# Driving
# Business Transformation
## through a Process-centric Approach

## ABSTRACT

The Ministry of Defence (MINDEF) Corporate IT community embarked on an enterprise-wide Business Transformation Initiative in 2008 to set up a pragmatic and sustainable framework to equip business owners with the expertise and support to improve business efficiency and the agility to respond to changes. Leveraging the Enterprise Architecture discipline, the initiative is designed to facilitate business integration, systems implementation and alignment to MINDEF's strategic goals. To achieve these goals, an enterprise business process management approach to business transformation is adopted. This article shares the motivation behind the initiative and describes the key concepts and enablers that have been put in place to drive business transformation. It also shares the experience and lessons gained from several business transformation projects. Finally, the article examines the key technology that capitalises on business process models for faster and more agile IT systems implementation.

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# Driving Business Transformation through a Process-centric Approach

## IMPETUS FOR BUSINESS TRANSFORMATION

Transform or perish – this is the stark reality which companies that compete globally face today. Whether it is to stay ahead of the competition in good times or to stay afloat in bad times, businesses need to continually adjust and transform themselves to respond to the fast-changing business environment. This message was aptly reinforced by Prime Minister Lee Hsien Loong in his National Day Rally Speech 2009, where he highlighted that many firms were changing their business processes and finding innovative ways to cut costs and generate revenue to adapt to the prevailing economic situation.

In the public sector, the motivation for transformation is just as compelling. Governments have to respond to a very different security climate after the 9/11 terrorist attacks. When the Severe Acute Respiratory Syndrome outbreak struck in 2002, governments in Asia scrambled frantically to contain the virus. Such unexpected events put governments under tremendous pressure to perform and exposed many problems and gaps in crisis management. As a result, governments are transforming to improve cross-agency collaboration and integration.

The Singapore Integrated Government 2010 initiative is one such effort. It aims to hasten the streamlining and re-working of cross-agency processes to strengthen customer-centricity in service delivery. In the US Department of Defense (DoD), the Business Transformation Agency (BTA) was set up to lead and institutionalise transformation across US defence organisations. The BTA provides day-to-day management of the business transformation effort at the DoD enterprise level, and ensures that it aligns to the needs of the armed forces, while providing direct support to the Defense Business Systems Management Committee, chaired by the US Deputy Secretary of Defense (Gansler, 2009).

The Ministry of Defence (MINDEF) Corporate IT (CIT) community embarked on an enterprise-wide Business Transformation Initiative in 2008 under its Enterprise Architecture (EA) programme to improve operational agility, integration and performance. Like all defence organisations, MINDEF faced an era of unprecedented change in security threats. To adapt quickly to non-conventional threats such as terrorism and to support prolonged peacekeeping and humanitarian missions, MINDEF must be able to organise and deliver capabilities under an expanded spectrum of operations speedily. Such adaptability requires a high degree of agility in organising the resources, supporting processes and technologies, as well as in integrating them more quickly to support new operational concepts.

This article first examines the global trends in business transformation practices, and then describes how MINDEF's initiative contributes to business transformation efforts in the CIT community today.

## WHAT HAVE BUSINESS PROCESSES GOT TO DO WITH BUSINESS TRANSFORMATION?

There is no doubt that technology plays an important role in enabling business transformation. For example, it was advances in network technology that enabled the network-centric capabilities in modern warfare. It was the Internet that transformed the way governments serve and connect to their citizens. However, technology is only part of the story.

As Bill Gates puts it: "The first rule of any technology used in a business is automation

applied to an efficient operation will magnify the efficiency. The second is that automation applied to an inefficient operation will magnify the inefficiency." In essence, if the same technology is available to all companies, a key differentiating factor in the performance lies in how efficient the business operations of each company are compared to the rest. Business processes that are re-designed to work 'hand-in-glove' with technology will yield the best results. This is based on the fundamental truth that the performance of any large company is highly dependent on the efficiency of its business processes.

Wikipedia defines business process as "a collection of related, structured activities or tasks that produce a specific service/product, (or serve a particular goal) for the customer". It describes the value chain that delivers a specific outcome.

The importance of business processes in business transformation came into prominence in the early 1990s when Michael Hammer started the business process re-engineering revolution. At a time where IT was widely used, he called for the identification and removal of tasks with no added value, as opposed to the usage of IT, to automate current processes. To truly transform their businesses and achieve dramatic improvements in performance, he exhorted companies to overhaul and re-design all their business processes completely and to take advantage of IT to integrate them. It was a radical approach in terms of the size and the effort required. His radical approach and the inadequate integration technologies at that time eventually led to dwindling support for it by the late 1990s. However, many of his concepts and ideas remain relevant and are practised today.

