

# Adoption of Cloud Basics in Small & Medium Enterprises (SME)

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## Abstract

*Small and Medium Enterprises (SME) plays a pivotal role in stimulating economic growth and creating jobs, largely due to their unique selling propositions (USPs). Given their limited budgets, they often focus on survival through their USPs, side lining the adoption of advanced technologies. Cloud technology, however, is ushering in a wave of benefits for these businesses, who otherwise struggle with substantial IT investments.*

*Characterized by scalability, rapid deployment, agility, elasticity, and a pay-as-you-go model, cloud technology is a more feasible alternative to traditional in-house IT setups. This new-age technology is benefitting companies greatly, establishing itself as an ideal IT solution for SMEs. The need for in-house IT expertise is negated as the cloud provider assumes a significant share of the deployment and operational responsibilities. Expertise offered by cloud service providers helps SMEs extract greater value from their technology investments, letting them concentrate on their core competencies to enhance their services and operations.*

*Cloud providers, on the other hand, also reap benefits due to economies of scale, and assured loyalty and commitment from their customers through lock-in periods. For optimal results and a trust-based relationship, cloud providers and SMEs must work together to identify the most fitting cloud offering. This collaboration will primarily aim at enhancing mutual business outcomes. The cloud services have already demonstrated their effectiveness during the COVID-19 lockdown situation. The study provides an overview of cloud technology basics and its strategic advantages for SMEs.*

**Keywords:** *Cloud Basics, Cloud Adoption, Cloud Technology, IT strategy, Small & Medium Enterprises*

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## 1. Introduction

Small and Medium-sized Enterprises (SMEs), also known as Small and Medium-sized Businesses (SMBs), hold a critical position in the economic landscape [1]. They are powerhouses of job creation, innovation, and contribute significantly to the nation's fiscal growth. In a country like India, SMEs are a primary employment source, employing 40% of the workforce. Famous for its innovative spirit, India witnesses many of its small businesses crafting novel products, services, and business frameworks that stimulate economic expansion. SMEs also constitute a substantial part of the nation's export revenue, with a myriad of small businesses participating in export-driven sectors such as IT, textiles, handicrafts, and pharmaceuticals. These enterprises are crucial to the economic progression in rural areas, where many of them are situated. Being deeply entrenched in their local communities, these businesses have a positive social impact. They not only offer job opportunities but also support local suppliers and invest in community development initiatives.

There are several issues that SMEs in India. SMEs in India often face challenges in accessing finance, this can limit their ability to invest in new equipment, technology, or marketing campaigns, and can hinder their growth prospects

They face stiff competition from large enterprises, which may have more resources, economies of scale, and established brands. SMEs often struggle to find and retain skilled employees, particularly in areas such as

technology, engineering, and management. COVID-19 pandemic, in the beginning of the year 2020 has impacted business across globally by slowing down the economy. This has invited plenty of problems for SMEs.

Overall, addressing these issues will be important for the growth and success of SMEs. To remain competitive in the domestic and international trade markets, SMEs need to continuously upgrade themselves against emerging challenges such as technology changes, changes in demand patterns, and new business innovations.

To overcome some of the challenges by SMEs. Cloud technology with its numerous benefits is perfect solution for them. Cloud computing eliminates the need for SMEs to invest in expensive hardware and software and allows them to pay only for what they use. This can help SMEs save a significant amount of money, which can then be reinvested in other areas of the business. Cloud computing allows SMEs to easily scale up or down their IT resources according to their needs. This means they can quickly respond to changes in demand,

In totality, cloud adoption can help SMEs to be more competitive, agile, and efficient in today's fast-paced business environment.

The technology if we don't use properly then it became liability and hence it is not only important to adopt newer technology but assess them whether they are really providing expected benefits. This article discuss some of the aspect of technology adoption for SMEs.

**1.1 SMEs definition**

Small and Medium Enterprises (SMEs) is also called Small and Medium-sized Businesses (SMBs). These are the business entities which fall under a specific range criterion based on their number of employees, revenue, and assets. The definitions of SMEs can vary across countries, but there are some common characteristics that help categorize them such employee size, revenue or turn-over asset size.

In Indian market, they are mainly classified in the two groups [2].

- Product Focused: organizations producing good or engaged into manufacturing activities.
- Services Focused: organizations offering services as their core business.

