Confederation of Indian Industry

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Cloud computing discussion paper for the education, automotive and IT/ITeS sector

CII Pune: IT and ITeS Panel

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Industry speak

Pravin Kulkarni
Convenor, CII, Pune Panel on IT and ITeS
VP and DC Head, Infosys Ltd

"If India needs to achieve its full growth potential, various sectors such as education, manufacturing particularly automotive and IT/ITeS need to adopt latest technology options such as cloud computing. Adoption of cloud-based IT solutions will allow SME players in these sectors to compete with large competitors globally, reduce cost, improve operational efficiency, stay agile and develop flexible business models to address growth challenges facing these three key sectors. The growth potential over the next 10 years for these sectors is enormous; both within India and the global market. With this discussion paper, we hope to better acquaint our members and nudge them to adopt cloud technology."

Dr. Arvind Tilak
Co-convenor, CII Pune Panel on IT and ITeS
Joint CEO, Ascent Informatics (I) Pvt Ltd

"IT on tap will transform many models and the way we conduct daily business, social and personal transactions. Internet of things (IoT), connected devices and ever increasing automation will mean growing the demand for IT infrastructure and bandwidth. Cloud platforms and solutions will be useful in delivering such services. Biggest advantages will come in the form of lowered costs and the ability to adjust costs as per business cycles and changing requirements. However, we do not visualise cloud platforms creating similar traction in the industrial automation domain. There is strong business case for adoption of cloud platform in this particular domain to make manufacturing more competitive. Cloud technology is bound to be the future of business ."

Narendra Barhate
SME representative, CII, Pune Panel on IT andITeS
MD and CEO, Seed Infotech Ltd

"All types of organisations are set to dramatically transform by adopting new technology-enabled options such as social media, mobile computing, analytics and cloud computing. It is time for stakeholders such as ourselves to gear up and get ready to keep pace with such transformational times. If we do not align ourselves as expected, there is a possibility that some business models of today will be obsolete in the near future."

Arnab Basu
Executive Director and Technology Consulting Leader
PricewaterhouseCoopers Pvt. Ltd.

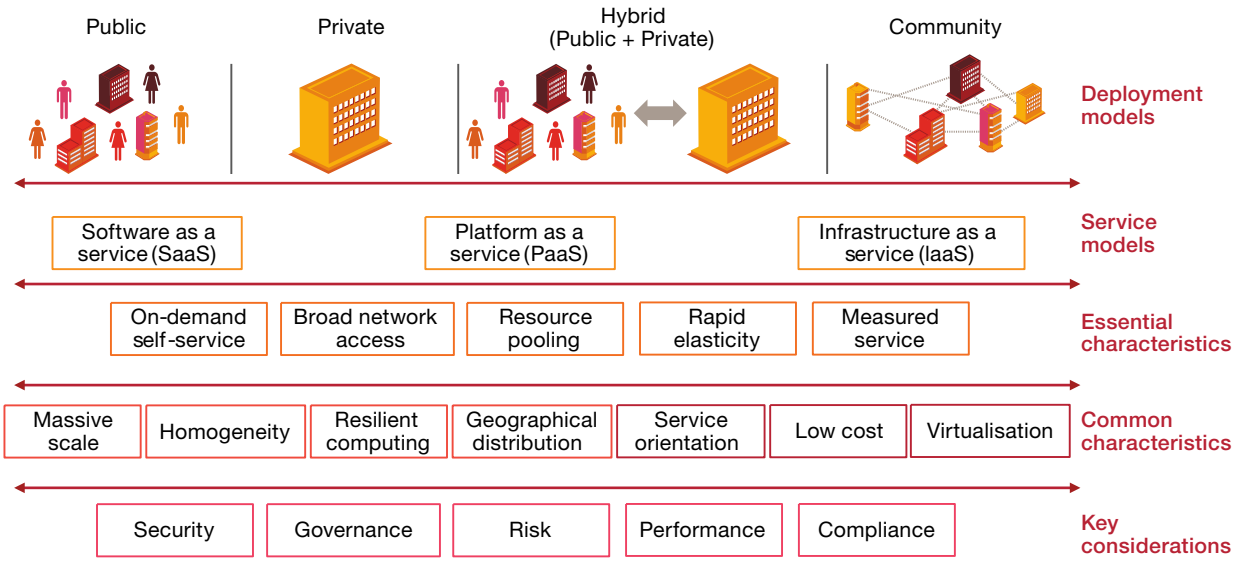
"SMEs play a pivotal role in the growth of the country's economy. The contribution of this sector to India's GDP has been growing consistently and is higher than the GDP growth rate. However, it is also facing several challenges such as sub-optimal scale of operation, technological obsolescence, supply chain inefficiencies, increasing domestic and global competition, fund shortages, turbulent and uncertain market conditions, etc. To survive in such conditions and compete with bigger players, innovation will be indispensable. Adoption of emerging technologies such as cloud computing can help fuel growth, foster innovation and provide SMEs with a level playing field."

