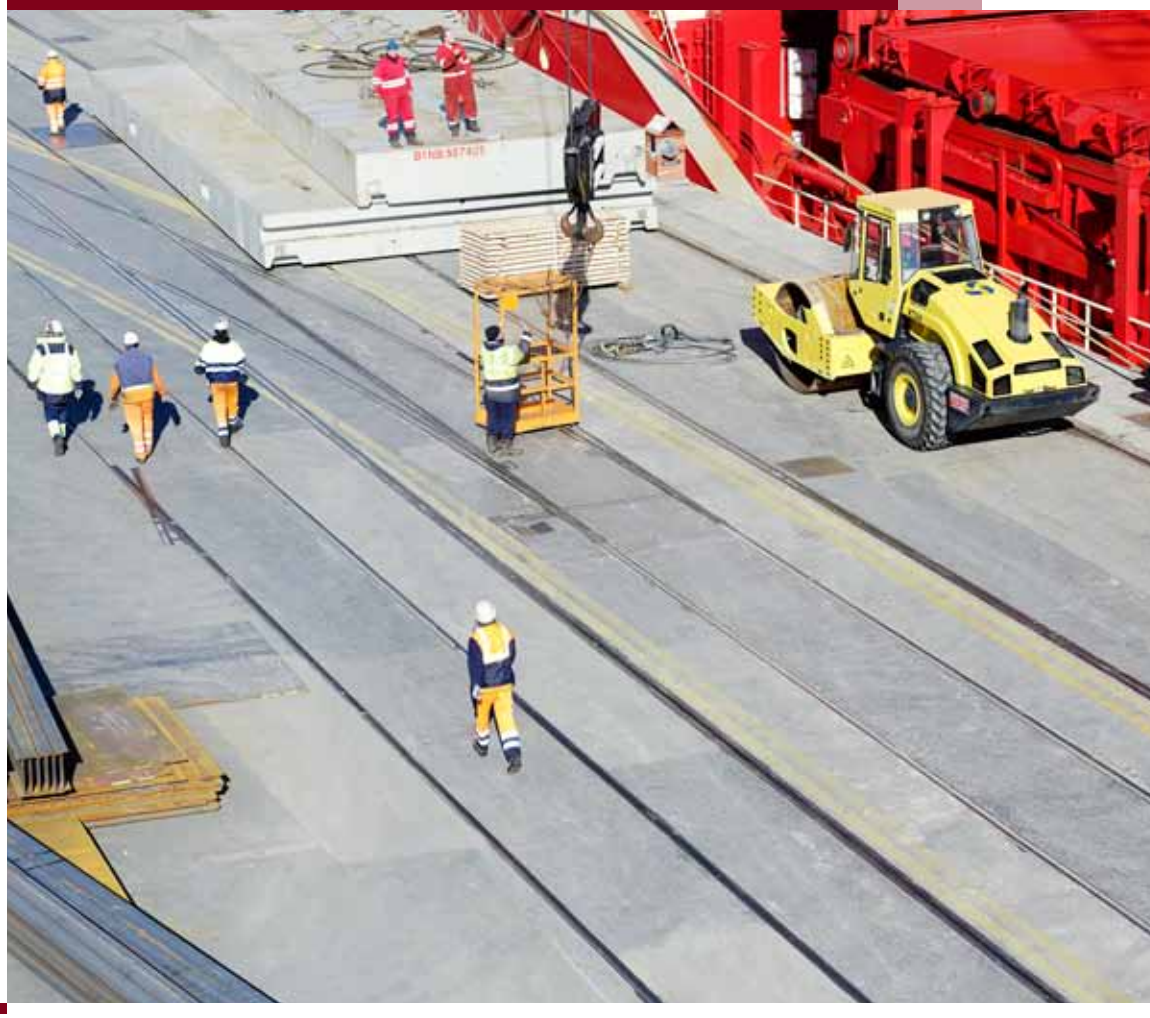
IT as a growth driver for Indian PSEs



Confederation of Indian Industry

pwc

Foreword

The Indian public sector undertakings (PSEs) have significantly contributed to the country's economic resurgence. Since the economic liberalisation in 1990-91,they have exhibited resilience against the global economic slowdown and have been major contributors to India's growth. In the last two decades, listed central PSEs have contributed an impressive 25% to the country's GDP.

However, challenges related to productivity and efficiency pose major barriers to their growth trajectories. Caught between stringent regulations, technological obsolescence and unavailability of suitably skilled manpower, PSEs need to constantly fine tune their business and growth strategies with increasing focus on efficiencies and quality of services.

In an increasingly technology driven environment, these companies need to adopt technology solutions that not only align themselves to the organisation's business needs but also help them achieve growth and efficiencies. Enterprise resource planning (ERP) solutions or any large software system must be scalable enough to support the appreciating volumes, integration needs and complexities that accompany this growth.

To achieve competitive advantage, PSEs need to leverage emerging technologies and best practices. They also need to adopt innovative ways of analysing data and tracking business performance parameters. It is important to manage organisational changes to create a culture that motivates employees during implementation of such technologies .

This paper highlights the imperativeness of information technology for PSEs within a knowledge management framework to achieve competitive advantage.

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Chapter 01

Indian public sector enterprise: An overview

Public sector enterprises (PSE) in India have been witnessing exciting times since the 'big hit' Coal India Ltd's (CIL) initial public offering (IPO). Listed central PSEs are now contributing over 26% of India's market capitalisation and six of them have figured among the top 10 companies in India, based on their average market capitalisation. After independence, the Indian government defined PSE-centric policies in the statements of 1973, 1977, 1980 and 1991. The 1980 Industrial Policy Statement was important as it encouraged domestic market competition, technological upgradation and modernisation by encouraging foreign investment in developed areas.

The PSEs contribute an impressive 25% to the country's GDP. The five Maharatnas[1] collectively reported an income of 4,326.3 billion INR in FY10, around 7.1% of India's GDP. The 15 Navratnas[2] collectively reported an income of 3,762.2 billion INR, around 6.1% of the country's GDP.

Over the last few years, the government has used PSEs to guide the economy through troubled waters. PSEs have overcome short-term interests to maximise long-term gains.

Some specific examples include the following:

- Rural growth in limelight now, has been led by PSEs for over 50 years.
- PSEs pay as high as 25.4% of their profit as corporate tax while the effective tax rate on the private sector as a whole is 23%[3].

PSEs are today enmeshed in the common man's life on account of the focus on inclusive growth. Balanced regional development is one of the chief achievements of PSEs. India's self-reliance in strategic sectors and the growing technical skills of the population helped small and medium enterprises (SMEs) grow. The social control which lasted for decades ensured equal distribution of goods and services.

The CIL IPO, which was oversubscribed 15 times, has re-affirmed investor confidence in PSEs that had waned during the mid 2000s. The government intends to reap benefits from the credibility and recognition that these enterprises hold in Indian markets as well as overseas. Robust PSEs have invested in India and overseas too. They have succeeded in meeting global challenges of competition, advancing technologies and free markets. Several central PSEs have established subsidiaries and alliances abroad.

However, all the problems are not solved yet. Regional disparities, unemployment, skewed income distribution persist. While these may take some time to be resolved, there are other pain-points the PSEs have taken head-on. Inefficiencies and limitations inherent in PSEs due to political and bureaucratic constraints need to be addressed urgently. Some of these include the following:

1 Coal India Ltd, Indian Oil Corporation Ltd, NTPC Ltd, Oil & Natural Gas Corporation Ltd,Steel Authority of India Ltd

2 Bharat Electronics Ltd, Bharat Heavy Electrical Ltd, Bharat Petroleum Corporation Ltd, GAIL (India) Ltd Hindustan Aeronautics Ltd, Hindustan Petroleum Corporation Ltd, Mahanagar Telephone Nigam Ltd, National Aluminium Company Ltd, NMDC Ltd, Neyveli Lignite Corporation Ltd, Oil India Ltd, Power Finance Corporation Ltd, Power Grid Corporation of India Ltd, Rashtriya Ispat Nigam Ltd, Rural Electrification Corporation Ltd, Shipping Corporation of India Ltd

3 Ministry of Heavy Industries and Public Enterprises: Government of India Annual Report 2010-2011 http://dhi.nic.in/annrep_eng_1011.htm

- Improving the image of PSEs in the minds of customers
- Increasing the accountability of employees and transparency in processes
- Increasing knowledge and information-sharing with focus on time-sensitivity

Many PSEs have looked at IT and IT-enabled processes to strategically address these issues.

PSEs are not run as only-profitmaking organisations but are also given developmental goals. Setting of quantifiable key performance indicators (KPIs) to reflect critical success factors is another area of focus. These KPIs can be maintained and tracked effectively using IT systems.

PSEs have multiple control authorities such as ministries, committees and agencies. IT can help bring standardisation in processes with minimum redundancies. End-to-end visibility of processes for transparency is rising with the increasing use of integrated IT solutions, enterprise resource planning (ERP) and performance management systems. As IT penetration increases, problems and process bottlenecks will reduce. In the following chapters, we shall delve into these.

