopters are confident that their initiatives help them bring IT and business closer together.

So, is it a case of just training up a few architects, developers and operations people then sitting back and waiting for these benefits to come about?

Well no, it is not quite as simple as that. The way in which SOA is adopted can have a huge impact on the results achieved.

Where to start, how to move forward

The ultimate vision to which a company can aspire is for SOA to be a central pivot for maintaining IT business alignment, with associated principles and practices driven into all relevant tactical processes and systems. If this can be achieved, benefits will be maximised both at the business flexibility and innovation level, as well as in terms of cost efficiency.

One of the biggest problems in moving forward with disruptive-sounding ideas like SOA, however, is knowing where to start and how to proceed while fulfilling ongoing obligations to manage existing systems and maintain service levels to the business. It is clearly not feasible to put everything on hold while policies, practices and procedures are developed and the operation of IT is completely re-engineered.

Fortunately, many organisations may already have some of the basics in place in terms of existing principles and practices. It is beyond the scope of this paper to run through different starting point scenarios in detail, but whatever your current level readiness, it is always possible to move forward into full SOA adoption in an incremental manner, achieving quick wins as you go. Regardless of the starting point, however, it is important that SOA principles are introduced in the right kind of way to maximise the returns.

Blending tactical and strategic approaches

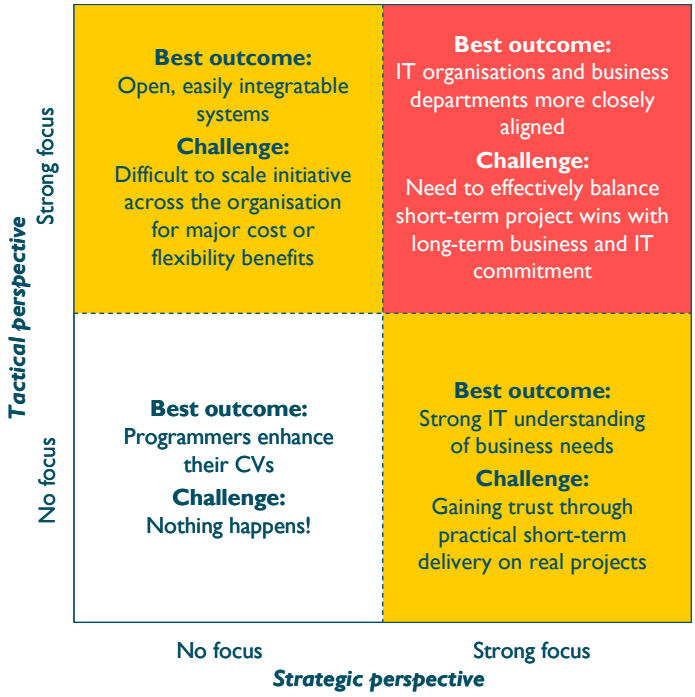
In many respects, the initial emphasis of your SOA initiative will depend on whether SOA is championed largely from within the IT department, or jointly by business and IT. If the former, then the likely focus for early activity will be to embrace the more systems engineering and operations aspects of SOA – the "bottom up" perspective. By this, we mean introducing disciplines such as component based software engineering and composite application methods into the development and integration process, facilitated by the necessary tools and middleware. It's likely that initial projects within this approach will focus on creating new service-based interfaces to existing systems, to make application integration easier.

This is a perfectly legitimate starting point for SOA and will allow the IT department to start unlocking bottom-up benefits that come from the loose coupling of IT capabilities, and the associated ability to use the same capabilities across multiple use cases and scenarios. This can streamline maintenance and integration efforts, and speed up the development of new applications. The net result is both cost savings and an ability to react more quickly to changing business demands.

The key word here though is "react". With a more strategic initial emphasis, however, SOA adoption allows IT to work more proactively with the business, in genuine collaboration, which results in more effective support for the ongoing business innovation and development process. Such innovation and development, as we have said, is the key to differentiation and success, whether measured in terms of growth, new market penetration, competitive market share, or some other indicator of performance. To get this right requires a balanced blending of the bottom-up and top-down perspectives of SOA.

The impact of different adoption approaches on results is summarised in figure 6.

Figure 6: Maximising business value is about balancing strategic and tactical approaches



The benefits of SOA can be achieved from focusing primarily on tactical or strategic concerns, but they can only be maximised through a blend of the two. The challenge here is one of balance.