Cloud computing: Overview[1]

Potential benefits for companies in adopting cloud computing over internal IT based resources include agility, location independence, scalability and reliability. Since companies are not required to build and maintain IT infrastructure, provisioning of cloud-based resources according to business demands allows them to be more agile. The on-demand scalability of cloud means such organisations are now no longer required to engineer their systems for peak load levels or maintain systems that record only 10 to 20% of usage in non-peak hours. Additionally, overall costs are greatly reduced thus lowering entry barriers for SMEs. The location independence feature of cloud, allows companies to access systems using a web browser without space and time constraints, from an internet-friendly device of their choice. Cloud also allows companies to enhance data security by centralising it and to improve reliability through the use of multiple redundant sites.

What is cloud computing

The National Institute of Standards and Technology (NIST) defines cloud computing as a model that helps enable ubiquitous, convenient, on-demand network access to a shared pool of configurable computing resources (eg, networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction. This cloud model promotes availability and is composed of five essential characteristics, three service models, and four deployment models.



Cloud characteristics

- **On-demand self-service:** A consumer can unilaterally obtain computing capabilities, such as server time and network storage, as needed automatically without requiring human interaction with each service provider.
- **Broad network access:** Cloud capabilities are available over a network and can be accessed through standard mechanisms that promote use by (multiple) client platforms (e.g., mobile phones, laptops, and personal digital assistants (PDAs)).
- **Resource pooling:** One of the great strengths of cloud computing is that the provider is able to pool computing resources, such as storage, processing, memory, network bandwidth, and virtual machines, to serve multiple consumers with different physical and virtual resources dynamically assigned and reassigned according to the consumer demand. The subscriber generally has no control over or knowledge of the exact location of the provided resources.
- **Rapid elasticity:** IT capabilities can be rapidly and elastically provisioned, in some cases automatically, according to the scale required. To the consumer, the capabilities available often appear to be unlimited and can be purchased in any quantity at any time.
- **Measured service:** Cloud systems automatically control and optimise resource use by filtering service appropriately by its type. Resource use is monitored, controlled, and reported, providing transparency for both the provider and consumer of the service.

[1] *Mell and Grance, The NIST Definition of Cloud Computing, National Institute of Standards and Technology Special Publication No. 800-145 (January 2011).*

Service models

Software as a service (SaaS): This model allows the consumer to use provider's applications running on a cloud infrastructure. Applications can be accessed from various client devices through a thin client interface such as web-based e-mail. The consumer does not manage or control underlying cloud infrastructure, including network, servers, operating systems, storage, or even individual application capabilities, with the possible exception of limited user-specific application configuration settings.

- **Platform as a service (PaaS):** PaaS allows the consumer to deploy onto the cloud infrastructure consumer-created or acquired applications created using programming languages and tools supported by the provider. The consumer does not manage or control the underlying cloud infrastructure, including network, servers, operating systems, or storage, but has control over the deployed applications and possibly application hosting environment configurations.
- **Infrastructure as a service (IaaS):** This model allows the consumer to obtain processing, storage, networks, and other fundamental computing resources and be able to deploy and run a range of software. The consumer does not manage or control the underlying cloud infrastructure but controls operating systems, storage and deployed applications and may have limited control of select networking components (eg, host firewalls).