Addressing problems with IT will help PSEs maintain and sustain their growth rates and continue to contribute to the Indian economy in a major way.

Chapter 02

IT penetration in Indian PSEs

The penetration of IT in Indian PSEs is lagging behind its usage in their private sector counterparts. However, some PSEs have managed to successfully integrate IT with their core business processes. Bharat Petroleum Corporation Ltd (BPCL), National Thermal Power Corporation (NTPC) and State Bank of India (SBI) are some PSEs that have efficient IT systems in place and are now reaping the benefits of their vision.

Banking PSEs, in particular, have taken rapid strides in the IT enablement of their organisations. SBI stands at the very forefront of these initiatives. Its core banking solution's success has been one of the primary reasons for its spectacular rebound despite increased competition from private banks.

Some highlights of PSE IT infrastructure and spending are as follows:

- SBI's core banking solution is one of the largest installations of its kind globally.
- Oil and Natural Gas Corporation (ONGC) is the biggest corporate spender on IT in India.
- Five of the top 10 spenders on IT in India are PSEs. State Bank of India (SBI), Bharat Sanchar Nigam Ltd(BSNL), Life Insurance Corporation (LIC) and Indian Oil Corporation Ltd (IOCL) are the other four.

In spite of this increased level of spending, which beats even some of the biggest private enterprises, the overall effectiveness of IT systems in PSEs is yet to produce intended results. The reasons for these are not very different from private sector failure stories such as poor system selection, lack of management, employee buy-in and lack of parameters to assess the success of any IT initiative. There are, however, a few reasons that are unique to PSEs. These mainly include perceived job insecurity through the introduction of IT systems, loss of power on sharing the information and weak change management.

IT should always be looked up on as a tool to solve business problems and not as a hindrance to the growth of the firm. IT projects done for the sake of improved infrastructure without doing a due diligence have often failed. Without clearly outlined business benefits, there won't be complete management buy-in, leading to inefficient usage of IT by end-users.

Overall IT spend in India (US$ millions), 2007-12

Segment/Year	2007	2008	2009	2010	2011	2012	CAGR
Services							
Planning	539.3	660.3	781	925.5	1070.9	1248.8	18.30%
Implementation	2226	2801	3351.7	4001	4757.2	5631	20.40%
Support services	1133.3	1412.7	1682.5	2002.6	2372.4	2764.1	19.50%
Operations	962.3	1309.4	1656.9	2084.9	2582.2	3178.9	27.00%
Training & education	195.6	229.8	254.9	275.6	315.5	335.9	11.40%
Services total	**5056.5**	**6413.2**	**7727**	**9289.6**	**11098.2**	**13158.7**	**21.20%**

As on May 11 2011. Source: BSE – PSE

Objectives

Technology streamlines business activity, makes IT more cost-efficient, reduces wastage in the case of manufacturing companies and optimises resources. Companies need to align IT to business as IT implementations without business imperatives are nothing but wasted efforts.

IT plays multiple roles in the Indian PSE set-up. However, its primary objective is to enforce accountability and increase speed. IT also plays conventional roles such as increasing productivity and standardisation of information management. Other key objectives are as follows:

- Increasing transparency and accountability
- Improving process efficiency
- Reducing cost
- Improving productivity and customer reach

We take a closer look at some of these objectives and how they are realised.

Transparency and accountability

In India, during the pre-liberalisation era, PSEs were deemed to be working in an autocratic manner with no accountability. Once the Indian markets were thrown open to the world, competition increased manifold. There was a need to monitor the efficiency and sustainability of PSEs and put in place accountability frameworks.

The primary role of IT in the Indian context therefore changed from being a business enabler or driver to that of an enforcer. The potential was huge. All decisions and approvals would leave behind electronic traces, the fundamental basis for enforcing an accountability framework. The government and PSEs started looking at IT to improve their image from that of a black-box to a more transparent organisation.

The eProcurement system used by many PSEs now for their procurement is a popular example of this role of IT. What used to be an arbitrary and much maligned system of procurement has now become more transparent, thanks to computerisation. The eProcurement system plugged most loopholes in the procurement process that could be exploited by those with vested interests.

Process efficiency

A major objective of private and public sector enterprises globally in their IT programmes is to bring in standard efficient processes across the organisation. Before a major system roll-out, PSEs ensure their processes are first studies and scaled to industry best practice levels. This not only allows their IT systems to be more effective, but also increases their overall efficiencies, reducing process turnaround times and costs. However, this objective of IT systems has never been fully realised in most PSEs. We will delve into the reasons in the next section.

Cost reduction

Many studies and surveys have suggested that automation of processes through an integrated IT set-up reduces costs. Given the global economic downturn, the cost-cutting role of IT has become prominent. While India has not been significantly hit, cost concerns exist. IT has proved to be a major cost reduction enabler in many PSEs by cutting down logistics costs mainly.

BSNL has achieved cost efficiencies by eliminating redundant systems and going in for a rating and billing solution that was based on an open source platform. Not only did its new IT system reduce costs of billing customers, it also boosted revenue by reducing cases of inaccurate billing.

Productivity improvement

An integrated IT infrastructure within an organisation has enabled some PSEs to have a high degree of automation in their processes. This, in turn, has allowed employees to spend lesser time on administrative processes and concentrate on their core competencies, improving productivity drastically. Real-time information provided by integrated IT systems has improved daily decision-making and the overall productivity of PSEs.

BHEL has implemented a state-of-the-art ERP system replacing its disparate technology systems. It has covered all its business functions such as sales and distribution, finance and control, material management, production planning and quality management. This system has increased productivity levels, mainly due to the availability of real-time information for better decision-making.

Enhancing customer reach

IT systems at PSEs have been designed to enable organisations to reach out to their end customers with better offerings. IT uses customer information efficiently enabling organisations develop targeted and customised offerings that engage the end consumer.

This role of IT is being used by some PSEs, but it has tremendous potential going forward. It can be used for targeted marketing initiatives if the data available is reliable and accurate.

The National Aviation Company of India Ltd has implemented a frequent flyer programme based on an integrated IT system. The system allowed Air India and Indian Airlines to offer reward miles to its regular customers, providing them with an incentive to fly the airline more often. While this is a standard practice in the airline industry, it is an example of how an IT system at the back-end can help an organisation reach out to its customers better.

Opportunities

As outlined earlier, PSEs are among the fastest growing Indian corporate houses. While they rank high when it comes to IT spending, there is still great scope for IT to play a bigger role and drive the growth further. Long-term sustainability of the health of PSEs is going to be determined by the robustness and efficiency of the IT systems they have in place to cover their processes.

The table below highlights some of the business issues faced by the PSEs and how IT can intervene.

Opport Undertakingies	How IT can help
Enhanced decision-making	Management information systems allow upper management to take informed decisions and monitor performance.
Key performance measurement mechanism	Business analytic tools give insightful metrics and help monitor them on a daily basis.
Standardisation of processes affecting efficient scalability	Putting in place an ERP system after business process review will help standardise procedures.
Customer relationship	Customer relationship management modules can help provide centralised customer information allowing PSEs to service customers better.
Knowledge and information-sharing and management for timely and high-quality delivery of projects	Knowledge management systems which enable employees to share and retrieve information seamlessly are widely available. Companies can use them to increase productivity.

ERP systems

Most PSEs lack standardised processes leading to a set of disparate processes, making data collection unreliable and inaccurate. Also, this inhibits the effectiveness of a system selection process and the selected system usually fails to meet its stated objectives completely. The CAG IT compliance audit in Indian PSEs repeatedly focuses on the lack of standardised processes as a reason for the failure of IT systems. Thus, the first step for any PSE looking to fully integrate its functions is to make sure it starts with a process review and standardises processes across all areas of operation.

The business landscape for PSEs is full of challenges warranting quick response. To maintain their leadership position, they might need to focus on several deliverables:

- Implement vendor base expansion and greater application of IT.
- Use more tools at plants and sites to accelerate project execution and streamline delivery systems to execute projects on time.
- Use global sourcing, indigenisation and integrated operations improvement initiatives to deliver better product quality at a competitive cost.
- Grow by way of tie-ups and business associations.

To meet current business challenges to sustain competitiveness in the market, these companies must undertake an ERP implementation driven business transformation exercise.

For some companies, overcoming challenges posed by heterogeneous IT platforms is important. This needs to be done while ensuring an integrated view of information, project visibility and a consolidated ERP solution. To implement an integrated information system across their subsidiaries or SBUs, companies must run the ERP implementation on a single integrated system.

Once an organisation has a standard set of processes, the IT systems can really take off. The biggest opportUndertakingy for PSEs is the implementation of an ERP system. An integrated ERP system covering all critical core functions and supporting functions can improve productivity and cut costs. PSEs like Nalco, Balco, SAIL RSP, Vishakapatnam Steel Plant, Mangalore Refineries and Petroleum Ltd already have a full fledged ERP system in place or are in the process of implementing one. Most PSEs have the revenue and manpower to warrant a fullfledged ERP system.

