



# INFORMATION TECHNOLOGY ADAPTATION IN INDIAN SMALL AND MEDIUM SIZED ENTERPRISES: OPPORTUNITIES AND CHALLENGES AHEAD

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**ABSTRACT**

The purpose of the study is to analyze the opportunities and the challenges associated with the adoption of Information technology in the Indian SMEs. The significant usage of Information Technology in the SME sector and the factors that influence the business are discussed. SME industry in India has shown substantial growth over the past few years. The implementation of new technologies tends to offer better opportunities to the companies particularly for SME sector in India. However, there are a few challenges associated with technology adaptation that needs attention. This research is focused on improved business quality and responsiveness towards market opportunities while using the latest technologies available. This study is based on a review of research journals and articles including news magazines concerning current SME market situation in India. The current market scenario of Indian SMEs, as well as several policy interventions and new trends in the market were discussed.

**KEYWORDS**

small and medium sized enterprises, information technology, information communication technology, cloud computing, National Association of Software and Services Companies, National Institute of Standards and Technology.

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## Introduction

It is considered SMEs are the growth engines of the economy worldwide as they support the social and economic development of the country. SMEs are encouraged all over the globe since they help creating new opportunities and contribute to economy by generating high revenue. They provide healthy competition between entrepreneurs and encourage adopting new strategies and measures for producing better products and services. SMEs also contribute to industrial output and productivity. Small and medium sized enterprises in India however has always played a vital role in growing Indian economy. According to the governments estimation the SME sector contributes 38 percent of its share to

Indian GDP and is helpful in balancing the economy of India. Indian SMEs provide huge employment opportunities and also contributes for industrial development. The SME sector is capable to spread its industrial growth and can contribute to the development of the country [1], [2]. SMEs operate in various sectors including manufacturing, service industry, food processing, packaging, chemicals and Pharmaceuticals, sports goods, leather goods, plastic products, Textiles, Electricals & Electronics, Information Technology etc. After agricultural sector, SMEs are considered as the second biggest employment generator across the country. It is estimated that SMEs contributes 45% towards manufacturing output and about 40% towards direct and indirect exports. According to reports generated by Ministry

of Micro, Small and Medium Enterprises, there are more than 48 million SMEs currently in India and the SME sector has emerged as one of the fastest growing sectors of the Indian industries. The small business sector has become more important as they emerge as a dominant force impacting the growth of national economies [3]. The industrialization of the backward and rural areas has been only possible due to successful setups of SMEs in rural parts. Thereby providing a path to eradicate or lessen the unemployment problem in rural India. Since SMEs have the potential to provide wage employment to Indian labor force and also for skilled people it attracts attention from both the government as well as private investors. From 2016 to 2017 the start-up base in India was estimated to cross 7% growth. India is one of the fastest-growing and third largest start-up ecosystems in the world, after US and UK according to the NASSCOM report [4].

SMEs in India are also referred to as Micro, Small & Medium Enterprises (MSMEs). The MSME have two major classes. They are manufacturing enterprises and the service enterprises. This can be easily explained by the classification based on the investment made. However, Europe-India SME business council (EISBC) defines the investment range in plant & machinery for Manufacturing Enterprises and the Service Enterprises as given in the following tables.

Table 1  
EISBC investment range into Plant & Machinery in Manufacturing Enterprises [5].

Manufacturing Enterprises – Investment in Plant & Machinery		
Description	INR (Indian Rupee)	USD(\$) (U.S Dollar)
Micro Enterprises	upto Rs. 25 Lakh	up to \$ 62,500
Small Enterprises	above Rs. 25 Lakh & upto Rs. 5 Crore	above \$ 62,500 & upto \$ 1.25 million
Medium Enterprises	above Rs. 5 Crore & upto Rs. 10 Crore	above \$ 1.25 million & upto \$ 2.5 million

Table 2  
EISBC investment range into equipment in Service Enterprises [5].