Choosing an infrastructure

- **Private cloud:** Operated solely for an organisation, a private cloud may be managed by the organisation or a third party and may exist on or off the premises.
- **Public cloud:** The infrastructure is made available to the general public or a large industry group and owned by an organisation selling cloud services.
- **Community cloud:** A community cloud is shared by several organisations and supports a specific community that has shared concerns (e.g., mission, security requirements, policy, and compliance considerations). It may be managed by the organisations or a third party and may exist on or off premises. For example, a state government may set-up a community cloud infrastructure for all its separate organisations to pool resources.
- **Hybrid cloud:** This infrastructure combines two or more clouds (private, community, or public) that remain unique entities but are bound together by standardised or proprietary technology that enables data and application portability (eg, cloud bursting, or a dynamic redistribution of resources between clouds to handle the demand surge and balance loads).

The three cloud service models appeal to distinct user groups. While enterprises that want complete control over data will look to migrate towards the IaaS model, programmers and developers will focus on the PaaS model. On the other hand, SMEs or business units looking for low-cost alternatives to traditional software and infrastructure will focus both on the IaaS and SaaS models.

Globally, cost reduction seems to be the major driver for cloud adoption followed by increased productivity and innovation. While, 25% of the companies worldwide feel that the adoption of cloud helps reduce cost, 20% feel that cloud adoption will fuel innovation and increase productivity.[2]

According to the results of our 15th Annual CEO Survey, 53% of CEOs say that lack of the right skills is their biggest talent challenge and 75% of them say they will change their strategies for managing people and talent. Cloud computing being a new technology, it is critical for companies to educate the relevant stakeholders within their organisations about the benefits of cloud adoption. Companies will also have to address the need for skilled manpower, to implement and use this technology.

As more companies consider the use of clouds, one of their first decisions is whether to use a private or a public cloud or a hybrid. Indian companies are favoring private over public cloud. Twenty-six percent companies worldwide are presently investing in public cloud applications, 20% in public cloud and 38% in private cloud infrastructure.

One of the major advantages of a private cloud is its greater security via dedicated resources under the control of one user. Private clouds also offer the highest level of customisation as per the company's needs. However, the downside is increased cost over public cloud options. Its greatest advantage includes scalability and lower costs. However, because it is a form of shared assets, public cloud providers are able to offer minimal customisation. In addition, security of the public cloud depends on the provider. Hence, it is advisable that the reliability of any public cloud provider must be evaluated thoroughly.

[2] *PwC's 5th Digital IQ Survey*

Education sector

The emergence of the automobile sector and the exponential growth of the IT sector in Pune have contributed substantially towards the growth of the city. This has augured well for the education sector, providing ample job opportunities. Currently with nine universities and more than 150 institutes of higher education, Pune is one of the strongest education hubs in the country. Among educational institutions that are considered among the best in India, Pune boasts of the University of Pune, Engineering College of Pune and BJ Medical College.

Overview

Over the last decade, the education industry in India has grown significantly. The education space is by far the largest capitalised with government spending amounting to 30 billion USD and private spending to 50 billion USD[3]. In line with this, India has proposed a 12.3% increase of budget for education starting this fiscal year, with greater stress on school and vocational education. Also, 100 crore INR has been budgeted for establishing virtual classrooms by leveraging technology to benefit the population residing in remote areas[4]. However, increased spending needs to be accompanied by higher penetration of education to remote villages with increase in the quality and learning amongst students.

The expected market size for the Indian education sector in FY 2015 is 602,410 crore INR from 341,180 crore INR in FY 2012. This demand is primarily due to the expected strong demand for quality education. At present the higher education system comprises of about 700 universities and over 35,500 colleges[5]. Favoured destinations for higher education in the country include places such as Bengaluru, Pune, Delhi and Mumbai.

Challenges

- The course curriculum in most institutes is not updated regularly in line with global developments. Reach of quality education in remote villages has traditionally been low. Lack of internet presence in such areas has been a bottleneck.
- Inflating cost of education has led to layoffs of teaching staff and increasing class size thus increasing the student to teacher ratio to unimaginable levels. Additionally, , there is dearth of qualified teachers in the country.
- Teachers and educational institutions have not been technology savvy traditionally; hence the adoption of new technologies has been slow.