If returns from SOA can only be maximised with a strong focus on both strategic and tactical concerns, how can you achieve the right balance in practice without ending up trying to "boil the ocean"?

Start with some lightweight strategic work

Feedback from experienced adopters gathered during our research suggests that the most effective adoption approach is to start by defining an initial high-level strategy that articulates the rationale for adopting this new way of working, along with the expected long-term benefits to the business and critical success factors. The purpose of this is not so much to lay down a great deal of detail, but to align expectations across IT and the business at various levels, and secure the buy-in of senior business management in particular.

Senior management buy-in is desirable for two reasons. Firstly, it is important for business managers to understand that the IT organisation will be moving towards a different and more effective way of engaging with them, and that it is important for the business to reciprocate accordingly. Secondly, although the prospect of tangible short-term payback is good, the effect of applying SOA is cumulative, so it is useful to gain commitment upfront to a sustained level of management support and investment while SOA is properly embedded into the organisation. It is no good pulling the plug on the SOA initiative after a few months because ROI calculations fail to meet the normal criteria for typical IT projects.

Follow up with some quick wins

Quick wins are important, however, so experienced adopters tell us that in parallel with the strategic alignment activity, it makes sense to select one or two discrete projects to which the SOA approach can be applied that can be executed within a relatively short period of time. Ideally, these projects will have the following attributes:

- One or more deliverables that are of recognised value to the business, which if delivered effectively will constitute a significant achievement that matters to business stakeholders
- A manageable timescale, measured in a single digit number of months (preferably fewer than 3)
- A deadline or target delivery date which allows room for learning curves and experimentation during a project
- A future roadmap, beyond the initial project, that allows the accumulated investment in SOA to be leveraged via follow on work
- Representative of similar projects to which SOA-related learning and practices developed and refined on the initial projects may be applied.

Given the nature of SOA as a platform for the delivery of open, flexible IT capabilities, it's likely that initial projects will be those that require integration and coordination of systems and information across departmental boundaries. It's in this kind of application that the advantages of open, reusable services can be quickly understood.

If such a project is executed under the umbrella of the strategic framework discussed previously, it will not only allow skills and experience to be built, but will also provide valuable input to test assumptions incorporated in the initial strategy and refine first-cut architecture guidelines and policies.

Experienced adopters participating in our research confirm the need for an approach that balances tactical and strategic concerns, and offer tips and insight such as the following for getting off the ground successfully:

> *"SOA isn't and shouldn't mean a sweeping replacement of systems."*
>
> *"Talk about how IT will be given a clear and concise mapping to business needs that just wasn't possible before with other architectural approaches."*
>
> *"Stress agility and the ability of business to comprehend what IT is delivering."*
>
> *"Align SOA with a business activity: either a new opportunity or improve an inefficient one to prove the benefits, then deploy more widely."*

Tools and technology considerations

So, in order to get started with SOA, will you have to spend vast amounts of money re-tooling the IT department and investing in new infrastructure? Not necessarily.

Of course, in order to pursue SOA from both a top-down and a bottom-up perspective you will need to employ some tools and technology. In particular, you will need to look at your current investments in modelling and software development tools, middleware and integration tools, systems monitoring and management tools, and security infrastructure.

You should be proactive in engaging your current tools and infrastructure technology suppliers in discussions about the requirements of SOA initiatives and how they can meet them with their products. If you have made significant investments relatively recently (in the last five years), it's highly likely that your technology suppliers are already working to embed SOA capabilities into their products. Your current tools and infrastructure will either already go some way to supporting the requirements of SOA, or your suppliers will be able to offer you upgrades or extensions for a manageable incremental investment which will provide most of the necessary capabilities.

There are a couple of areas, though, where it's likely that you will have to make net new investment – perhaps with SOA specialists, depending on the capabilities of your current software suppliers. If you want to move beyond an initial SOA pilot to a wider rollout of SOA principles and practices, you will need to consider service lifecycle management tools, underpinned by service registry/repository technology. In addition, you may well need to invest in specialised web services security management technology, if you plan to roll your SOA initiative out to scenarios where you need to restrict the ways in which services can be invoked, or secure communications between services.

Challenges and how to deal with them

We gathered a great deal of feedback from our research respondents about the main challenges that they saw in SOA adoption. The experienced adopters overwhelmingly referred to one issue, although they used varying language: "governance". Secondary to SOA governance challenges, there were two other related sets of challenges that came up time and time again: the creation of standard development and management practices and the security of service networks.