## BUSINESS PROCESS MANAGEMENT AS A STRATEGIC MANAGEMENT DISCIPLINE AND AS A TECHNOLOGY

A new wave of interest in business processes emerged in 2003 with the advances made in integration technology and the advent of a strategic business management philosophy known as Business Process Management (BPM). Paul Harmon defines BPM as a management discipline focused on improving corporate performance by managing a company's business processes (Harmon, 2007). This process-centric approach ensures that the enterprise business processes are aligned to achieve the goals set out in the corporate strategy. In the new BPM, the focus is on enterprise processes that span the organisation. Process excellence is treated as an organisational asset. Business processes are created to serve as management controls to ensure that organisational performance is monitored and measured. This approach provides the means for continual improvement and the agility to adjust when the business environment changes.

For example, BPM can help large organisations and government overcome bureaucratic problems in different departments that cause delay and frustration to customers. In the worst case scenario, no one in the organisation has a clear understanding of how the end-to-end processes work, making it impossible to measure the process performance.

The interest in business processes can be seen by the popularity of business process best practices like IT Infrastructure Library, Supply Chain Operations Reference and Enhanced Telecom Operations Map. Companies are increasingly turning to such best practices to improve competitiveness and reduce costs.

There is also a growing market for packaged applications based on industry best practices. Enterprise Resource Planning (ERP) vendors such as SAP offer process-centric applications that help organisations integrate their business activities across different departments.

The new growth in BPM started after 2005 when a new technology based on the BPM concepts and principles emerged. The benefits of this new technology, known as Business Process Management Systems (BPMS), lie in providing organisations with greater flexibility and agility in automating their business processes. Unlike the earlier waves of BPM innovation, this new BPM approach is assessed to be more effective and enduring because the BPM management philosophy is now backed by a new enabling technology that is built specifically to realise BPM. BPMS technology has grown into a key IT capability today with all the major middleware vendors like IBM, Oracle and TIBCO offering BPMS products.

## MINDEF'S BUSINESS TRANSFORMATION INITIATIVE

To drive its business transformation effort, MINDEF has adopted BPM as an appreciating capability. This process-centric approach is largely motivated by the successful implementation of the Enterprise System (ES) in transforming the logistics and finance operations of the Singapore Armed Forces (SAF).

Initiated in 2003, the ES was the first large-scale system where business process models were extensively developed to analyse and establish business requirements. The approach proved crucial in facilitating the analysis, harmonisation and integration of the diverse business processes found in the different Services and Lines of Business (LOB). Without the business models, it would have been extremely difficult to visualise and understand the complexity of the business operations. In all, the project harmonised and standardised more than 90% of the approximately 600 processes defined for the three Services – the Singapore Army, Navy and Air Force. It resulted in some S$80 million of cost savings in systems implementation, and transformed the way logistics and financial operations are carried out today.

Encouraged by the benefits of the process-centric analysis and implementation approach in the ES, the MINDEF Chief Information Officer Office (now the MINDEF Information Services Division or MISD) determined that an Enterprise BPM approach would serve as a good foundation for conducting business transformation efforts. The main goals of the new Business Transformation approach are as follows:

**a. To use BPM as a sustainable and enduring best practice in MINDEF to help business owners improve their business processes and operational efficiency.** With this approach, business owners are encouraged to improve their business processes before investing in new IT systems. Instead of embarking on a large-scale transformation effort involving many LOBs and stakeholders, this approach is targeted at the LOB level where each LOB is encouraged to identify opportunities to progressively transform its key business functions. To ensure coherence across the LOBs, MISD maintains an enterprise-wide business map to integrate the processes of the various efforts.

**b. To achieve effective alignment between IT investment and the MINDEF Strategic Plan.** For a large and complex organisation like MINDEF, this has always been a challenge. With the BPM, a hierarchy of business models is developed. At the top of the hierarchy is the Defence Business Map