Cloud in the education sector

With the rapid advancement of technology and the development of emerging technologies such as cloud computing, the issues of reach and quality are addressed by enabling low cost implementation of IT tools.

Cloud enables education institutions to focus on its core activities and ensure smooth operations and improving the quality of the teaching course content. The educational institutions now have an option to leverage many SaaS, PaaS and IaaS based offerings in the market without the need to invest in procurement and maintenance of infrastructure.

Remote classrooms enabled by cloud will help in running multiple classrooms through a small group of teachers and will help overcome the problem of lack of skilled teachers. In addition, it will also lead to standardisation of course content and education delivery methods.

The India Vision 2020 document, by the Planning Commission of India, lays a huge emphasis on higher education. Cloud can play a massive role in delivering higher education by being an innovative platform for classroom lectures, using streaming on the web.

Provided that cloud-enabled technologies can overcome student data privacy-related concerns and if the network bandwidth becomes available at every doorstep, cloud can lay down a solid foundation for a transformational journey of the education system in India.

Benefits of cloud adoption

- **Standardisation of content:** Courses delivered over cloud through a central location will lead to a standard content delivery to multiple remote virtual classrooms.
- **Collaboration:** Students and teachers can collaborate on studies, projects using collaboration solutions.
- **Agility to rollout new courses:** Cloud-enabled technologies ensure rapid access to infrastructure services thereby rendering agility in rolling out newer products.
- **Improved administrative efficiency of schools and universities:** Teachers and the administrative staff can focus on the core functions of the institution instead of futile efforts on IT infrastructure and the applications set-up.

[3] *India: Higher Education sector, Opportunities for Foreign Universities, PwC India report*

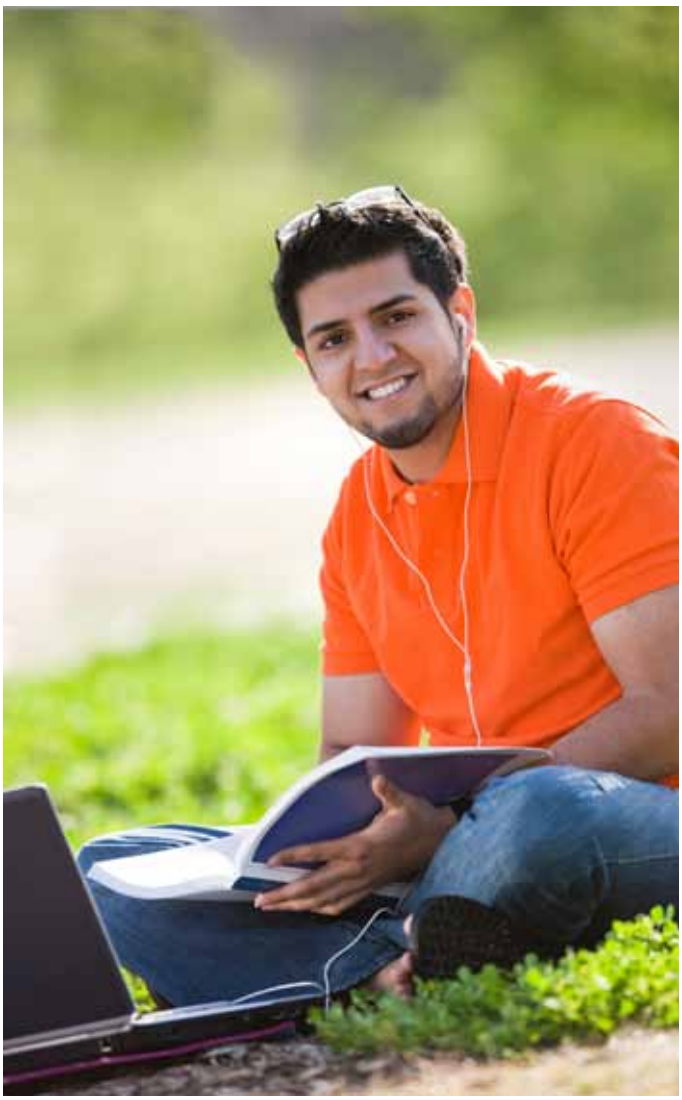
[4] *http://articles.economictimes.indiatimes.com/2014-07-10/news/51300638_1_education-sector-school-education-training-programme*