An ERP system offers myriad benefits. It provides a real-time view of the organisation's different functions. It improves plant throughput significantly and allows better tracking of customer and employee data. It can also reduce inventory costs considerably. The very integration of different functions in an organisation leads to more synchronous decision-making facilitated by data.

Management information system (MIS)

One of the biggest grouses against PSEs is a lack of structured decision-making. IT can help senior management take informed decisions backed by accurate and reliable data. One area where IT can make an impact is by using MIS. It provides organisations with consolidated, real-time data based on transactional level data captured by most ERP and other IT systems.

Building a business intelligence solution has proved to be one of the most effective and imperative implementations in addition to an ERP. It essentially helps in the following:

- Integrate 'non-ERP' data: History not being converted to new system at implementation, but required for trend analysis,data from other operational systems ,data purchased from commercial data sources and archived data
- Improve performance: It helps solve analytical queries which degrade the performance of online transaction processing system.
- Model the data specifically for decision support: It provides faster performance and a user-friendly interface.

A business intelligence system can help provide solutions to several questions posed by different divisions of a typical PSE. E.g. within the marketing and retailing functions, it can track customer touch points with regards to different channels, give a snapshot of goods movement status at assorted terminals on a single screen and plan for supplies during any shutdown. It also helps collate various information across the supply chain, distribution, asset management and sales functions of the organisation.

The major beneficiaries of business intelligence are people seeking 'market intelligence', decision-makers needing perspectives and details and people focusing on improving internal processes.

Performance and resource management systems

In the areas of human resource management, PSEs are still seen to be lagging behind their private sector counterparts. While some companies like NTPC, VSP and Indian Oil figure as the best places to work for in India, the overall picture is not quite as rosy. This is another area where IT can make a significant intervention. Performance management systems (PMS) can increase employee engagement significantly and encourage more efficient performance. A PMS will also ensure transparency in the people management policies of the PSE and high employee confidence in the system. A PMS can map the competencies of employees and allow effective utilisation of resources across different projects. Private companies are putting in place online training modules. With an end-to-end IT-enabled system where a performance appraisal and training system is in place, employee productivity will improve.

Knowledge management and CRM

Knowledge management is another key IT intervention that needs to be explored by PSEs. Knowledge management is a discipline that promotes an integrated approach to fostering the creation, retention, access, sharing and leveraging of an enterprise's intangible assets for business gain.

It can include the following assets:

- Non-technology elements such as culture, organisation, process
- Technology elements including all information technologies and data forms
- Being holistic in scope and approach

Knowledge management tools allow employees to share information seamlessly and help fresh employees ramp up quickly. Other benefits include increased productivity as the easy availability of information will allow faster delivery of projects.

CRM modules can also allow PSEs to track customer data. They provide a wealth of critical data that can be used to target specific consumer groups with customised products based on their buying or consumption patterns.

Business continuity and disaster recovery

A major area where IT needs to play an immediate role is business continuity and disaster recovery. The audit of IT applications across PSEs by the CAG has pointed out that most organisations do not have a viable and responsive disaster recovery and business continuity programme in place. A natural disaster in such a case can lead to days or even months of no productivity for organisations that rely on IT systems for their daily operations. Given that most PSEs operate in critical areas like defence and telecom, a robust disaster recovery is an absolute necessity.

Key barriers

Indian PSEs face a few obstacles in their quest to improve the level of efficient automation of their key functions. These include ineffective change management and lack of standardised processes. We take a look at some of the points that often come up when the IT systems at PSEs are evaluated.

Resistance to change

A large-scale IT system implementation is a change management challenge for any company. There are times when employees are slow to adopt new technologies. Even after many years, modules remain unused. This resistance to change is probably a little more pronounced in PSEs. This is due to lack of management buy-in before implementation, lack of involvement of staff in early trial runs and a multi-layered decision-making structure leading to a lack of clear vision on the goals of the IT programme.

Mishandling of the change management aspect is a key issue that hurts an organisation the most. This can set the organisation back by five to seven years in their roadmap for IT. A failure of the change management programme creates doubts about IT systems in the minds of employees who remain sceptical about newer and better initiatives that might be next on the agenda. Such a failure has a cascading effect on future IT programmes.

Lack of standard processes

Lack of processes is one of the biggest hindrances PSEs face while effectively adopting IT systems. An IT system can only be as effective as the processes being followed. Lack of processes leads to some of the following problems.

- There is limited ability to choose an effective IT system to meet the needs of the organisation.
- There is a high possibility of duplicate or inaccurate data being fed into the system, making the very basis of decision-making and reporting inaccurate.
- There is a misalignment of chosen IT systems and processes which inhibits employee use of IT systems, rendering the systems a dead investment.
- The perception of IT systems as a disturbance to daily processes gains ground and management and employee buy-in is lost.

To fix this, companies must conduct a business process review and improve processes incorporating best practices and aligning with IT. ERP or any other IT system should then be chosen keeping in mind the standard operating processes of these firms. Only then can the complete benefits of an IT system be realised.

Lack of trained IT personnel

Lack of trained IT personnel is a problem that plagues many PSEs. While most PSEs hire firms from outside to implement their IT systems, lack of a strong IT team within their ranks seriously hampers their ability to extract maximum value from the partnership.

In many PSEs, this means that the software installed has not been customised to meet client needs. It also indicates that there was no validation check for the data being entered, leading to duplicate and inaccurate data. This leads to inefficient use of IT systems, causing modules to remain unused due to inherent disparities within the processes.

Another major problem is the inadequate training provided to employees. Without training, employees don't understand the benefits of the system and cannot make full use of it.

Demographic of employees

The demographic of the employees is another often quoted reason for the lack of successful IT roll-outs in PSEs. The standard argument is that an older working force does not see the benefits of computerisation as much as a younger population would. This results in lack of staff buy-in at the earliest levels in a project. While true in some cases, some PSEs have shown that this is not a major stumbling block.

Chapter 03

Success stories

IT is an enabler of development across economic sectors. Some have called this the 'digital economy', and noted that 'it is important to realise that the digital economy is more than an economy conducted on the Internet'.[4]

The digital economy represents the pervasive use of IT (hardware, software, applications and telecommunications) in all aspects of the economy, including the internal operations of organisations (business, government and non-profit). It also includes the use of IT in transactions between organisations as well as between individuals, acting both as consumers and citizens, and organisations. IT has made of a host of tools to create, manipulate, organise, transmit, store and act on information in digital form in new ways and through new organisational forms. Its impact is pervasive as it is being used in virtually every sector from farming to manufacturing, from services to government.

This is not a phenomenon limited to the developed world. Developing economies benefit enormously from the introduction of IT. Some of the best examples are in India today.

IT implementation models

Oil and gas

Post-liberalisation, the adoption of ERP solutions has been a strategic way forward for many Indian companies to leverage information and achieve competitive advantage in a deregulated and aggressive market scenario.

Cost optimisation and enhancing operational efficiency as well as productivity have been the major implementation motivators.

Oil and gas giants like Indian Oil Corporation Ltd (IOCL), ONGC, Gas Authority of India Ltd (GAIL) and Oil India Ltd (OIL) have selected SAP as their ERP solution.

According to a PwC study, IOCL's countrywide network of over 10,144 retail outlets serviced through 165 bulk storage terminals, 95 aviation fuelling stations and 87 LPG bottling plants are supported by SAP. There are over 500 custom developed reports across all modules of SAP. GAIL has covered its entire business through nine modules of SAP R/3 solution including material management, sales and distribution, plant maintenance, project systems, finance and control, human resources, production planning, quality management and customer relationship management. OIL has taken a step further by implementing SAP SRM suite of applications over the base SAP R/e solution to enable e-procurement and automation of the procurement process. The key drivers for ONGC's SAP implementation like many of the companies in this sector was standardisation of business processes, enabling integrated information availability on a real-time basis and elimination of duplication of activities across business processes by capturing data at a single source point.

IOCL's B2B exchange approach

IOCL, India's largest state-owned oil company, accounting for 48% of the petroleum products market share, was facing optimisation issues with its B2B manual settlement and resolution of large volumes of oil products. To augment this process, it managed to persuade another PSE oil company to share a linked IT-enabled platform and achieve a business worth 35,000 crore INR.

Buying and selling of petroleum products with other companies is very crucial to the business model of oil companies. IOCL is no exception. However, an extensive cross-country document processing was leading to exchanges of ad-hoc deposits on the due dates on a monthly basis. Actual settlement was realised on the 25th of each month after the reconciliation of all the incongruities in product quantity reporting and billing. In occasion of any disputes, settlement required the concerned parties to account for all the documents involved in a single transaction to support their claim. A direct outcome of these delays was a huge financial pile-up translating to losses.

Case highlights

- *The first phase saw the automation of ERP systems of IOCL and BPCL, where transactions worth over Rs 35,000 crore were involved.*
- *Automating the billing and stock transfer process saved about 90% time and reduced the amount of effort.*

4 Atkinson & Mckay, Digital Prosperity, (Information Technology Innovation Foundation, 2007)

This was when the company decided to link its ERP systems with the companies with whom it conducted regular oil exchange. BPCL was the first company which was taken on to this new technology sharing platform.