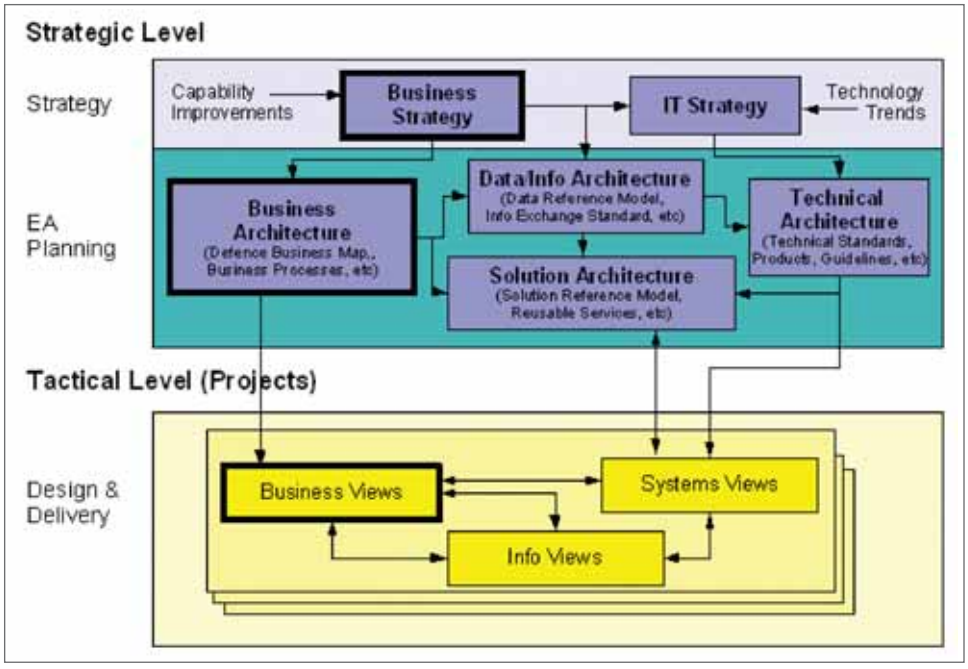


*Figure 1. Strategic and Tactical Alignment*

(See Figure 1). It is linked upward to the Strategic Plan, and downward to the lower level business models (shown in Figure 3) which serve as requirements for systems implementation. This alignment ensures a line of sight from strategy to systems implementation. Figure 1 shows the alignment from business strategy to enterprise business architecture to the business requirements for implementation.

**c. To deliver on the promise of business agility and enterprise integration to support the transformation of the Third Generation SAF.** There are two parts to realising this. The technical capability for systems integration and agility will be enabled by the BPMS and the Service-Oriented Architecture (SOA) technologies. The details are elaborated in the last section of this article. The business part is more challenging as it involves understanding and integrating cross-functional processes, as well as inculcating a culture for responsive change. The next section elaborates on the business transformation strategy to achieve this.

## MINDEF'S BUSINESS TRANSFORMATION INITIATIVE STRATEGY

To realise the business transformation goals, the following key components were put in place:

**Setting up of the Business Process Management Department in MISD.** The Business Process Management Department (BPMD) was set up in February 2008 to serve as the catalyst to facilitate and drive business transformation in MINDEF. It is equivalent to the BPM Centre of Excellence that is widely promoted as a best practice to initiate enterprise-wide transformation. In addition to working with business owners to lead business transformation projects, it is also responsible for building up the Defence Business Map and facilitating enterprise integration.

**Formation of the Enterprise Business Steering Committee.** The Business Transformation Initiative is an enterprise-wide change effort. For it to succeed, strong commitment and support from the senior leadership is crucial. The Enterprise Business Steering Committee (EBSC) was set up with the strong support of the MINDEF Deputy Secretary (Administration) and the Chief of Staff (Joint Staff) as co-chairmen. The forum, together with the LOB leaders, provides the overall leadership in transforming the MINDEF business capabilities. It reviews and endorses business transformation proposals put up by the LOB Leads. It also plays the critical role of identifying and resolving ownership issues for business areas where clear ownership is lacking.

**Integrated Methodology for Business Transformation.** This is a detailed four-phase methodology formulated to guide business owners in carrying out business transformation efforts. It is described in more detail in the later sections.

**A Business Process Architecture Modelling Framework.** This is the framework that provides the tools and concepts to describe the organisation's business architecture in a clear and consistent manner. The main tool to achieve this is the common business modelling language. It consists of a hierarchy of well-defined graphical diagrams to represent different perspectives of the business. The Defence Business Map (OV-0) shows the overall MINDEF business capabilities and functions categorised by LOBs (see Figures 2 and 3). Each of the capability/function is linked to the enabling business processes (OV-5) which show the key activities required to support the capability/function. This is in turn linked to the business processes that show the detailed business workflow (OV-6) in each activity. This hierarchy of business models helps to link the strategy to the systems implementation. Figure 3 shows how the different business models (OV-0, OV-5 and OV-6) in the hierarchy are linked. To support enterprise-wide modelling, a central EA repository has been set up to share and promote the reuse of processes.