[5] *Education Sector in India Snapshot, IBEF, June 2014*

Key considerations

As barriers to technology adoption reduce and education industry looks to leverage technology to drive business advantage, following are the key questions to consider:

- Is there a business case for cloud?
- Which cloud service or deployment model is the most appropriate for my organisation?
- How can one profile, prioritise and architect services to migrate to cloud?
- How can cloud help me as I plan for a technology refresh or data center expansion?
- How should I create my vendor selection process and structure contracts and SLAs?



- **Higher quality of education delivered anytime, anywhere:** Courses with updated content can be delivered consistently across all locations.
- **Lower cost of education:** Leveraging on limited staff or teachers, a university can reach out to numerous students all across the globe, hence limiting the costs of education delivery.
- **Scalability:** Scalable systems on cloud to provision big data platform for research and analysis.

Areas where cloud computing can have an impact

Category	Description
Classroom technologies	
Interactive engagement	• Centralised faculty assisted by local teachers • Students interaction with teachers, delivering lectures, presentations or response to polls and questions
Collaboration	• Students and teachers collaborating on projects by creating and sharing content • Communication by messaging or video
Mobility	• Extend classrooms and labs with mobile devices such as smartphones, • Tablets virtual desktop technologies facilitate remote access
Real-time assessment	• Adapting lessons based on observations of student interactions, notes taken • Content can be highlighted, annotated or updated via electronic media
Administrative technologies	
CRM	• Student life-cycle management enables better management of recruitment and admissions, student financial aid and billing, student records and performance, transfers and alumni relationship
ERP	• Educational institutions manage internal and external resources including physical assets, financial and human resources
Business intelligence	• Teachers and students use analytics in classrooms; evaluating and establishing curriculum
Smart campus	• Universities appear to be cities in themselves • The CIO is responsible for public safety, transportation, energy and water management, building maintenance, student services

Automotive sector

Overview

Accounting for around 22% of India's manufacturing gross domestic product, the automotive sector currently is one of the country's largest sector in manufacturing. This sector comprises of various segments such as passenger cars, two-wheelers, three-wheelers and commercial vehicles as well as ancillary units. It is currently the seventh largest in the world, with an average annual production of 17.5 million vehicles, of which 2.3 million are exported[6]. Cautious growth is expected in the next few years primarily due to factors such as improved affordability, rising incomes and untapped markets. This is likely to create additional opportunities for Indian players in this sector.

Even with all the growth forecast, the sector is also being plagued by global economic volatility, deficits, debts, rising raw material and energy costs. Players are struggling to maintain a fine balance of innovation by putting in efforts to increase the efficiency of traditional combustion engines while researching on electric and fuel-cell powered vehicles. The ever changing demand of customer experience as well as behaviour is pushing the original equipment manufacturers (OEMs) and suppliers to keep pace with the technological changes. This has also led to the transition of this industry from being product-centric to co-creation of products and services.

Pune: A top automobile hub

The proliferation of automobile manufacturing units as well as component suppliers that populate the landscape of outer Pune have increasingly earned it the sobriquet of being the 'Detroit of India', and it continues to elicit interest and attract investments from investors. With the Chakan-Talegaon belt in the region considered as one of the most dense automotive clusters in the world, Pune has emerged as a leading centre for the automotive sector in India as well as globally. Heavyweights from the Indian automotive industry such as Tata Motors and Bajaj Auto had entered the city in the 1960s. In this millennium, global automotive giants such as General Motors, Volkswagen and Mahindra & Mahindra have setup their plants in Pune.

Today, the Pune automobile landscape includes the 'who's who' of Indian as well as global automobile majors. Tata Motors is the largest followed by Bajaj Auto, Force Motors, Mahindra Two-Wheelers, Mercedes-Benz, GM, JCB construction equipment, Volkswagen, M&M, Premier Motors and Fiat.