Service Enterprises – Investment in Equipments		
Description	INR (Indian Rupee)	USD(\$) (U.S Dollar)
Micro Enterprises	upto Rs. 10Lakh	upto \$ 25,000
Small Enterprises	above Rs. 10 Lakh & upto Rs. 2 Crore	above \$ 25,000 & upto \$ 0.5 million
Medium Enterprises	above Rs. 2 Crore & upto Rs. 5 Crore	above \$ 0.5 million & upto \$ 1.5 million

It is important to keep in mind that Information Technology adaptation in Indian SMEs took place overtime and SMEs has evolved in a gradual way. In the beginning phase of IT adoption in SMEs it was primarily the use of personal computers and some basic productivity tools. Later it has evolved into local and global connectivity due to advancement in IT communication tools such as broadband connections, Internet and mobile connectivity as well. Small business has been recognized as highly flexible and adaptable to change, be it environmental, operational or technological [6]. This phase has changed the perspective and dimensions of business to a great extent since it created the network between customers, suppliers and vendors. It allowed the SMEs to expand the reach of their business and helped in knowledge sharing, information sharing and the connectivity. In the later phase SMEs started using cloud-based technologies, Enterprise resource planning (ERP), social media and online tools and mobile based transactions which transformed the business into another level. Some of the IT tools which are now available in the market for SMEs include desktop computers, Internet, Office productivity software, smartphones, Internet enabled communication, Enterprise resource planning (ERP) software, social media pages, online portal for customers, mobile websites, cloud-based services.

## Challenges in Indian SMEs

Indian SMEs are considerably one of the biggest eco systems in the world which operates in different manufacturing and service sectors, however some of these sectors are facing challenges in terms of limited market access due to lack of enough financial support, marketing, logistic and sales support, and most importantly information and communication technology (ICT) deprived infrastructure. Keeping in mind that most of the SMEs are start-up firms by new entrepreneurs with less market awareness and limited accessibility to technological and financial support. Indian SMEs tend to depend on the traditional and non-technical systems. Some of the areas where SMEs are particularly facing challenges are

### Technology adaptation

One of the major reasons that manufacturing and service sectors of SME industry are still slow in some areas is that they are less adoptive to new technology specially Information and Communication Technology (ICT). More commonly conventional methods are still in practice in Indian SMEs. Due to the immense competition both at national and interna-

tional markets and rapidly changing market scenario due to the new accessible technologies in the market force SMEs to adopt improvement strategies and upgrade to technologically efficient methods. SMEs face greater risk in implementation of Information Technology than compared to large enterprises due to inadequate resources and insufficient knowledge of new technologies [7]. Technology adoption plays an important role in the areas such as marketing, managing inventories, supporting sales and services and in generating financial reports. Introducing new technology in to SMEs can give long lasting and positive results and can enhance the competitiveness of business. But the SME sector seems to be either less familiar with the benefits or willingly reluctant to adopt new technology due to its financial burden on the business. SMEs are not enough convinced with the idea of return on technology investment. So, cost of technology upgradation can be considered as one of the factors that prevent SMEs from implementing a successful technological change. Much attention from the government's side is needed towards technology up-gradation in SME sector especially through enabling credit offers and funding to purchase suitable machinery and technology equipment.

### **Inadequate Finance**

Lack of adequate access to finance can be considered as a major setback to SME industry in India. Some of the issues related to finance in SME sector are high interest rates that are charged by the Banks and their tight agreements towards commercial entrepreneurs. Obtaining loans is a challenge because bankers perceive lending to SMEs to be risky due to poor repayment records and low market credibility [8]. Most investors are not particularly the risk takers so they are less available for small business, so equity capital is less accessible to SMEs. Due to lack of financial awareness small business always suffer in the areas of marketing and procurement of raw materials. However, SMEs are less likely to adopt IT when its initial set-up cost is high [9]. Due to limited capital SMEs sometimes face challenges with limited resources resulting in poor business performance in terms of output products and services. And this can also affect the export markets with less profitable business. SMEs in India face problems in obtaining the financial capital necessary to become competitive and achieve economic growth [8]. Insufficient finance or capital is therefore a major obstacle in the growth of SME sector in India. It is therefore extremely necessary for the government to intervene and provide financial support for small business through various financial schemes and investment plans. Also, private

investors must show confidence in SMEs by supporting with capital investment.