Built on open source, the implementation was carried out in two phases where the first phase involved transactions worth over 35,000 crore INR with the automation of ERP systems of IOCL and BPCL. Once BPCL agreed on the feasibility of such an arrangement, a common platform was implemented for B2B exchanges.

Automating the billing and stock transfer process saved about 90% time and reduced the effort. Also, data entry errors dropped and settlements became faster and more transparent.

Power

The government of India (GoI) is keen to increase the per capita consumption of energy to raise standards of living in the country. Under the Rajiv Gandhi Grameen Vidyutikaran Yojana (RGGVY), the Ministry of Power plans to provide electricity to 120,000 villages in the 11th Five Year Plan (2007-12).

Energy transmission and distribution is a key component of the electricity supply chain, but this segment has lagged in operational efficiency as well as financial performance. Recognising the urgent need for reforms in the power distribution sector, the GoI introduced the Restructured – Accelerated Power Development and Reforms Programme (R-APDRP) in 2007. R-APDRP aimed at strengthening transmission and distribution networks and reduction in aggregate technical and commercial (AT&C) or transmission and distribution (T&D) losses.

Uner R-APDRP, GoI has planned to spend US$11 billion across various states to develop an ICT-enabled power infrastructure. In the first phase of this programme about US$2 billion is planned to be spent. Key ICT opportunity areas in this phase include – energy accounting and auditing, SCADA systems, MIS, Meter Reading (billing and collection), automatic data logging system, GIS mapping, automatic meter reading, prepaid electricity etc.[5]

Case highlights

- *A collaborative framework across the enterprise*
- *The new system is being leveraged to conduct crucial activities such as management*

SAP implementation across NTPC and change management initiatives

An ERP roll-out across an organisation is one of the most extensive and difficult exercises for its IT team. During the roll–out, all resources of the organisation are put to deploy it successfully. As a result, other IT initiatives are sidelined.

However, the decision-makers in power giant NTPC decided to go against this statistic. So, when the company's IT team was fully absorbed in rolling out an SAP implementation along with the ongoing change management initiatives, the senior management introduced an enterprise-wide collaborative initiative. The motive behind this was not only to help with change management but also to increase productivity and reduce cost and ensure that the organisation went beyond just ERP implementation.

The company adopted an audio and video conferencing framework to reach out to all its employees as a part of its collaborative efforts. Change management with ERP implementation makes it imperative to interact extensively with all users and the conferencing set-up was supposed to facilitate this.

To overcome the challenges of making people use the new technology, a standard manual of dos and don'ts was created and circulated among all project heads. The new system helped conduct key activities such as management committee meetings, project monitoring and reviews of the upcoming thermal or hydro power generating projects. Also, management committee meetings took place regularly, across 40 locations with over 150 participants simultaneously.

Thus, the company saved cost and found a synergy in problem-solving methods during various stages of upcoming projects. It also made sure that the organisational hierarchy and geographical barriers do not pose as real-time barriers when it came to capturing ideas and figuring out ways to implement them.

5 Cybermedia Research: Energy and power sector report. http://www.cmrindia.com/global_market_research.asp

Bharat Heavy Electricals Ltd (BHEL) RFID enabled bin tracking solution

BHEL is the largest engineering and manufacturing enterprise in the energy and infrastructure sector with revenues of US$4.7 billion. It manufactures over 180 products categorised under 30 major groups, catering to the basic infrastructure verticals like power generation and transmission, transportation, renewable energy and telecommunication. BHEL provides complete turnkey solutions to core infrastructure sectors like power generation and mass transportation and caters to the requirements of both, large private sector customers as well as governments of various countries.

Business requirement

Catering to the huge demand for power plants, BHEL factories work round the clock to manufacture various power plant assemblies like turbines, engines etc. One such plant manufactures blades that go into making the turbines of a power plant.

At the new blade shop of this plant, raw material (in form of stainless steel bars) and semi-finished blades are fed to sophisticated computer numerically controlled (CNC) machines which cut, grind and polish them into the finished blades for the turbines. These raw material stainless steel bars, semi-finished blades and blade assemblies are stored in an automated storage and retrieval system (ASRS). The ASRS makes efficient use of the available storage space by accommodating large quantities of various materials in vertically stored metallic bins. Their ASRS comprised of:

- 540 bins
- 34 columns with eight rows in each column
- Total area 12,430 cubic feet

The ASRS control software keeps a record of the bin location and the contents of each bin which is manually fed into the system. The process is error-prone and leads to inaccurate data over time. A misplaced bin translates into:

- Unproductive labour required to search the misplaced bins
- Manufacturing machine downtime does to the systems inability to feed raw materials on time
- Delays in project completion leading to penalties

BHEL needed a solution that could help it keep track of the bin location, the material information that was stored in the bin and be able to verify if the correct bin was being retrieved when asked for. The objective was as follows:

- Verify if the correct bin was picked by the ASRS crane even before the bin was brought to the base station giving an opportunity to the operator to take corrective action ahead of time, preventing loss of time due to incorrect bin retrieval thus improving operation efficiency of the ASRS
- Gain visibility on the bin content (material stock-keeping unit(SKU) and quantity

With RFID deployment on the ASRS, the operators of the ASRS were being able to verify if the correct bin was being retrieved from the system, even before the system brought the bin to the base station. They were also able to update the database with the material SKU information as well as the quantity that the bin holds.

The benefits accrued by introducing RFID based bin verification were as follows:

- Instances of incorrect bin retrieval were reduced from a daily average of seven to nil.
- Quantity of SKU held in the bin was updated in real-time whenever any material was removed from the bin; this resulted in 100% accuracy in SKU inventory count.

This improved the bin put-away and retrieval efficiency of the ASRS, thus ensuring the high cost CNC machines were fed with the correct material and that BHEL was able to meet the deadlines set by its customers for erecting the power plants.[6]

6 Keytone Technologies: Case Studies: “Bhel RFID Case Study” http://www.keytonetech.com/resources/assettrace/BHEL%20Case%20Study.pdf.

E-procurement initiatives in India

With the advent of the Internet in India in the late 1990s, individuals and organisations started identifying ways and means of automating their key processes. E-procurement is an area where the Internet was instrumental in automating the purchase process, thereby significantly reducing cost and time.

The broad spectrum of e-procurement is much more than just a plain vanilla system for making purchases online. It is a comprehensive platform, using the Internet to make it easier, faster and cost-effective for businesses to source their requirements on a timely basis, and in a way that is aligned with organisational goals and objectives. In the current scenario, characterised by a focus on key strategic initiatives, lesser time-to-market and increased global competition, e-procurement aids organisations in streamlining their entire purchasing process, so that they can focus on core business activities and increase profitability.

Simply stated, e-procurement is the electronic business-to-business (B2B),business-to-consumers (B2C) or business-to-government (B2G) sale and purchase of goods and services. The medium used might be the Internet or any other media like electronic data interchange (EDI) and enterprise integrations (formerly known as EAI).

Over the last few years, several state governments and PSEs in India have taken an aggressively pro-active stance on e-procurement. The e-procurement process is unique to government. While corporate purchasing has become supplier management and driven by business partnerships, government procurement remains dedicated to levelling the playing field between competitors by use of the sealed competitive bidding and awarding bids to the lowest bidder meeting specification.

Government records are open and the prices revealed in the public arena. Thus, under public scrutiny, public purchasers must attempt to conserve the taxpayer's money in an open arena. Fortune 500 companies boast of maintaining a key supplier base of 10-15 first and secondary suppliers which is minuscule to what a government has as registered vendors and many more that bid, but never make it to the vendor list. Given this divergence, a government has to adopt e-procurement solutions that take into account the above factors. Government must forge its own model of e-procurement and, by doing so, encourage the competition so heartily sought. The deluge of requests via the Internet from companies wanting to compete will have to be managed. Government must create a model that pays for itself, thus maximising the taxpayer contribution without damaging small and emerging businesses.

Government must implement a solution that weakens the procurement cycle without paralysing other functions. This e-procurement process recommendation should improve the procurement cycle without upsetting the government policies and procedures necessary to the successful governance of the populace and businesses.

Government to business consists of the electronic interactions between government agencies and private businesses. It allows e-transaction initiatives such as e-procurement and the development of an electronic marketplace for government. Companies everywhere are conducting business-to-business e-commerce in order to lower their costs and improve inventory control. The opportunity to conduct online transactions with government reduces red tape and simplifies regulatory processes, therefore helping businesses to become more competitive. The delivery of integrated, single-source public services creates opportunities for businesses and government to partner together for establishing a web presence faster and cheaper.

State governments like those of Andhra Pradesh and Gujarat have initiated e-procurement within their e-governance programmes. Using e-procurement, these governments have not only saved on their procurement costs but have also brought about transparency in their processes and have earned goodwill and trust. Included in these large-scale benefits are cost reduction, improved decision-making, process efficiency, price and supplier behaviour forecasting and supplier performance monitoring which ultimately leads to vendor rationalisation and standardisation.