Source: The Hindu

Challenges

Some of the challenges faced by automakers include the following[7]:

- Labour costs of workforce and drop in industrial productivity due to lack of capital investment, ambiguous and obsolete labour laws along with increase in input material costs
- Product quality issues due to faulty component parts, etc
- Lack of R&D improvisations in existing and future products
- Community infrastructure readiness challenges such as roads, ports, power, etc
- Higher inflation, increase in fuel prices and rising interest rates

Cloud in the automotive sector

Automotive executives are most ambitious about technology and customer experience innovation. Within this innovation bandwagon, the key to success is the adoption of emerging technologies such as social, mobile, analytics (big data) and cloud computing (SMAC).

Like most manufacturing companies, supply chain is a critical aspect for most auto manufacturers. These organisations rely on IT in order to ensure smooth operations of their supply chain. Cloud computing can be an enabler towards an agile, lean as well as flexible supply chain, which can adapt to the changing market, consumer and logistic demands. In particular, cloud computing can help auto manufacturers to cost-effectively optimise their supply chain that is required to support future growth.

Before an organisation embarks on a cloud journey, it needs to address the following key questions:

- How do we transform IT into a strategic unit? How does cloud enable the business to become agile and scalable?
- How do we prioritise cloud migration efforts?
- How do we assess the readiness of applications landscape for cloud migration?
- What operational metrics need to be measured and reported?

Based on the above set of questions, a sound cloud adoption strategy can be formulated, along with identified business transformation opportunities.

Benefits of cloud adoption

Some key benefits offered by cloud computing which the automotive industry can leverage include the following:

- Subscription-based pricing model which ensures that organisations pay only for the capacity that they require and for the time they need.
- Ability to scale IT capacity smoothly in response to the changing business needs or market conditions
- Optimisation of the supply chain in order to make it more leaner and adaptable to the changing business demands, thus in turn improving production, customer service as well as customer satisfaction
- Accelerate development and delivery of innovative products and services
- Reduce cost while shifting spends and efforts from maintenance to strategic investments

Areas where cloud computing can have an impact

Cloud-based infrastructure	• Reduce data centre and energy footprint by using virtualisation. Also, customers can subscribe to cloud based services from a public cloud provider or implement a private cloud • As companies shift from traditional or legacy systems to a new IT platform, they would need to manage hybrid architecture (that is, a combination of on-premise and private cloud infrastructure along with public cloud infrastructure and services)
Design and simulations	• Computer-based design and simulations generate huge amount of data. As this data grows in volume, provisioning of low-cost storage options can be a challenge. Cloud-based storage can provide a cost-effective solution • Cloud infrastructure can be leveraged for analysis of huge as well as complex data sets using big data analytics techniques such as Hadoop, etc
Test and development	• Often the test and development environments are unutilised but are an integral component for product innovation. Maintaining these can be expensive and result in unutilised resources. Cloud-based test and development environments can provide a cost-effective solution, which can be torn down after the tests are over
Collaboration	• Cloud-based collaboration services can be used to foster collaboration and information sharing with the partner network (including dealers, OEMs, VARs, etc) to improve the supply chain efficiency in procurement, demand planning, logistics, compliance, tracking, new product launch, etc • Usage of mobile devices such as smartphones, tablets, etc can also result in better efficiency
Analytics	• Cloud-based analytics can provide a cost-effective option to evaluate and track complex key performance indicators. Such improved visibility into specific supply chain events can improve the robustness of the supply chain and provide it with the much needed agility
Customer relation management (CRM)	• Players in the sector can subscribe to cloud-based CRM solutions
Enterprise resource planning (ERP)	• Players in the sector can subscribe to cloud-based ERP solutions or migrate the existing on-premise ERP environments

IT and ITeS sector

Changing equations

For long, India's IT/ITeS sector is largely been viewed as the back office of the world. Over the years, the business model has closely been aligned to exports. As a result, the industry has faced the brunt of the economic shake-up that has redefined the order among nations. However, the scenario is changing and the Indian IT and ITeS industry has steadily evolved from executing projects at the lowest end of the value chain to executing large scale business transformations.

Also, with the advanced economies growing at a sluggish pace, emerging as well as developing economies are seeing the most growth opportunity. As a result, the focus on exports is reducing for Indian IT and ITeS companies, and we are now seeing increased competition in the domestic space, especially for those who had hitherto not focused on the Indian domestic market.