### **Weak Infrastructure**

One of the basic problems that Indian SMEs are dealing with is lack of comprehensive infrastructure. This can be seen as a major drawback for the growth of SME sector in India. It has been noticed in the SMEs that decision making is centralized to a limited number of persons and there is limited long-term planning with less standard procedures, moreover there is a dependency on external expertise for implementation of information technology and services [10]. It is believed that there is still a section of SMEs that operate in an unorganized way due to lack of proper resources and modernized equipment. However, the percentage of such SMEs is still not clearly known. These SMEs definitely lack some of the basic facilities which makes them left behind in the competition with other stronger players in the market. Such SMEs also lack proper marketing platforms and doesn't gain enough exposure to market opportunities. Suitable measures are to be taken from government's side in order to uplift and improve the competitiveness of such SMEs and to enable them as better players in the market.

### **Insufficient skills**

Technology upgradation always comes with the challenge that essential and appropriate knowledge of newly introduced methods and techniques must also be simultaneously provided to the employees. SME sector still deals the challenge of unskilled workers. One of the reasons for this can be lack of proper knowledge sharing and training opportunities for the employees. Due to the fact that majority of SMEs operate in urban and rural areas, hiring skilled people is a little difficult task. SMEs is the only sector after agriculture which can help the unemployment problem in India but it needs to improve the quality of the jobs they provide by hiring skilled manpower. Skilled and talented man power is still the hunger of SMEs in India, more specifically technologically skilled people are the biggest demand of the SME market. It is therefore a challenge to hire right set of talent and skilled people who have enough knowledge about the current available technology and who are interested to update themselves according to the changing market requirements. On the other hand, factors such as internet experience determine whether the SMEs have enough knowledge in assessing the benefits and barriers of IT adoption [11]. Providing information and training opportunities to new entrepreneurs in areas such as sales

and marketing in the technologically advancing markets is a challenge for Indian government.

### **Opportunities by adopting information technology in SMEs**

Starting a new business on a small scale has become much easier and simpler than before due to the advancement of Information technology. Alberto and Fernando [12] argue that IT adaptation can improve the competitiveness for SMEs by using Internet technology and can provide many opportunities to compete with large enterprises. At the same time IT implementation in SMEs can reduce cost and increase productivity [13]. Due to the considerable internet penetration and the mobile technology spread throughout the country the perspective of doing business has much evolved. Consumers are now more inclined towards much easier and flexible business methods using latest information technology gadgets. Some of the other benefits that SMEs can gain by using information technology are improved capacity, effective marketing techniques, competitiveness in the market, operational flexibility, improved capacity of sales, increased mobility, etc. However, not all the SMEs are fully taking advantage of the market opportunities they have and perhaps many of them are simply unaware. Since SMEs are wide spread and they are working in different markets, they still have a major classification under manufacturing sector and service sector. So, both the sectors can have different opportunities than each other depending on the market space they operate. Considering technology adoption in Indian SMEs, information and communication technology (ICT) proved to be very efficient. However, they need better infrastructure to rely on. Many researches indicate that optimal usage of information communication technology in the firms can create new opportunities and can gain useful knowledge about the customers, and also it improves the product development cycle in an effective manner [14, 15]. Especially in last few years due to the extensive usage of information and communication technology (ICT), opportunities for SMEs has grown even further. Firms can use ICT for different, but compatible reasons such as to exchange information, to communicate information, and for purpose of automation of internal business processes [16]. SMEs that can afford dedicated networks and ICT tools can boost their business performance and can compete with the bigger enterprises which are already familiar with using latest technology. New methods are trending in to market rapidly which are more IT based. Entrepreneurs who are self-starters

of small businesses now have better opportunities in the market than earlier to incorporate the latest technology in their business and to achieve improved performance.