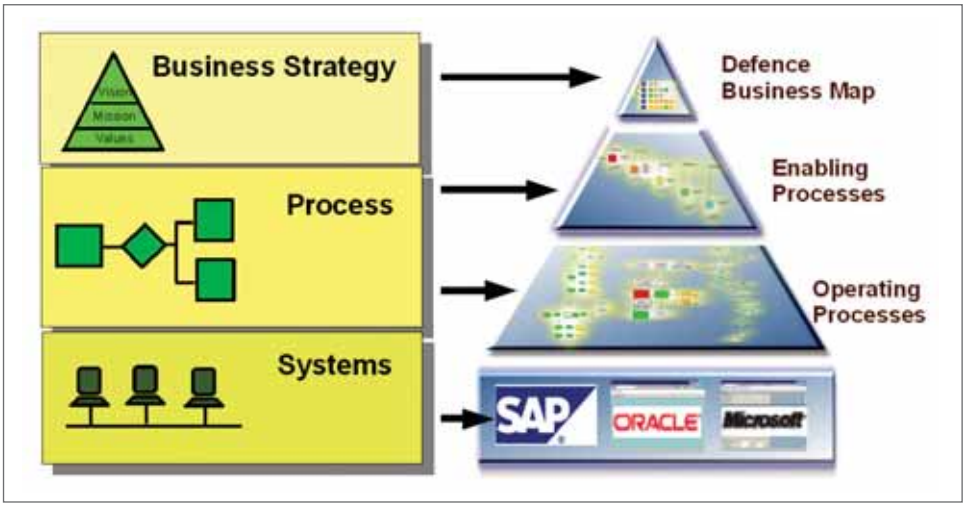


*Figure 2. Business Process Architecture modelling framework*

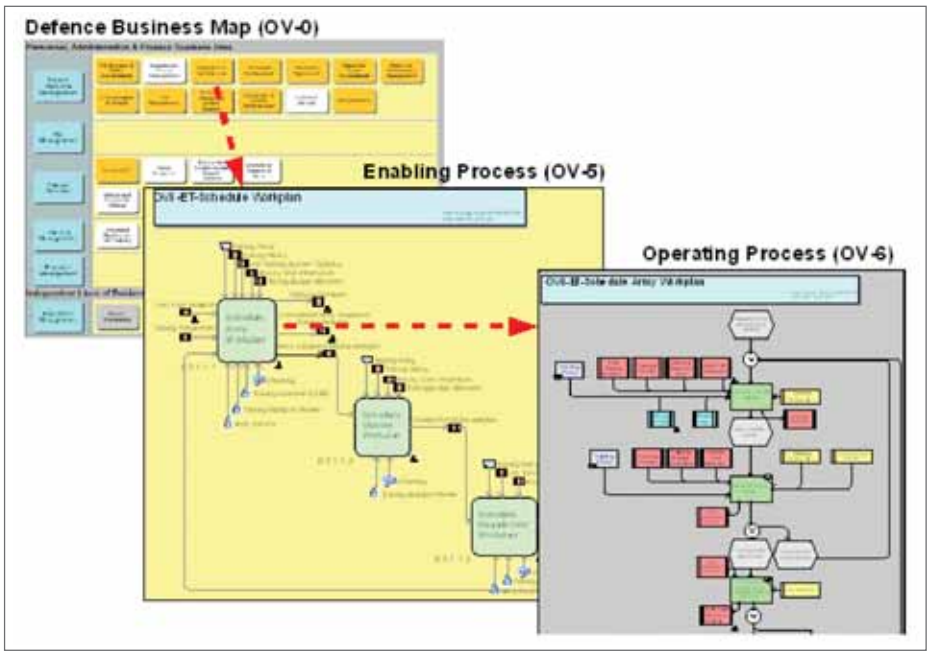


*Figure 3. Hierarchy of business models*

## THE IMPORTANCE OF BUSINESS PROCESS MODELLING

The business process models shown in Figure 3 are an important part of BPM. A process model is a visual representation of the business process. It is like the blueprint produced by architects in the building industry (see architect's view in Figure 4). The architect's blueprint contains concise and detailed information in a graphical diagram which the homeowner, architect and builder can understand and agree upon. It therefore serves as the common language for communication and for implementation. Figure 4 also shows how the blueprint is required in order to