With the revenue of the sector growing from 1.2% of the country's overall GDP in 1997-98[8] to 8.1%[9] in 2013, Indian IT companies have today carved a niche for themselves in the global market. The sector has also emerged as the leader in terms of both value as well as volume of investments with an investment of 908 million USD going into 43 deals in the first quarter of 2014. The value and volume of deals in this sector in Q1 '14 constitute around 38 and 43% of the total deal value and volume, respectively[10].

Sector overview

The sector has recorded a CAGR of 12% since 2010 to reach 118 billion USD in FY '14[11]. India's IT and ITeS sector can be broadly classified into four main components – IT services, business process management (BPM), software products, engineering services and hardware.

According to the National Association of Software and Services Companies (NASSCOM), while hardware dominates the domestic market, IT services are the largest contributor in the sector, which is primarily driven by IT consulting, information systems outsourcing and software testing. While BPM services experienced healthy growth last year, software products growth was driven mainly by demand for vertical-specific solutions and social, mobile, analytics and cloud (SMAC) based solutions. Major contributors to the revenue from verticals include manufacturing, banking and financial services, telecom and government. The US with a 61% share of the total IT export market remains the largest contributor to the sector's revenue followed by Europe.

Pune: Leading IT destination

With the coming of the information technology age, the last decade saw Pune venture into newer pastures. The Leading Industry associations have set up a software technology park wherein several IT businesses were incubated. Presently, almost every significant name on the national and international IT map has set up a campus in the city. Wipro, Tech Mahindra, Cognizant, IBM, Mphasis, Veritas, BMC Software, to name a few, have set up large campuses, and a large fraction of India's IT revenue is generated from the Pune region. A significant part of the success is also contributed by a multitude of small IT as well as ITES companies located within the city.

Source: The Hindu Business Line

Small and medium providers

The small and medium providers (SMPs) in the IT and ITeS sector India are integral to the growth engine of the industry in particular and the Indian economy in general. This trend is expected to continue in the future with the emergence of new opportunities, especially around SMAC solutions. Given the lower cost structures, flexible business model and agility compared to the larger players, small and medium IT and ITeS providers in India will continue to experience growth. However, SMPs will need to navigate through key challenges in order to tap into the right opportunities such as sustainability amidst competition from the larger players, both domestic and global, market identification, talent retention, alliance creation, exploring various financing options, improving operational efficiency and retain and mine customer opportunities.

Turning challenges into strengths

With the proliferation of emerging technologies, Indian SMPs within the IT and ITeS sector have a great opportunity to turn the challenges that they currently face into strategic advantages and removing the barriers to entry. For the larger players, their IT structure's ability to respond to just-in-time business requirements is hindered by outdated approaches and inflexible IT architectures that are not structured to cope with the rapidly changing business landscapes. Aspects such as legacy IT models, rigid organisational structures and slow governance process stifle agility and innovation – both of which are key requirements for businesses today.

[8] *Indian IT/ITeS Industry, Evolving Business Models for Sustained Growth, CII and PwC*

[9] *National Association of Software and Services Companies (NASSCOM)*

[10] *MoneyTree TM India Report, Q1 2014, PricewaterhouseCoopers India Pvt Ltd*

[11] *National Association of Software and Services Companies (NASSCOM)*

Industry profile

- *It has a share of 8.1% in the national GDP (2013)*
- *Largest private sector employer employing 3.1 million people*
- *Revenues estimated at 118 billion USD in FY '14*
- *Five-year CAGR at 12%*
- *Export revenues grew at a rate of approximately 13% year-on-year (YoY) to reach 86.4 billion USD in FY '14, the highest in the last five years*
- *IT services as the largest (54%) contributor among the segments*
- *Domestic revenues at 31.6 billion USD (estimated) for FY '14*

Source: NASSCOM

Since most start-ups or SMPs do not have the burden of 'big IT', they can leverage new technologies to build agile technology capabilities needed to tackle the business challenges of today and tomorrow. This can radically change the dynamics of the game by allowing Indian SMPs in the IT and ITeS sector to adopt an 'outside-in' approach which thoughtfully blends innovation with the organisation's core capabilities. For example, today a start-up or an SMP does not need to invest in costly hardware. Instead, it can subscribe to cloud services for a minimal amount for an hour. Added to the cost advantages are the features provided by the prominent cloud providers such as high availability, reliability, guaranteed uptime, durability of storage, etc. Similarly, other areas where cloud computing can have significant impact includes cloud-based development or test environments, email and collaboration services and platform services. Such a model is in turn creating a level playing field for the Indian IT and ITeS SMPs to compete with global or domestic giants.