### **Digitalization in Indian SMEs**

In the rapidly changing world influenced by Information Technology, digitalization of business is highly recommendable. Digitalization is defined as “the economic and social transformation triggered by the massive adoption of digital technologies to generate, process, share and transact information” [17]. It will ease the business and creates new opportunities to expand the market. SMEs are not lagging behind in adopting digital marketing and selling techniques to enhance the business efficiency. Digital transformation of business plays an important role these days since online trading practices has grown immensely in recent years. Electronic payments practices are now much more common than it used to be in the recent years, while internet penetration is getting deeper including suburban and rural parts of India. The government of India has specially decided to implement “Digital MSME” scheme for the promotion of Information and Communication Technology (ICT) in the SME sector with a total budget of \$12.88 million USD during the year 2017–2018. Due to the increasing adaptability of mobile technology in the market with high capacity smartphones within the reach of common people, digital transformation of the business is being facilitated. The country is on its way to transform into “Digital India”, an initiative and campaign started by the government of India. Since SME industry is a valuable asset for Indian economy and for the infrastructure, SMEs are now competing for the digital transformation of the business.

### *Digital Marketing*

Marketing via e-mail service has also grown in SMEs since we all know that everyone is attached to their emails on daily basis. Using a mobile for online payment is one of the popular methods for customers. Marketing via SMS, MMS or through a mobile application is also growing since mobile phones are most commonly used in today’s world. Another form of marketing that has evolved recently is social media marketing (SMM) that typically involves social media platforms such as Facebook, Twitter, YouTube etc. for advertising and promoting a product or a service. SMEs can now take advantage of the growing social media attention among the individuals for attracting potential customers. Apart from this Content Marketing, Website Design, AdWords,

SEO are all part of digital marketing tools. SMEs are looking ahead for the modernization of their business for better competition in the market. Digital marketing in SMEs in this scenario plays a crucial role and offers better marketing opportunities.

### Digital sales

Digitalization in SMEs also improves the sales to a great extent. It is emerging as the key economic driver of recent time as it provides economic growth and helps in job creation [18]. With the advanced mobile technology, smartphones are very popular these days and mobile users are only growing in number than the traditional laptop users for accessing e-mails, websites and social media platforms. Business is more connected to a mobile device today. SMEs are now using digital selling techniques designed specially to attract mobile users in the market. The reach of social media on mobile devices can be seen as another factor that enables SMEs to focus more on mobile users for digital sales. The benefits of digital selling are huge because of its easy reach and communication with existing and potential customers. One of the digital selling methods include e-mail selling, where the customers are established connection on an email and allowed to pay and get an invoice via email. Content selling has also evolved as a digital selling technique used by sales department to enhance the sales efficiency. SMEs have a good opportunity via digital sales when adopted in a strategic manner. Digital selling is effective in reaching its potential and current customers right away saving time. It is one of the price effective tool that can successfully improve the volumes of sales. Digitalization is a better solution for effective marketing and sales technique with limited budget in SMEs.

### Cloud Computing Technology

Cloud Computing (CC) is an Internet based technology which is currently used in Indian SMEs as a part of Information Technology adaptation. This innovative technology helps SMEs to stay competitive and agile in the market. Cloud computing improves the business performance by using different cloud models depending on the business requirements, thereby improving the responsiveness towards market opportunities. According to the official National Institute of Standards and Technology (NIST) definition “cloud computing is a model for enabling ubiquitous, convenient, on-demand network access to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service

provider interaction” [19]. Cloud computing is very dynamic and critical to implement in SMEs which can transform business into digital version. SMEs that are adopted to this relatively new technology enjoys access to customized on-demand IT services via Internet. Cloud computing offers some of the useful services since it is generally hosted by a third-party Internet service model. Cloud computing is basically a set of services that provide Infrastructure resources using Internet and data storage is handled on a third-party server. It has three dimensions known as Software level service, Platform level service, Infrastructure service. It is available to the client’s on-demand and by pay on use basis. The physical structure (hardware and setup) of cloud computing is referred as “Cloud” whereas the applications used in cloud computing is known as “Software as a service”.