The governing agencies are working to remove the blockages and smoothen challenges to provide healthy ecosystem for regional SME developments. In our country, the SMEs are classified based on their investment profile or based on their turnover in financial year. The new classification has expanded the boundaries to offer assistance to large population as depicted in table 1.

**Table 1 - New definition of MSME (<https://msme.gov.in/know-about-msme>)**

Category	Micro	Small	Medium
Product and Services Focused	Investment in Plant and Machinery or Equipment: Not more than Rs.1 crore and Annual Turnover; not more than Rs. 5 crore	Investment in Plant and Machinery or Equipment: Not more than Rs.10 crore and Annual Turnover ; not more than Rs. 50 crore	Investment in Plant and Machinery or Equipment: Not more than Rs.50 crore and Annual Turnover ; not more than Rs. 250 crore

The cloud computing has five essential characteristics, three service models and four deployment models as depicted in the below figure 1 [3].

**1.1.1 Essential Characteristics**

**a. Demand based self-provisioning feature**

An end user can place requests for the provisioning of cloud resources such as Virtual Machines, file storage, and network by himself. The on-demand provisioning happens without human interaction with the service provider, automatically with a few clicks of a mouse. The on-demand service has brought up a lot more flexibility and agility in the whole provisioning process. [4].

**b. Broad network access**

The cloud resources can be accessed using any thick or thin front-end client from any device such as mobiles, laptops, tablets, and desktops. Most of the cloud utilities are hosted on the public cloud and reachable round the clock through varied front-end devices [5].

**c. Resource pooling**

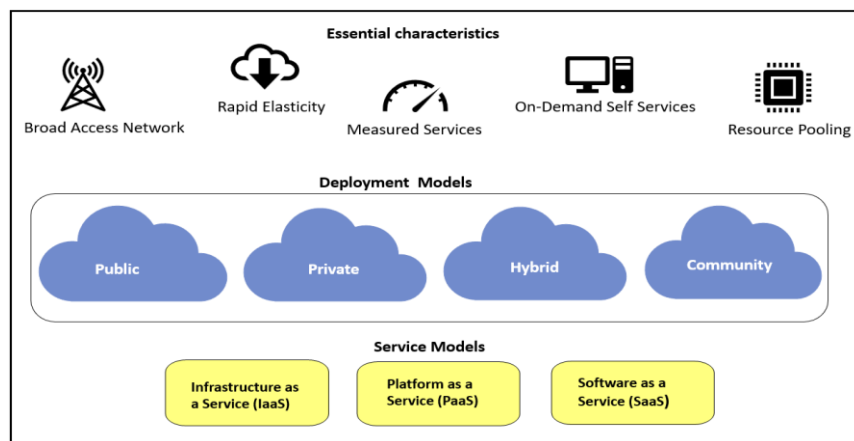
Pooling is an important features of cloud computing of resources for shared access for multiple subscribers. These assignment and reassignment of resources happen dynamically based on consumer’s demand. The resource allocation of resources such data storage, processers, memory, and network happen through abstraction layer and consumer might know the region or country at most from where these services are allocated. Resource pooling essentially save lots of energy by optimizing provisioning of resources on need basis [6].

**d. Rapid elasticity**

Computing resources are getting elastically scaled up and down based on certain triggers automatically or based on demands. For the consumer, the resources provisioning capabilities make availability of computing resources just-in time with required quantity by optimizing resource usages [7]. Best example is of commercial website which need to be scaled up with computing resources during flash sales and scale down for off season sales.

**e. Measured service**

The utilization of cloud resources are monitored, measured and reported to both the parties i.e., supplier and consumer for transparency reasons. The measurement units might be number of active users, number of processers or memory units, network bandwidth allocation, storage usages or number of computer instructions which are metered to some abstraction layer as unit or service offering charges in the form of rent [8].



**Figure 1- NIST Model of Cloud Computing**

*1.1.2 Service Models*

Even though the lines between the three service models are blurring, they are now commonly used in existing cloud computing.

**i. Software as a Service (SaaS)**

It is complete offering from cloud provider in which consumer will access them using front end technology and pay for licensing cost or pay based on transactions. These packages are covering standard offering suitable for multiple clients from specific domain. Consumer has very less opportunity to customize them. The underlying computer resources are managed by supplier. This is a model where the vendor controls every aspect such as bug fixes and upgrades [9]. This category includes many enterprise apps, including Success Factors from SAP, CRM from sales force, and others.