Public sector Undertakings like ONGC, IOC, BHEL have all taken up e-procurement initiatives to rationalise the US$30 to US$40 billion purchases they make every year.

The entire procurement process for the Andhra Pradesh government is being automated and streamlined. The focus is to avoid cartel formation, besides reducing inventory costs and creating a level playing field for suppliers and buyers. For the government of Andhra Pradesh, the value of procurement is more than US$2 billion across more than 150 departments, which will be covered by a single e-platform. Similarly in Gujarat, a fuel exchange has been set up for GSFMC (a consortium of various PSEs in Gujarat) wherein the participating members buy and sell fuel online.

The purpose of e-procurement is cost reduction and enhancing operational efficiency in the procurement process. However, developing nations like India still have a long way to go in implementing this technology widely. Some of the key challenges faced here are as follows:

- The lack of IT infrastructure
- Sourcing goods through online channels is relatively unheard of.
- Despite relatively high levels of computerisation, many organisations find it easier to do business over the telephone.
- Limited Internet and broadband penetration especially in rural areas, where companies need to ensure an uninterrupted connection.

These are some of the areas of opportunities for e-procurement facilitator companies to offer their solutions over channels other than the Internet, perhaps using telecom or as technology evolve, over television networks.[7]

7 Source: http://www.slideshare.net/pksinghtatawala/e-procurement-4750175

Key initiatives by major stakeholders

The Information Technology Act 2000 showed the Indian government's commitment to IT and IT enabled processes in terms of policies. The Act established the legal recognition of electronic documents and digital signatures. It also provided legal recognition to transactions in terms of electronic data exchange and communication. This ushered in an era of electronic commerce. Government organisations could now start filling applications electronically, generating e-invoices and electronically transferring money.

Once this Act was passed, IT was seen to have the power to accelerate and transform systems and processes. The National Informatics Centre was set up under the Department of IT as the premier science and technology organisation to promote and implement information and communication technology (ICT) solutions. This led to many e-governance initiatives which ran parallel with ICT being implemented in PSEs. PSEs would not have been able to implement IT solutions had their counterpart, the government, done so too. Infrastructure for VSAT programmes, video conferencing, web services and the Internet was set up. Training programmes were run for public servants and PSE employees. It also became a certifying authority for digital certificates.

One of the major infrastructure developments came in terms of national and state data centres in an attempt to consolidated IT infrastructure. Each state created a data centre to consolidate services, applications and infrastructure. This provided efficient electronic delivery of government-to-business services by providing a central data repository, secure data storage, online delivery of services, services portal, state intranet portal, disaster recovery, remote management and service integration among other benefits. PSEs could now look at IT in a big way as their major collaborator was taking big strides in implementing it.

PSEs, especially public sector banks (PSBs), have looked at CRM systems for data warehousing and data mining. It has also enabled them to do cross-selling and risk management. Behaviour and needs could be mined which enabled PSBs to provide custom-made products for different regions. It has helped reduce regional and income disparities. The use of CRM is also seen in other PSEs where they have been able to improve the customer experience drastically. This has happened due to customer demand.

Many PSEs have private as well as government suppliers. Planning, contract management, e-procurement, e-bills, e-invoices and electronic payments all have become a part of PSEs connecting with their suppliers.

There was a time when employees held baandhs and demonstrations against ERP implementation because they were afraid of losing control and jobs. However, PSEs have seen a shift in attitude as employees have come to realise the benefits of IT, especially in terms of their own empowerment. They can get accurate data from any place with great ease involving their leaves, compensation, appraisals, etc. This has increased transparency and faith of employees in their organisations. The HR departments of PSEs have seen great benefits in terms of reduced paperwork and manual calculation. Quick communication and easy reporting are some other benefits felt across PSEs.

Chapter 04

The way forward

For any business, irrespective of size and scale, innovative technology solutions are the need of the hour. However, the challenge for PSEs is not to adopt high-end solutions, but to align existing infrastructure with new deployments and engage their manpower in the new systems effortlessly. There exists a huge scope for technology in the government sectors. Although it is difficult to predict whether technology will induce people to work more efficiently, it is safe to assume that it can speed-up the process and bring in order, accountability and transparency in the business. For highly centralised organisations such as PSEs, the innovation and adoption of technology can be implemented in two ways. They may choose a 'big bang' approach where innovation is introduced simultaneously across the firm. With this, differences among organisational enterprises are minimised, and the firm does not have to operate using different sets of processes. In the second approach, organisations implement the innovation within a single business unit. After the initial implementation is complete, it extends to other business enterprises. However, irrespective of the approach, the following hygiene factors need to be maintained:

- Standardisation of processes through the implementation of frameworks such as the CMMI, TQM and ISO 9000.
- Standardisation of reports to ensure elimination of duplicate and redundant activities.

A few key initiatives during each phase of implementation will ensure the success and sustainability of the technology adoption programme in the long term.

Pre-implementation

Business process standardisation

Integration of systems is important to manage big enterprises such as the PSEs. Business processes should be re-engineered to fit the new technology or software instead of customising the software to fit the existing business processes. Besides, customising software can increase costs and errors. The complexity and magnitude of the efforts required may deter organisations from customisation. Implementations like an ERP project have changed processes. An adequate degree of fit, between the organisation and the technology package, is critical for the success of any implementation.

Product and vendor selection

While choosing a software vendor, the main concern is that even though the enterprise system might have substantial resource tools and untapped applications, it may eventually turn out to be inappropriate for the operational process. This can result in huge losses for the organisation.

Companies should be careful in choosing a solution package. It should match the legacy systems, e.g., the hardware platform, databases and operating systems.

To select the right vendor and product, companies must define their key requirements, identify possible vendors or maintain a master database of pre-selected vendors. They must also develop scenarios for proof of concept, facilitate software demonstrations and engage an external partner or consultant to conduct vendor due diligence and plan implementation.

Success parameters

A technology solution will provide no returns if users are unable to use it. Therefore, functional teams need to train end-users on the new system. An ERP system that includes an intuitive, easy-to-use interface will allow organisations to train employees quickly and cost-effectively.

Measure KPIs

Organisations can't manage what they don't measure. Unless they measure the solution results, they will not know whether their business processes are getting better or worse. Therefore, during the implementation process, the functional teams need to define which metrics (e.g. KPIs) to measure to determine the success of their technology implementation.

An implementation should help the organisation improve its performance. KPIs are quantifiable metrics that reflect the performance of an organisation in achieving its goals and objectives. Organisations need to find KPIs that reflect strategic value drivers rather than just measuring non-critical business activities and processes. The right KPIs align all business enterprises, departments and individuals with clearly defined targets and benchmarks to create accountability and track progress.

While business enterprises, departments and individuals must use KPIs that support overall business objectives, each will have its own KPIs that reflect its performance. E.g., sales might track things like average sale, average margin per sale, sales-per-sales rep and lost accounts. While the accounts receivables department might track total receivables, receivables over 30, 60 or 90 days, average overdue receivable, average account ageing etc.

While determining KPIs, organisations must measure factors that interest their business and adopt an overall vertical industry metric. This will help them compare their performance.

Implementation

IT programme management

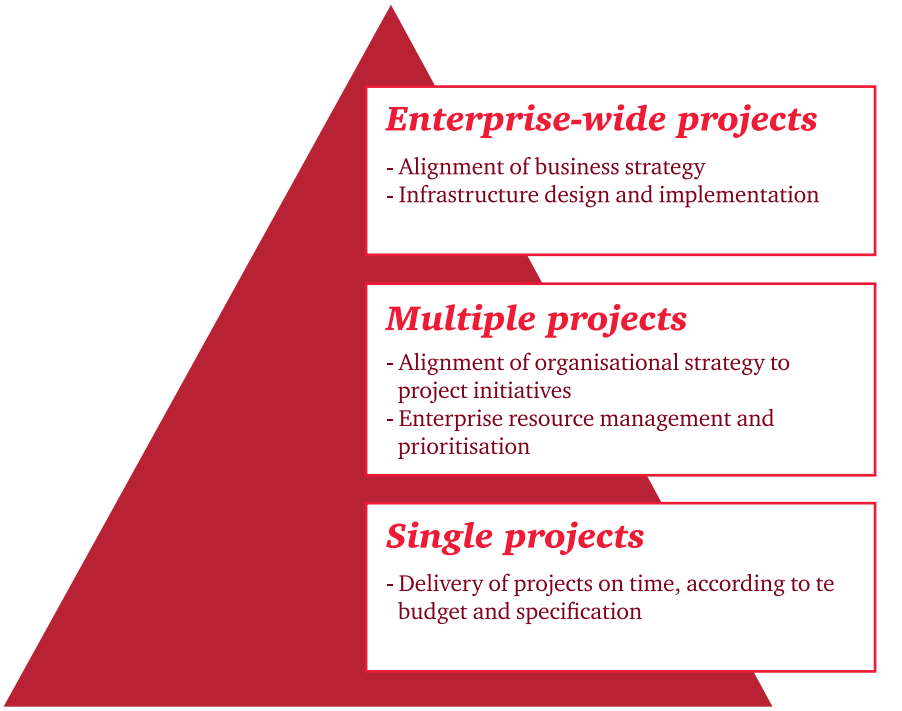
Note: Project offices (POs) are often referred as programme office, programme management office, project management office, central project office, project support office, etc. In the report, the term 'PO' applies to the different types and configurations.