a) *Infrastructure as a service (IaaS)*: Basically, in this model the client is provided with a customized infrastructure in which the applications are arranged by the host which includes Operating systems, data storage and servers. The cloud subscriber however can update and fix the operating system in this model.

b) *Software as a service (SaaS)*: In this model a cloud computing subscriber is offered with a range of services which may include applications for productivity such as Google Docs, Social media applications such as Facebook, LinkedIn etc. including email services. The user can access the collective functionalities of the service through a web page including services which can collaborate with different functions of the business. For example, Salesforce.com

c) *Platform as a service (PaaS)*: This model provides the service subscriber with the tools related to programming language functionalities and algorithms to utilize in an environment designed and maintained by the service provider. It is basically to help build new applications. Some of the examples are Google application engine, and force.com

However, cloud deployment models are classified according to exclusive and non-exclusive type of access to cloud services by the clients, they are public cloud, private cloud, hybrid cloud and community clouds [20]. “Public cloud” is preferred by a lot of SMEs because of cost effective and easier to adopt. It is accessible to small businesses on demand and within the budget of most of the SMEs. This model allows to efficiently manage the business resources without relying too much on the physical infrastructure. The SMEs simply need to hire the services from a cloud provider over the Internet to get the simplified IT management services. Some of the benefits of public cloud adaptation into SMEs include they

are scalable, agile, reliable and dynamic which can adapt to the changing business requirements. It is designed to suit most of the common business needs and capacities. Whereas “Private cloud” is designed for mission critical business applications where organizations are much concerned about the data security and reliability. This model offers a dedicated service which is designed for specific business needs. The current and future needs of the business are taken into consideration before offering a selective architecture which is much controllable and reliable in the long run. Private cloud often ensures a scalable, dedicated and much secure environment which is suitable for technical needs of the business. On the other hand, “Hybrid Cloud” is a mixture of public and private cloud models that offers the optimized functionality of both models at the same time. By using hybrid cloud business can use their own hybrid infrastructure. This model provides the flexibility to adopt and control any of cloud models (public and private) depending on the scalability, reliability, security and performance needs.

### **Reasons to adopt Cloud Technology by SMEs**

There are a lot of potential reasons for Indian SMEs to adopt cloud technology. Some of them include minimum cost burden on the business while affording a built-in infrastructure which is easily accessible through internet. Data storage is guaranteed and cloud services are available on demand which reduces the time constraint on the business. Data accessibility is possible from almost anywhere due to its availability and connectivity methods. This significantly improves the transportability and mobility of the business. While using cloud computing in the SMEs the firm do not have to own the infrastructure so they can be relieved from any capital expenditure and instead they can utilize the resources as a service and pay as per their usage of the resources provided by the cloud [21]. SMEs do not need to depend too much on physical setup for IT related operations, which significantly saves the spending on physical resources. So, the small business does not have to worry for paying more, as they pay only for what they need or subscribe. Some of the other advantages are data security is improved due to highly secure infrastructure. Cloud offers versatile services to SMEs, and they don't need to worry for individual things. For example, one service model can be responsible for many different purposes such as software applications, customizing tools of productivity, and also it can mount appropriate service for the current business requirement. So, cloud computing gives one solution for different needs of the business while

it is easily adaptable. Implementing the cloud service models in SMEs significantly improves the business agility and ability to respond to the changes in the market. Business performance will be highly improved by using cloud when compared to traditional methods. Also cloud services are flexible to use and can be upgraded anytime according to the business expansion or due to market demand. Apart from that business becomes much portable and accessible due to its connectivity over any basic IT gadget for example a PC desktop, a smartphone, portable workstation etc.