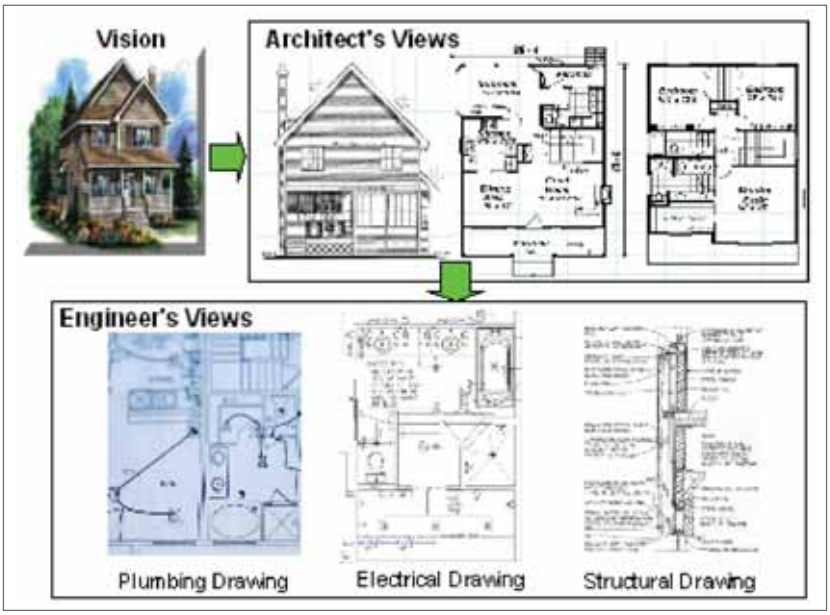


*Figure 4. Architecture models in the building industry*

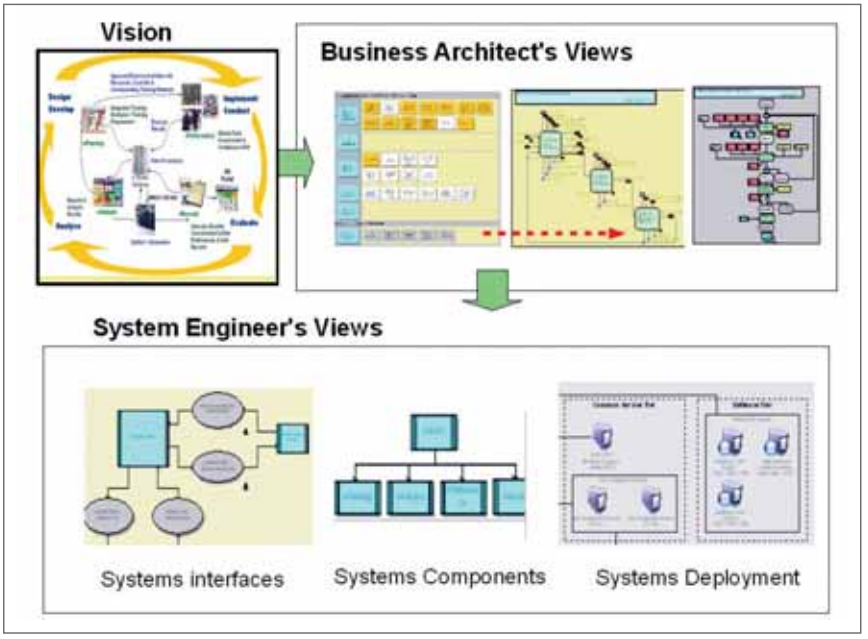


*Figure 5. Business Architecture Model for Business-IT alignment*

produce detailed engineering diagrams. Similarly, in the business world, the equivalent of the building blueprint is the blueprint of the organisation's business model and processes depicted in graphical diagrams (See Figure 5). A good understanding of the business architecture (found in the process models) will greatly facilitate the development of IT systems to automate the processes. More significantly, it helps to reveal and manage the complexity of enterprise processes that cut across departments and IT systems.

The significance of business process models in IT has reached a new level with the advancement made in executable models. Essentially, concise business models can now be translated into software codes for execution. This fulfils the promise of the Model-Driven Architecture set out by the Object Management Group many years ago, where requirements are modelled independently and then converted into codes for execution in different implementation specific platforms (e.g. IBM, Microsoft, SAP, etc). This has been made possible by the convergence and standardisation of the key business modelling standards in the IT industry.

The advancement made in the BPMS technology has led to the recognition of two types of BPM. The Business BPM concerns the business people and develops the business process models to realise business goals independent of technology. Together with the business owners, the business analysts help to develop, analyse and improve the business processes for the organisation. The Technical BPM takes the business process models and translates them for execution in the IT systems. Figure 6 shows the roles involved in this new systems development approach. In BPM, the role of the business analyst becomes much more significant and the competency in business process analysis is key. Similarly, the technical team needs new skillsets to develop applications based on workflow models derived from the business process models. Figure 6 also highlights how BPM creates a strong alignment between the business and IT stakeholders.

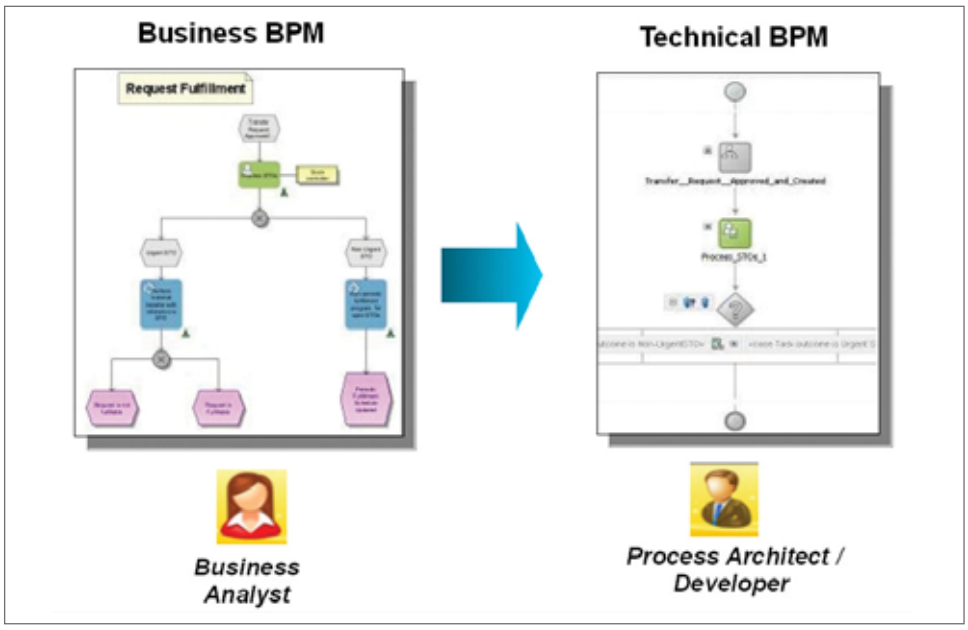


*Figure 6. Business BPM vs Technical BPM*

## WHAT IS INVOLVED IN EXECUTING A BUSINESS TRANSFORMATION PROJECT?

Since its formation in MINDEF, the BPMD has helped to launch and lead several business transformation efforts. In June, September and October 2008, three business transformation programmes were successfully initiated for the Building & Infrastructure (B&I) LOB, Medical Services LOB and the Army Training Management LOB respectively. The BPMD has also helped in the Army Admin System Review, covering 133 key processes over 100 IT applications, where 80 areas for potential process improvements have been identified and implementation approval sought from the senior management in early 2009.