Key considerations

As barriers to technology adoption fall and Indian SMPs in the IT and ITeS sector look to leverage technology to drive business advantage, following are the key questions to consider:

- *How do we transform IT?*
- *How can we scale operations with changing business requirements?*
- *What new services can help us engage with customers better?*
- *How does technology enable my business to become more agile and scalable?*
- *How should I create my vendor selection process and structure contracts and SLAs?*

Today's approach will define tomorrow's success

Nonetheless, the usage of technology must be approached with caution and strenuous assessment of the associated security, risk and compliance issues. Successful IT organisations of the future will be those who will able to accurately evaluate technologies and select the right ones that will solve the most critical business problems. Those who jump on the 'anything technology' bandwagon will quickly become mired in expensive gadgetry that only creates more complexity[12].

While technology has the potential to transform the Indian IT and ITeS sector, however, like any transformation, a successful strategy requires a new mindset and a strong focus on collaboration, innovation and an 'outside-in' thinking approach with a customer-centric point of view13.

[12] *Reinventing Information Technology in the Digital Enterprise, January 2014, PwC*
[13] *PwC's 5th Annual Digital IQ Survey*

Industry case studies of cloud adoption

A selected list of PwC India's successful cloud citations has been presented below.

Global education services provider based in India	Cloud adoption assessment with formulation of a multi-year roadmap and strategy in order to address its business challenges and drive business growth across universities, distance learning centres and corporate training centres
Leading publishing company in India	Assessment, design, implementation and migration of SAP and BI production environments to Amazon Web Services (AWS) virtual private cloud (VPC)
Leading datacentre hosting services provider in the US	Service-oriented operations organisation to support new cloud service offerings
World's leading product and technology company	Develop a strategy and a three-year roadmap to migrate to private cloud
Technology consulting practice of PwC Australia	Design and implementation of email and collaboration solution on AWS cloud
Leading security software corporation, the US	Architecture and design of private and hybrid cloud environment
Leading system integrator application service provider, Oman	Software as a service (SaaS) readiness assessment
Large education services provider in India	Cloud foundation initiatives, implementation of SAP disaster recovery system on the cloud and design of learning management system on the cloud

About the Confederation of Indian Industry

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

CII is a non-government, not-for-profit, industry-led and industry-managed organisation, playing a proactive role in India's development process. Founded in 1895, India's premier business association has over 7100 members, from the private as well as public sectors, including SMEs and MNCs, and an indirect membership of over 90,000 enterprises from around 257 national and regional sectoral industry bodies.

CII charts change by working closely with government on policy issues, interfacing with thought leaders, and enhancing efficiency, competitiveness and business opportunities for industry through a range of specialised services and strategic global linkages. It also provides a platform for consensus-building and networking on key issues.

Extending its agenda beyond business, CII assists industry to identify and execute corporate citizenship programmes. Partnerships with civil society organisations carry forward corporate initiatives for integrated and inclusive development across diverse domains including affirmative action, healthcare, education, livelihood, diversity management, skill development, empowerment of women, and water, to name a few.

The CII Theme for 2013-14 is **Accelerating Economic Growth through Innovation, Transformation, Inclusion and Governance**. Towards this, CII advocacy will accord top priority to stepping up the growth trajectory of the nation, while retaining a strong focus on accountability, transparency and measurement in the corporate and social eco-system, building a knowledge economy, and broad-basing development to help deliver the fruits of progress to all.

With 63 offices, including nine centres of excellence, in India, and seven overseas offices in Australia, China, Egypt, France, Singapore, UK, and USA, as well as institutional partnerships with 224 counterpart organisations in 90 countries, CII serves as a reference point for Indian industry and the international business community.

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