SMEs in India are now viewing cloud technology as a means for a sustainable growth for the business. Especially public cloud model is appealing for Indian SMEs since it offers what they need within their budget as a complete pack of IT services. The potential of cloud computing is realized only when the adopting businesses restructure their business models and organization structures to leverage the capabilities of the cloud [22]. SMEs now know that they don't have to rely on heavy equipment for data and application handling instead they can now easily switch to a system which can be remotely accessed to support the day to day business activities. For small and medium sized businesses cloud computing is a one solution for many problems and it has many favorable outcomes. Some of them include simpler and financially suitable. Web connectivity makes it accessible for anywhere and at any time. Most of the service providers guarantees a 99.99% availability. Applications and data are accessible and manageable remotely which is in the favor of SMEs without adding additional cost such as operational or administration cost on the business. Data and resources are handled in a secure method so that it is much reliable than compared to the traditional infrastructure where they need to spend a lot on IT equipment. Keeping in mind all the advantages that cloud services brings, Indian SMEs are now moving towards cloud adaptation very fast to leverage the benefits and to boost the competitiveness in the Indian market. In the past two years SMEs in India has shown a rapid shift towards adopting cloud computing models. This shift has also been encouraged by the government through various schemes and subsidies granted for newly start-up businesses. Many experts believe that this expansion will grow even further in the coming years.

### **Government's initiatives for SME promotion**

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Government of India has always cared to introduce new policies and effective schemes for the devel-

opment of SMEs sector. Particularly for helping new start-ups in small business as they are less resourceful and knowledgeable. Indian government is assisting SME sector with different means of promotional activities, funding schemes, government policies, social awareness campaigns, sectoral promotional schemes etc. SMEs are potential growth drivers for Indian economy so they are in the national interest. Since SMEs in India operate in different sectorial markets, special schemes meant for a particular SME sector are also introduced by the government. Some of the promotional schemes include:

*“Digital MSME” Scheme for promotion of Information & Communication Technology in MSME Sector:* This scheme is introduced to promote ICT applications to make them “Digital” by adopting new approach of Cloud Computing in Indian SMEs.

*Technology Upgradation Fund Scheme (TUFES):* It is meant for the textile industry of India which is a major SME sector. This scheme is introduced for technological upgradation and enhancement purposes by the Ministry of Textiles.

*Technological Upgradation or Modernization or Establishment Scheme:* This scheme is designed to help food processing industry in India which covers modernization and expansion of different food processing sections such as milk products, meat products, fruits and vegetables, fishery, oil, poultry etc.

*Micro & Small Enterprises – Cluster Development Programme (MSE-CDP):* The MSME and Government of India together decided to implement this program as part of enhancing competitiveness and productivity of Indian SMEs.

According to the Union Budget 2017–2018, the Finance Minister of Indian has declared that the corporate tax on the SMEs and start-ups has been reduced from 30 % to 25% that is a five percent of reduction. Also, that the presumptive tax will be decreased from 8 percent to 6 percent which will decrease the financial burden on the Indian SMEs further and the small entrepreneurs can benefit from it. The Prime Minister of India has previously announced credit guarantee scheme for MSME sector and a credit guarantee fund for startups is being setup with a budgetary corpus of 500 crore INR (75 Million USD) per year, over the next four years according to the government [23]. The SME industry is surely in the interest area of the government promotional policies and schemes and is supported through financial, infrastructural, and technological assistance. Several policies and schemes are currently being implemented to lead the success path of SME industry in India.

## Conclusions

The SMEs are always been recognized as an important segment of the economy and will remain as the backbone of economic development in many economies throughout the world [24]. Despite facing challenges in the areas of technology, finance, and infrastructure Indian SME sector is still a strong player of Indian economy and revenue. And holds a reputation of one of biggest employment creator in the country. Due to the dynamic adaptability of web-based technologies and Information Communication Technology (ICT) helps Indian SMEs to compete in the global market and to connect easily to a lot of potential customers. The service models under Cloud provides SMEs a better solution for adopting a suitable infrastructure, platform or a software service. A lot of SMEs are now shifting towards Cloud service models due to the customized productivity tools and easy to shift infrastructure. At the same time trends of digitalization are getting more popular now in the Indian SMEs. The impact of adapting new technologies in Indian SMEs can be easily felt. Entrepreneurs are now aware of government schemes and development policies which encourage them to invest in SMEs. But there are still a lot of opportunities yet to be unfold. Indian SME sector is one of the largest ecosystems and is now discovering slowly but steadily its true potential.

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