A PO interacts with all project stakeholders and supports project sponsors and managers by providing assistance, guidance and subject matter expertise.

The PO provides support for the following:

- Single projects: It provides management with an independent view of project status and ensures consistent project management, quality, documentation and uniform standards are applied across projects.
- Multiple projects: It provides, in addition to the services provided for a single project, portfolio management support.
- Enterprise-wide projects: An enterprise PO provides assistance for large strategic initiatives by consolidating outputs from multiple projects, while aligning and providing oversight to multiple POs.

PO roles and functions



Research has indicated the following causes for project success and failure:

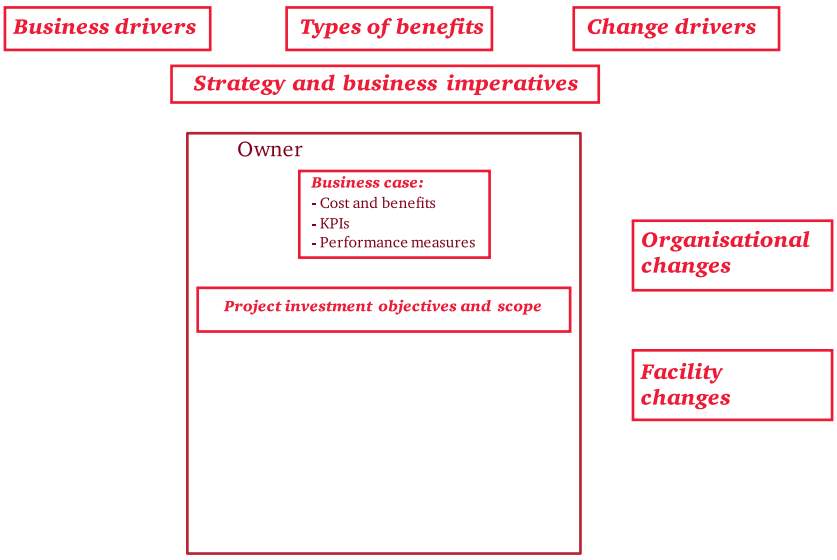
Success

Formal governance and change approval guidelines

- Business owners accountable for project results
- Training in project management
- Measurement and feedback systems
- Formal priorities for requests and changes
- Regular communication with users
- Clear tracking of people, skills and time
- Inventory of skill-based competencies
- Automated project management tools

Failure

- Inadequate planning and incomplete requirements
- Insufficient involvement of stakeholders
- Infrequent communication with business owners
- Poor containment of the project's scope
- Poor management of expectations, roles and responsibilities
- Ineffective resource management
- Incomplete deliverables between groups
- No relevant authority to overcome impediments
- Poor project estimations



The project benefits realisation process is composed of the following elements:

- Business drivers: This may include becoming a low-cost producer, 'locking-in' suppliers or customers by offering superior levels of service, creating barriers to entry, retaining market share, competitive parity, etc.
- Types of benefits: It includes improved inventory turnover, reduced warranty claims and delivery costs, faster-to-market product and service development, and lower customer order processing costs.
  - Change drivers: It includes external drivers such as new or obsolete technologies, legislation or regulation changes, competition or market changes, supplier or customer demands and obsolete product or services. The internal drivers include new management, high staff turnover and labour inefficiencies.
- Strategy and business imperatives: It is a result of business drivers, different types of benefits or change drivers. It creates projects to address business issues which link or impact the organisation's business strategy.
- Business case: It includes a detailed business justification to define the project(s) necessary to address the business imperatives. Items such as the competitive impact, resource requirements, organisational impact, cost and benefit calculations, critical success factors, key performance indicators and associated performance measures form a part of it.
- Project investment objectives and scope: It includes clearly defined scope, project schedule, timing and duration of project resources, project assumption and dependencies, accurate project cost estimates and outputs, business outcomes and measures benefits.
- Ownership and responsibilities: It includes the definition and acceptance of the roles and responsibilities for all aspects of the project and the benefits realisation process from inception to delivery.
- Project management: It extends the 'traditional' measures of project success (the project outputs measured on time, to budget and to specification) to include benefits management. This incorporates the business outcomes and the benefits realisation which is an integral part of the project right from its inception.
- Business process, technology, organisational and facility changes: These represent the components that must be changed to successfully deliver the planned business outcomes and business benefits.
- Benefits realised: These are the measured tangible benefits that have resulted from the project and that confirm the cost and benefit calculations. They use select key performance indicators and measures.

Creating a business case monitoring and benefits realisation process, which incorporates all the elements, adds significant value by focussing not just on business outcomes but also on project outputs.

IT governance

Lately, the subject of IT governance has been a much debated issue and has increased the pressure on overseeing its effectiveness. To provide value to the stakeholder, the current IT environment requires regulatory compliance, cost control, availability, risk management, business alignment, timely project delivery, change and innovation.

The following are some of the major drivers of IT governance within organisations such as PSEs:

- Need for IT alignment
- Regulatory pressure
- IT governance as follow-on from corporate governance projects and enforced by board and executive management or headquarters.
- Need for performance improvement, e.g. cost of IT, lack of effective solutions and efficiency gains.
- Improved risk management

Organisations that have recently commenced IT governance initiatives often have no mechanism in place to measure the success or benefits of their efforts. When IT governance performance measurement disciplines and practices are in use, they are mostly informal, subjective or based on qualitative measures. Some organisations measure progress on the basis of their IT governance measures (process indicators), rather than the eventual outcome, e.g. cost savings.

There are many benefits of IT that are not quantified or measured. These include the following:

- Enhanced IT alignment
- Cost savings

- Improved customer satisfaction
- Greater security

The use of IT governance frameworks is widely accepted. According to a PwC survey, 95% of organisations seek aid and guidance from major and well-known frameworks such as CobiT and ITIL. These frameworks are combined with each other or with other lesser known frameworks (such as CMMI and PRINCE II). In addition, many organisations focus on getting the basics of IT governance correct, i.e. installing the right governance bodies and committees, assigning accountability and opening communication channels between business and IT.

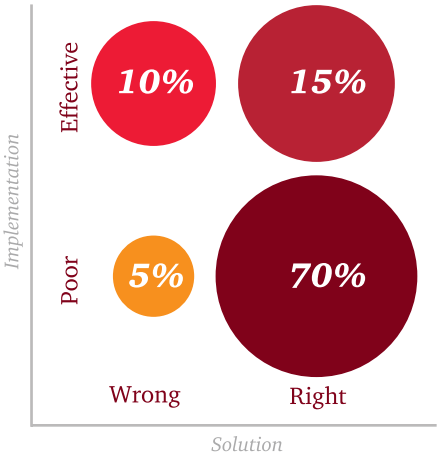
Change management and training programme

According to a Gartner research study, around 70% of change projects fail to deliver expected benefits. These failures are not due to wrong solutions but are the result of poor implementation and lack of focus on change management.

Change management for ERP

ERP provides an integrated view--an information system to identify and plan the enterprise-wide resources needed to take, make, ship and account for customer orders.

ERP systems attempt to cover all basic functions of an organisation by replacing two or more independent applications.



An ERP solution is an integrated system where all the functional modules are interconnected and the majority of transactions are carried out online. Data redundancy is minimised and all functional departments involved in operations or production are integrated in one system. The systems are usually at multiple locations and can cut across international borders while focusing on cross-functional teams.

The structure of an organisation can change post-ERP implementation and employees can have new roles, responsibilities and reporting relationships.

ERP projects are often associated with unmanaged expectations followed by troughs of despair leading to employee disillusionment. In the absence of a proper change management strategy, the project is bound to fail. So embedded and sustained change management is the only way employees will remain committed to the success of the project.

While integrating technologies within traditional organisations such as PSEs, change management should involve the following:

- Assessment of the readiness and capability of the organisation and its employees
- Creation of a change management strategy
- Identification and prioritisation of action points based on opportunities for development
- Mobilisation of the organisation for the transformation by involving the management and workforce

For effective change management, the following are critical:

- Clear commitment and direction from senior management
- Clear goals and objectives for the proposed changes
- Well-defined requirements and realistic expectations from users
- Regular and effective communication
- Clear roles
- Benefits due to the changes

Post implementation

People management

Retirement of crucial staff members, absence of adequate compensation structures, delayed appraisals, lack of in-house expertise in dealing with new technologies in contrast to the attractive packages and growth opportunities offered by the private sector makes people-related issues a major impediment in implementing technologies.

For PSEs, the main challenge lies in delivering results with the existing manpower, while they attract new talent to fill in the gaps. Government agencies overlook critical aspects such as providing people with the right talent and motivation, appropriate compensation and a stimulating work environment.