To sustain such transformation efforts consistently, the Integrated Methodology for Business Transformation (iMBT) was formulated as part of the EA Framework. iMBT is a systematic and holistic approach to help business owners determine their desired future state along a structured and disciplined four-phase stage journey that involves Discovering Value, Defining Value, Realising Value and Sustaining Value.

### Phase One: Prioritise and Select Business Function for Process Mapping

The transformation journey starts with the formal submission of business transformation proposals by business owners to EBSC for prioritisation and approval. Upon approval, the respective LOB Lead and Co-Lead provide the leadership for the transformation.

The scope of a business transformation effort is broadly determined by the business functions to be transformed. A business function is a specific key business activity or capability that is performed within a LOB. Depending on the scope of the expected transformation, more than one business function can be selected and approved.

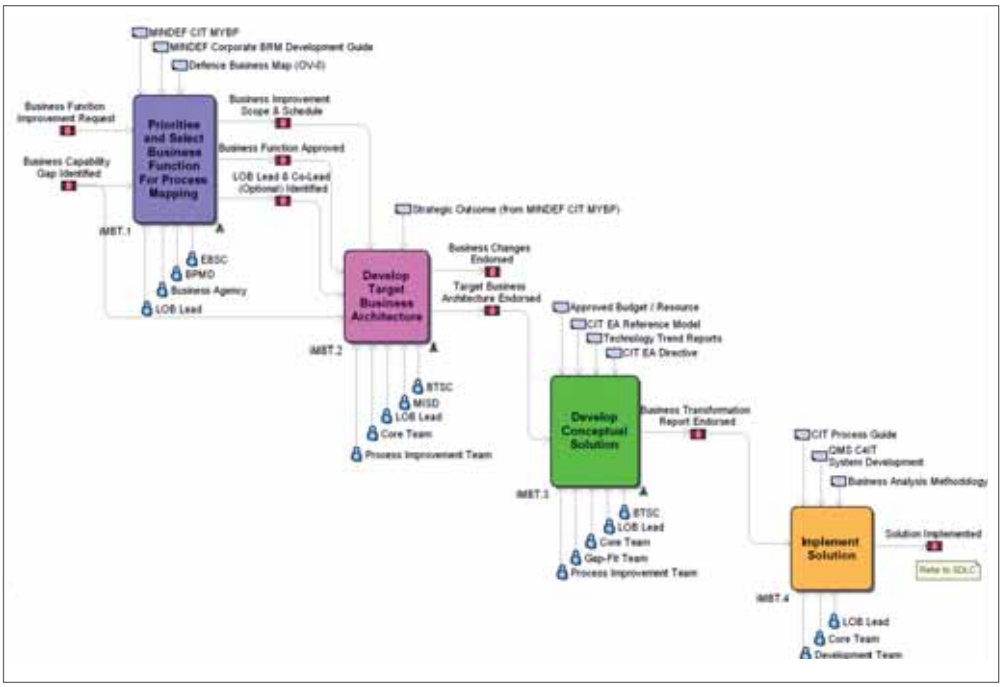


*Figure 7. The four phases of the iMBT*

Upon approval by the EBSC, an estimate of the overall budget to implement the transformation is worked out and registered in the MINDEF CIT Multi-Year Business Plan (MYBP). This is done to ensure that the budget needed is catered for under the MYBP.

## Phase Two: Develop Target Business Architecture

During this phase, the major activities needed to transform the business functions and processes take place. The main output of this phase is the target business architecture. It is a description of the 'To-Be' business processes, activities and information requirements captured in various business models.

This is an elaborate phase involving several parties. First, active participation from the LOB stakeholders and subject matter experts is required. An LOB core team is formed in this phase to lead the effort. It is supported by one or more business focus groups to look into the details of the business operations.

To derive the target business architecture, the participants are brought together in a series of activities. This includes a review exercise to examine and enhance the business direction. This is followed by the business process mapping activity where the current business processes are analysed and re-designed to align to the vision and to eliminate current problems and limitations. Process, data and technology gaps are also identified. Business process re-engineering that involves external consultants is also included where necessary to tap on best practices from the industry. The phase ends with the endorsement of the target business architecture and a decision to proceed to the next phase of the iMBT.

## Phase Three: Develop the Conceptual Solution

A large part of this process focuses on the Gap-fit analysis to assess alternative solutions, including Commercial-Off-The-Shelf solutions, and to determine how well they meet the requirements of the target business architecture.

The development of the solution architecture must take into consideration the current IT landscape for the LOB and its current limitations in terms of information sharing, security, integration and application performance. The solution architecture and the business architecture defined in Phase Two are put together to produce the overall Target Business Architecture. This is used to derive the cost and to produce the Approval of Requirements (AOR) for the project to acquire the solution in the next phase of the iMBT.