It's important to realise, though, that SOA doesn't create these challenges: today's business patterns mean that they exist already, whether we know it or not. What SOA does, because it makes us think about how to build and deploy systems that can operate in unplanned usage scenarios, across domains of control and so on, is shine a bright light on them.

Governance

"SOA governance" is a bit of a catch-all term, but it is best described as an "architecture" for how SOA initiatives are managed in practice. That is, it's a set of procedures, practices and rules which determine: how your organisation creates and manages SOA projects, and ensures that they are working in the right way with business stakeholders; how and from where projects are funded – particularly as services built as part of one project start to be used in other projects; and how portfolios of services are managed throughout their lifecycles.

Without a clear policy framework for managing SOA initiatives as they roll out, they flounder. However the challenge is to find the right people with the right skills – people who can communicate easily within both business and IT circles – to develop governance practices, and to give them the authority to make the necessary decisions.

Architectural and development standards

Closely related to the challenge of SOA governance is the challenge of identifying and sticking to crucial technical standards relating to service definition and development. Adherence to common technical standards is of course key as SOA initiatives roll out past the initial pilot projects, because benefits are only maximised if all projects adopt the same technical conventions.

Protocol standards like SOAP and WSDL only take you so far, because the real challenges relate more to semantic issues concerning function and data namespaces, and message formats. These need to be agreed, and then consistent application of them needs to be enforced across projects and teams.

Security

Security challenges relate to securing communications between services, and management of service authentication and authorisation. These issues can get particularly complicated when "secure services" start to be used within multiple scenarios and across multiple domains of control.

If you are deploying services behind a firewall and you are looking to expose existing applications as services then the security issues you are likely to face will relate to authentication and access control. For example, if there is no existing application-to-application communication (because the applications being reworked were user-facing only) then you are going to have to consider how to pass authentication and access control details between them, which is likely to require programmatic integration with existing directories.

If your SOA initiative is driven by the need to combine existing capabilities to deliver new aggregated/composite capabilities, then you need to recognise that some of the security-related features of the existing capabilities (for example logging, notification of security events) may themselves need to be aggregated/composed in order to deliver the right level of insight within the new composite/aggregate capability.

Obviously, a whole different set of issues raise their head if service-orientation is being applied to address inter-organisation business processing. At a business level, there is a need to define policies to manage trust relationships between organisations, and the work of groups like the Liberty Alliance (www.projectliberty.org) to develop the necessary processes and standards, e.g. around federated identity management, is important here.

Coming up a level, any significant SOA initiative is a real opportunity to revisit your current approaches to risk and security management. It is also going to require business sponsorship, and that provides an opportunity to initiate a dialogue to assess the business and technology risks associated with the initiative, and understand the steps required to mitigate any risks which warrant it. For example, there's an opportunity to answer important questions such as: what are the risks associated with industry regulations and what controls must be put in place to demonstrate compliance with those regulations? And, how are those controls going to be enforced and monitored? In other words, it's an opportunity to do what should have been done previously but probably wasn't.

Further Reading

For more analysis of the challenges and opportunities related to SOA, and for a deeper look at the research findings, you may be interested in the following resources:

- **Aligning IT with the business** – a report from Freeform Dynamics examining the effectiveness of different coordination mechanisms between IT and the business

  See http://www.freeformdynamics.com/pdf/Aligning_IT_Jan06.pdf

- **SOA: handle with care** – a report from MWD which analyses SOA from a holistic perspective, looking in more depth at the concepts of services and contracts

  See http://www.mwdadvisors.com/articles/detail.php?id=10

- **The challenges of SOA quality management** – a report from MWD which looks in detail at the SOA lifecycle, and explains the roles of registry/repository and other enabling technologies

  See http://www.mwdadvisors.com/articles/detail.php?id=19

- **Identity management: An architectural approach for business value** – a report from MWD which provides a simple model to help organisations map identity management capabilities to business drivers and scenarios

  See http://www.mwdadvisors.com/articles/detail.php?id=24

- **SOA – Insights from the front line** – a report from Freeform Dynamics which analyses the findings of the SOA research programme referred to in this report in more detail

  See http://www.freeformdynamics.com/pdf/SOA-Insights-Jul-06.pdf.