Therefore, during any technology implementation employee mindset must be technology-ready and productive. E.g., during an ERP software system implementation, management exercises are key to the sustainability of the system. A large-scale implementation across the organisation that covers all the processes needs to ensure that employees work on their daily activities using the new system.

Role of stakeholders

For Indian PSEs, allocation of funds for technology implementation is not as much a challenge as convincing the management to approve the required IT investment. To gain management consensus for an IT spend, it is necessary to prepare an effective plan that showcases the benefits accrued from the proposed investment. To ensure complete acceptance, private companies responsible for supplying the technology and other major stakeholders must work together to realise the advantages of adopting any new technology.

In the 1990s, the government spent extensively on setting up IT infrastructure and creating huge IT support. And now is the right time to understand the needs of the current environment. PSE CIOs need to advise their organisations and the various stakeholders on the investments worth pursuing for providing the best possible services. They need to ensure that the technology helps organisations achieve their goals in a timely manner and within their budgets.

Benefit management

It is essential for management teams across companies to see tangible benefits of the technology adopted to ensure that the projects are completed on schedule. This also helps in justifying the resources offered. The purchase and implementation of an ERP system is the only capital project companies undertake where a return on investment (RoI) calculation is not mandatory. Yet, knowing the RoI of a system implementation is important because every system project is compared to other capital projects being undertaken. If those other programmes or projects have an objective return associated with them, an ERP system implementation programme will be tough to justify. To facilitate management approval for technology approval, benefits can be seen in various areas. E.g., benefits can be achieved through reductions in inventory, direct and indirect cost, improved delivery performance and increased visibility. A few ways in which companies can manage benefits are as follows:

- Use of tools like system alerting and supplier agreements
- Implementation of demand flow line side procurement without the need for back-up inventory
- Demand flow procurement and inventory management that eliminates communication between the purchasing team and suppliers with respect to scheduling and expediting. The reduction in the supply chain reduces the impact of engineering changes.

Many companies are forced by market pressures or their business models to constantly introduce new products. This creates a communications overload between engineering and manufacturing. Today's integrated systems and project management tools help establish milestones, work schedules and budgets for engineering projects. Using these tools, management has the visibility to make sure projects are completed on time and within the budget.

The role of cloud computing

The Indian public sector is warming up to the opportunities of cloud. The Government of India is actively promoting cloud computing through the construction of various test beds and the launch of multiple cloud service initiatives such as e-governance, cloud grids, etc."

The government can apply cloud in the following cases:

- Government-to-government (G2G)
- Government-to-business (G2B)
- Government-to-citizen (G2C)
- Government-to-employee (G2E)

Although concerns around privacy, security and sovereignty of data continue, the value proposition of moving to the cloud is too attractive for the governments to ignore.

Global adoption of cloud computing in the public sector

The US is taking the lead and moving to a 'Cloud First' strategy. U.S. Federal Budget for 2011 has incorporated cloud computing as a major part of its strategy to achieve efficiency and reduce costs. It has been mandated that all agencies should evaluate cloud computing alternatives as part of their budget submissions for all major IT investments, where relevant. The following deadlines have been set for project completion:

- Newly planned or performing major IT investments acquisitions must complete an analysis that includes a cloud computing based alternative as part of their budget submissions by September 2011.
- All IT investments making enhancements to an existing investment must complete an analysis that includes a cloud computing based alternative as part of their budget submissions by September 2012.
- IT investments in steady-state must complete an analysis that includes a cloud computing based alternative as part of their budget submissions.

European *governments are slow on adopting cloud.* The EU is expected to present European cloud computing strategy (Euro cloud) next year. Main concerns remain over data privacy and jurisdiction, responsibility and EU legislation. According to IDC:

- Among European governments, 40% have no plans of adopting cloud.
- The propensity to adopt cloud computing among the top five European governments showed that 22.8% have no plans to adopt and 18.9% don't know if they will.
- Governments of Germany, UK, France, Italy and Spain are adopting cloud but with a cautious approach.

The UK government plans to build the 'G-Cloud' government cloud service strategy. Though the UK government is yet to set up a specific spending budget, it will invest around £ 60 million to establish public cloud service network. By 2015, the goal of the UK government is to reduce at least 50% of the IT resources through public cloud services. It hopes to save £ 20 million from 2012 to 2013, £ 60 million from 2013 to 2014 and £ 80 million from 2014 to 2015.

Cloud adoption trends in the Asia-Pacific region

Governments in Asia are looking at cloud services to bring in efficiencies in their ICT usage. They are looking to enhance their infrastructure and reduce spending. They also believe that by establishing a cloud computing ecosystem within the country, they will be able to generate more business opportunities and even create export opportunities for their services.

Australia *is expanding the whole of government approach to the cloud.*

- The Australian Taxation Office (ATO) has moved eTax, electronic lodgement system (ELS) and tax agent board administrative support systems into the cloud.
- The Australian Bureau of Statistics has implemented a virtualisation solution to enable transition to a private cloud environment.
- The treasury or ATO has migrated standard business reporting (SBR) and business names projects into the cloud.
- The Department of Immigration and Citizenship (IMMI) initiated a proof of concept for the provisioning of an end-to-end online client lodgement process on a cloud platform.
- The Australian Maritime Safety Authority has implemented a public cloud for SaaS and PaaS deployments from www.salesforce.com.
- The Department of Immigration and Citizenship (DIAC) has implemented a hybrid cloud for IaaS as a proof of concept.[8]
- West Australian Health has adopted for a private cloud for IaaS deployment. The data centres are expected to be completed in April and June 2011.

China *is leveraging cloud computing to transform the city of Dongying.*

Cloud adoption in the public sector in China is being driven at a local level in cities such as Dongying and Wuxi. The Yellow River Delta Cloud Computing Centre, built by IBM will provide the following:

- Cloud-based platform for the petroleum industry to develop more innovative application services
- Software development and test resources through the Internet, to start-ups and other companies that establish their presence in the city
- An eGovernment Services Platform for the Dongying economic development zone
- In the City of Wuxi, the government has developed a cloud services factory to provide adequate computing resources to the enterprises located in the software park.[9]

Future plans include implementing a cloud based solution and enabling 'smart roads' and a 'smart airport' based on data analytics. In addition, healthcare services can be moved to the cloud as part of the plan to centralise patients' records and make them available to doctors online.

Hong Kong *government's new IT strategy for 2011 focusses on cloud.*

- The government is taking a cautious approach toward deciding the areas where cloud computing will be implemented in order to ensure that data security and privacy are maintained. Use of cloud is being evaluated in the following areas:
  - Use of cloud computing for sharing infrastructure, software components and data
  - Adoption over a period of time rather than a big band transformation
  - Collaboration and communication, internally between departments and with citizens to have the maximum potential with a shift to cloud technologies
- The government plans to use private clouds in the initial phase to augment capabilities. The private cloud may not be hosted in a government data centre, but be an outsourced private cloud, where the government has complete knowledge of the location of its data[10].

Japan *to tap government potential through the Kasumigaseki cloud.*

In 2009, the Japanese government embarked on a significant cloud initiative as part of its Digital Japan Creation Project, dubbed the ICT Hatoyama Plan.

The cloud initiative, Kasumigaseki cloud, aims to do the following:

- Establish a large cloud computing infrastructure to meet the increasing requirements of the government's IT systems.
- Save costs and consolidate the IT infrastructure is expected to make operations more environment friendly.
- Bring greater efficiencies though a shared pool of resources, thereby eliminating the need to maintain separate IT systems for different ministries
- Digitise government documents and other popular information, and introduce standardised formats and metadata to improve public access in the National Digital Archive project.
- The Kasumigaseki Cloud is expected to be completed in phases by 2015.

8 Frost & Sullivan Market Insight 2011 'State of Cloud Computing in the Public Sector – A Strategic analysis of the business case and overview of initiatives across Asia Pacific'

9 Frost & Sullivan Market Insight 2011 'State of Cloud Computing in the Public Sector – A Strategic analysis of the business case and overview of initiatives across Asia Pacific'

10 Frost & Sullivan Market Insight 2011 'State of Cloud Computing in the Public Sector – A Strategic analysis of the business case and overview of initiatives across Asia Pacific'

*The **South Korean** government investing in cloud to drive ICT industry competitiveness.*

South Korea's communication commission has allocated about US$500 million for the development of Korean Cloud Computing (KCC) facilities. This has been set up to garner 10% of the global cloud computing market and reduce 50% in public sector's ICT spending by 2014.

KCC has partnered with the Ministry of Knowledge Economy and the Ministry of Public Administration and Security for the creation of cloud-based IT infrastructure that supports the government as well as the ICT industry.

The South Korea government has also been involved in the Electronics and Telecommunications Research Institute in the Open Cirrus collaborative cloud computing research programme.

Governments in other countries are either evaluating or taking a cautious approach.