One important part of this phase is to leverage and explore new technological capabilities to support the necessary transformation. In this aspect, exploration and proof-of-concept prototypes could be carried out in this phase as a validation process for the target solution architecture.

### Phase Four: Implement Solution

This stage of the iMBT involves the implementation of the IT solution to realise the business transformation. It includes the formal AOR process to obtain funding for the project implementation and the setting up of the project management team to oversee the development. The inclusion of the budget in Phase One of the iMBT ensures that the funds are already catered for in this phase.

## CHALLENGES AND BENEFITS OF THE BUSINESS TRANSFORMATION INITIATIVE

While senior management support was present in all the projects, the main challenge was in motivating the participants to review and transform the way they work. The projects required challenging current assumptions and ensuring collaborative participation from all the stakeholders involved in operating or supporting the end-to-end processes. There were challenges such as resistance to change, conflicting short-term needs of the stakeholders and management changes in the user's core team lead and the LOB Lead. A critical part of the projects was thus spent on change management activities to understand the stakeholders' issues and concerns so that the project team could address their immediate concerns while working out long-term transformation recommendations.

While advocating 'doing things right' through the BPM discipline, there were concerns from business owners that the systematic approach of process mapping, re-engineering and IT Gap-fit studies would result in considerable delays to the realisation of the required IT capability. This was alleviated by adopting a strategy that concurrently identified and implemented quick-wins when the gaps were clarified. Through the visioning workshops, the key pain points were solicited from the stakeholders and the relevant processes were mapped and analysed to determine if they could be resolved before the completion of the transformation study. The pain points could be addressed through IT or process changes.

Due to different work schedules and commitment, key participants in the project were unable to attend all meetings and workshops. This problem inevitably led to delays in the overall progress. Several measures were put in place to address this. First, the number of meetings was reduced to a minimum, and the meetings were replaced by face-to-face interviews with key participants. Second, more preparatory work was carried out to improve the quality of the discussions and decision making. This helped to sustain the interest of the participants. Third, increasing the focus on enhancing business values and overcoming limitations

led to more active participation from the users.

Although the business transformation projects are ongoing, several tangible benefits have already been achieved:

**Cost savings from streamlined/ improved processes.** In the B&I transformation project, it was projected that the proposed transformation would lead to annual cost savings of some S$8.03 million. The amount was attributed to productivity gains from IT automation, cost avoidance and savings with a return of investment of 18.07% over three years.

**Reuse of common processes.** Two of the business transformation projects have yielded an estimated cost avoidance of S$2.4 million in investment by reusing 48 existing process models for the process improvements of B&I LOB and Medical Logistics. This is based on a conservative figure of S$50,000 cost savings per reuse of a process model. This benefit is significant not just from the cost perspective. It reinforces the belief that well-developed business processes can be applied across the organisation and turned into best practices. Besides retaining an organisation's intellectual knowledge, these processes enhance the organisation's performance when they are widely reused.

**Stakeholder satisfaction with the business transformation project.** The LOB Lead of the B&I LOB, a senior management member from MINDEF, commented positively that "the business process models provided a good visualisation of what things get done within the B&I LOB and the business touch-points with external functional domains" and highlighted at the Defence Management Group Annual Business Plan for Financial Year 2009 that he was keen to engage BPMD for another process improvement project.

## MOVING FORWARD – LEVERAGING THE POWER OF BPMS TECHNOLOGY

As described earlier, BPMS is poised to change the way future IT systems are built. The process-centric approach is enhancing the traditional development approach based on object-oriented or structured methodology. More importantly, business users can relate better to BPMS.

Unlike proprietary technology pioneered by leading ERP vendors in the 1990s, this new technology is based on open modelling standards, a flexible architecture and is built for integration. Leveraging the SOA, a business process can be configured to make use of services provided by multiple systems. This allows new capabilities and processes to be developed quickly. Such composite applications are especially beneficial to large organisations like MINDEF where there is an extensive portfolio of systems. Other key benefits of using the BPMS include:

**Business agility.** BPMS technology offers many inherent features for quick responses. First, the performance of well-defined processes can be measured and monitored readily, thus providing timely and useful information for decision making. Second, changes in business processes can be systematically updated through the process models and implemented through the BPM engine. Last, the layered architecture with specialised modular components like workflow engine, integration middleware, and business rule engine allows for changes to be localised and implemented at the right places.

**Effective Business-IT alignment.** This can be measured in two ways. One is to measure the number and cost of change requests resulting from unclear requirements. Well-constructed

business process models not only help to clarify requirements, they can be put through simulation to validate the requirements and implement the most optimal workflow. The second way is to put in place a mechanism to guard against incorrect implementation of the user requirements. With BPMS technology, the automated translation from business to technical models for implementation helps to reduce potential errors. Major ERP vendors like SAP and Oracle have in-built capabilities to synchronise the business BPM and technical BPM models to ensure that the implemented BPM models are in accordance with the business process models.

**Standardisation and reuse of business processes.** With BPMS, there is an increased awareness of business processes. Putting in place a BPM infrastructure will increase the opportunities for standardisation and reuse of existing processes. The benefits of this are increased operational efficiency and reduced development cost. It will also promote and speed up the adoption of SOA in encapsulating processes as services.

**Managing the cost of extending SAP systems capability.** Many companies found out the hard way that modifying and making changes to the SAP systems can be a costly affair, especially when they discovered that they were unable to upgrade easily to the next version. New BPM technologies make it easier to bridge the gaps in the SAP system by linking to an external BPMS to carry out the extended workflow. As MINDEF is a key SAP user, this approach can potentially reduce the cost of incorporating future changes.

## EXPLOITING THE POWER OF BPMS IN MINDEF

MINDEF has started to explore the use of BPMS technology. It is ready to exploit this technology as it has been facilitating the development of business models through its EA programme and business transformation initiatives. The infrastructure that has been set up to support this includes the central EA repository where all the business processes are shared. In addition, EA training sessions have been set up to build up modelling competency. To date, more than 400 MINDEF and DSTA staff have attended this training.

Figure 8 shows the future common infrastructure proposed to support both SAP and non-SAP BPM implementation efforts. The key component is the AVATAR EA repository that serves as the single source of business processes. The integration between the ARIS

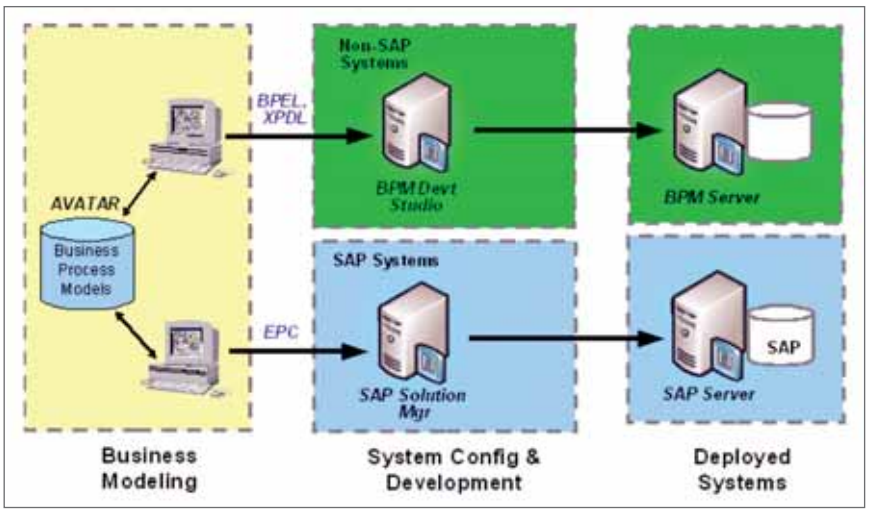


*Figure 8. End-to-end process-centric management*

modelling platform and the IT development and configuration environment enables the transfer of the business specifications for translation into the technical BPM models for further development. Similarly, when business processes are changed, the entire change request management starts with the update of the business processes in AVATAR where it is formally approved before being transferred for implementation. This governance process reinforces the important principle that processes are governed by the business users and IT needs to be aligned with business goals.

## CONCLUSION

The MINDEF BPM journey is barely two years old and the results so far have been very encouraging. The initiative was started to encourage and institutionalise business transformation as a prevalent practice in MINDEF. To maximise the value of our IT investments, it is crucial that MINDEF continues to move forward progressively with business innovation, improvement and integration to enhance the operational efficiency of the organisation. A structured and systematic approach backed by sound architectural practices to align business-IT investments has been put in place to facilitate business transformation efforts. In addition, the use of process-oriented practices is in line with industry trends and will provide the capability for better business agility, especially when the BPMS-enabled ecosystem is completed.

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## BIOGRAPHY

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Lionel Heng Choong Ching is Assistant Chief Information Officer (MINDEF Information Systems Division – Enterprise Architecture). He formulates and implements key initiatives that develop and lay the EA foundation to enable the effective governance of all CIT investments. These initiatives help to ensure the alignment of CIT investments to the organisation's mission objectives and goals, as well as to achieve an efficient use of resources. Lionel also ensures the advancement of the CIT EA maturity to support the continual business transformation of MINDEF and the Singapore Armed Forces (SAF). Lionel was a member of the team responsible for the successful deployment of the JANUS desktop upgrade, and was also among the key champions and change managers of today's successful adoption of OpenOffice in MINDEF and the SAF. Lionel attained the Diploma for Advanced Management Programme at the National Defense University in USA and also became a certified CIO in 2006.

Koh Chin Yong is Assistant Chief Information Officer (MINDEF Information Systems Division – Enterprise Architect). As the CIT Enterprise Architect, he oversees the overall planning and systems architecting of the CIT Enterprise ecosystem. Chin Yong manages enterprise resources in terms of people, process and technology to achieve the objectives of MINDEF and the SAF. He was part of the project team that helped MINDEF to win the Best IT Governance award at the MIS Asia IT Excellence 2009. He received the title of Distinguished Graduate for both the Advanced Management and CIO Certification Programmes from the National Defense University Information Resource Management College, USA in 2008.