- **Philippines** lacks a central authority to develop standards and this is affecting cloud adoption.
- The **Vietnam** government is collaborating with IBM to promote adoption.
- Lack of infrastructure and low awareness levels are inhibiting adoption in **Indonesia.**
- The **Singapore** government is promoting cloud computing through subsidies.
- The **Thai** government is starting to test cloud services for long-term use.
- The **Malaysian** government is creating the right environment to push cloud services.
- The **Taiwanese** government is investing significantly in cloud services.

*In case of **India,** security concerns are hindering adoption.*
The Indian government is yet to announce a formal cloud strategy and there has been very limited adoption of cloud computing even at state level. This is largely due to the security and privacy concerns of providing control of their critical data to third-party service providers.

Among states in the country, the Jammu and Kashmir state government has been the first to adopt cloud computing for its e-governance services. The government, using the state data centres based out of Madhya Pradesh, is provisioning e-governance services such as issuing death or birth certificates and trade licenses through the cloud. The government uses Microsoft's solution to implement cloud computing.

Despite low adoption levels, there is a significant interest among agencies and the Department of IT in India to promote cloud computing across the country. According to analyst firm IDC, the cloud computing market in India is expected to grow at a CAGR of 40% by 2014, from an estimated US$66.7 million in 2009. Main drivers include cost reduction and performance efficiency.

Value proposition of cloud computing in public sector

Reduction in ICT Spending	By adopting cloud computing, government agencies can create a central pool of shared resources – software and infrastructure. The consolidation of resources and the fact that cloud computing is more cost effective, leads to reduction in ICT spending.
Agility	Governments operate in a strict hierarchical manner and the process for approvals and purchase orders is a time consuming activity. Cloud computing provides the capability to eliminate these time consuming activities and provision resources on the fly.
Access to Most Updated Technology	Cloud computing offers the government the ability to constantly have access to the most updated software and hardware. The onus of upgrading technology is on the service provider in this delivery model who ensures access to the most up-to-date solutions.
Elimination of Procurement & Maintenance	Another key advantage is the elimination for the need to procure, monitor, and maintain IT resources. This too is the responsibility of the service provider under the delivery model. Apart from reducing the workload, this reduces the need for IT staff and allows the government/agencies to focus on their core areas of work.
Universal Resource Access	Cloud computing is delivered through the Internet enabling universal access to resources. Furthermore, it helps the government in establishing a common platform for all its eGovenance initiatives, one that is easily accessible by the citizens as well

Source: Frost & Sullivan

Adopting cloud computing in the public sector: Implementation challenges

- Lack of awareness about cloud across various government departments at local, central and state levels
- Lack of well-defined cloud strategy and roadmap
- Data privacy and security concerns
- Legal compliance issues
- Legacy systems
- Computer literacy

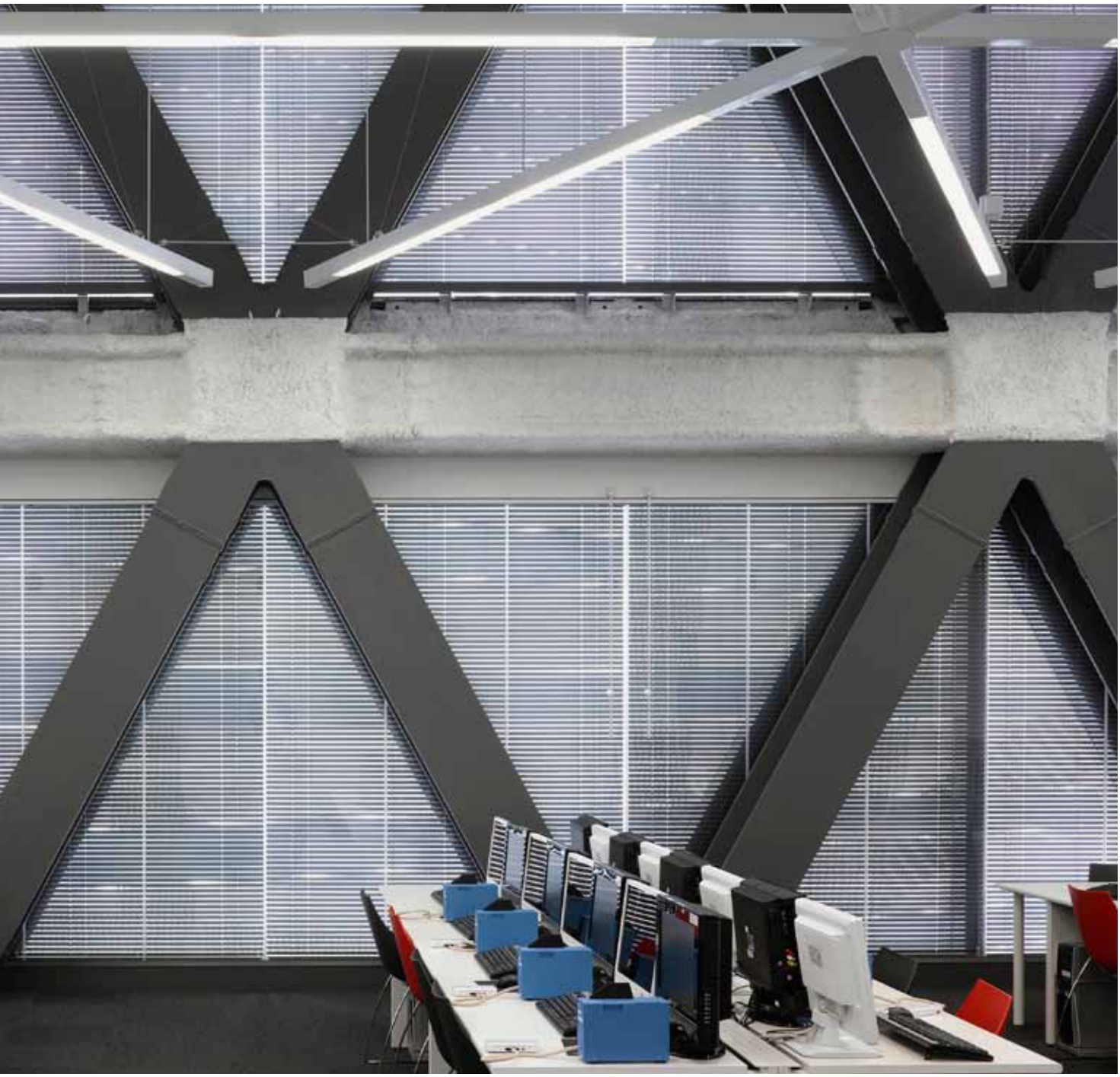
According to the Global State of Information Security Survey 2010, following are the primary concerns facing governments when they move to a cloud computing environment:

- Lack of ability to enforce security policies as a cloud provider
- Inadequate training and IT auditing
- Questionable privileged access control at the provider site
- Difficult data recovery
- Proximity of one company's data to that of another company
- Inadequate ability to audit the provider
- Transparency and equity of pay-as-you go billing model[4]

Chapter 05

Conclusion

During external and internal competitive



Notes

About CII

The Confederation of Indian Industry (CII) works to create and sustain an environment conducive to the growth of industry in India, partnering industry and government alike through advisory and consultative processes.

CII is a non-government, not-for-profit, industry led and industry managed organization, playing a proactive role in India's development process. Founded over 116 years ago, it is India's premier business association, with a direct membership of over 8100 organizations from the private as well as public sectors, including SMEs and MNCs, and an indirect membership of over 90,000 companies from around 400 national and regional sectoral associations.

CII catalyses change by working closely with government on policy issues, enhancing efficiency, competitiveness and expanding business opportunities for industry through a range of specialized services and global linkages. It also provides a platform for sectoral consensus building and networking. Major emphasis is laid on projecting a positive image of business, assisting industry to identify and execute corporate citizenship programmes. Partnerships with over 120 NGOs across the country carry forward our initiatives in integrated and inclusive development, which include health, education, livelihood, diversity management, skill development and water, to name a few.

CII has taken up the agenda of "Business for Livelihood" for the year 2011-12. This converges the fundamental themes of spreading growth to disadvantaged sections of society, building skills for meeting emerging economic compulsions, and fostering a climate of good governance. In line with this, CII is placing increased focus on Affirmative Action, Skills Development and Governance during the year.

With 64 offices and 7 Centres of Excellence in India, and 7 overseas offices in Australia, China, France, Singapore, South Africa, UK, and USA, as well as institutional partnerships with 223 counterpart organizations in 90 countries, CII serves as a reference point for Indian industry and the international business community.

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In India, PwC (www.pwc.com/India) offers a comprehensive portfolio of Advisory and Tax & Regulatory services; each, in turn, presents a basket of finely defined deliverables. Network firms of PwC in India also provide services in Assurance as per the relevant rules and regulations in India.

Providing organisations with the advice they need, wherever they may be located, our highly qualified, experienced professionals, who have sound knowledge of the Indian business environment, listen to different points of view to help organisations solve their business issues and identify and maximise the opportunities they seek. Our industry specialisation allows us to help co-create solutions with our clients for their sector of interest.

We are located in these cities: Ahmedabad, Bangalore, Bhubaneshwar, Chennai, Delhi NCR, Hyderabad, Kolkata, Mumbai and Pune.

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