**ii. Platform as a Service (PaaS)**

The platform is hosted by cloud provider typically called as middleware. The consumer does not manage hardware, operating systems and middleware software. It is responsibility of cloud provider to provide high available and stable platform for hosting business application developed and managed by consumer organization. The bug fixes and release upgrade for business application will be managed by consumer in conjunction with supplier underlying platform from compatibility and performance perspective. This offering covers multiple diverse scenarios and not easy to manage without full stack knowledge and expertise in multiple areas [10].

### iii. Infrastructure as a Service (IaaS).

This is a foundation service offered to the end user to consume computing resources for hosting business application with essential runtime environment (OS and middleware layer). The consumer has to manage and had most control over platform and business applications. The underlying hardware and network resources are managed by cloud service provider. This is the foundational offering of cloud computing service model where consumer is responsible for installation and management of software stack [11]

Apart from these three classical service models, there are new category of service offerings which falls between the two service models. Serverless computing and functions are new features where the piece of code is executed for specific actions based on event-based triggers. In a nutshell, the cloud service offering descriptions are intractable based on their usages and purpose [12].

#### 1.1.3 Deployment Models

Cloud infrastructures get deployed in a variability, or more precisely, they can be accessed in a variety of ways. Different types of clouds are specified by the deployment models.

- **Private cloud**

The cloud services which is made available for usage one company or business units of same company for their private use. It may exist on or off premises. It's ownership of management and operation either remain with company by themselves or with help of service provider or it may be combination. Sometime cloud services are made available through a private network without using internet platform to handle company's data in more secured way [13]. This is not a common pattern and depend upon organization to organization due to their regulatory, or data privacy and security compliance reasons. Private cloud is merely another method of managing online data centre.

- **Community cloud**

Particular group of customers from businesses that share similar issues have access to the shared cloud infrastructure supporting their shared requirements in term of security compliance and regulatory policies or common project objectives. It can also be called hybrid form of private and public clouds. The ownership responsibility of community cloud may remain with community or with service provider or both are partially involved in combination [14].

- **Public cloud**

The public can use the cloud infrastructure without restriction. A commercial organization, academic, or governmental body, or in a combination, may own, administer, and run it. It is present on the cloud provider's property. This is the well-known common model. This strategy is largely used today to deploy cloud computing. This is accessible and usable via the open Internet. Initially, a large number of people raised security concern due to shared resources but data encryption in transit and at rest may have improved their perception and authenticity of public cloud [15].

**Hybrid cloud:** The cloud deployment model which is made up of two or more different cloud models is called hybrid cloud. The some of the inherent characteristics and feature of secluded, communal, or public clouds are continuing to exist in as a separate entity as a hybrid cloud form. The hybrid cloud is most popular form in commercial organization as they can use the cloud technology and it's benefit to their advantages depending upon the use case [16]. Some of the examples are storing more critical data over private cloud from security perspective while less secure data go over public cloud. Another best example of load balancing, increasing resilience, and high availability of services using a hybrid cloud platform from multiple vendors.

## 2. Choosing the IT strategy for SMEs

SMEs primarily concentrate on their unique selling proposition (USP), with less emphasis on technology for their IT functions. They anticipate every technological investment to amplify their market presence. This technology utilization should assist them in tapping into untapped potential, which is currently limited due to factors such as consumer purchasing behavior and internal agility to meet unforeseen business demands. Those companies that are already employing IT operations are keen to enhance their business performance. In both scenarios, the organization's goal is centered on business agility and profit augmentation.

The challenge lies in adopting an integrated approach to the information technology strategy that addresses business challenges and yields sustainable business results. The organization must formulate an effective IT strategy that not only achieves business goals but also encourages technology usage among its stakeholders. The business drivers influence the IT strategy. There are six main key consideration one should focus while laying down IT strategy for

SME organizations.

- How it helps for increase the market share.
- How it assists for practicing world class process and operational standards
- How it helps to bring efficiency and reduce the cost burden
- How it assists against business uncertainties
- How it remains competitive from future perspective
- How much is the total cost of ownership (TCO)

The alignment of business and IT strategies is crucial for yielding superior business outcomes. The function of Enterprise Architecture (EA) aids in converting business strategies into IT strategies, employing established methodologies, tools, and techniques in the planning process. Regrettably, SMEs often lack in-house IT specialists, necessitating dependence on external expertise. Previous research illustrates that SMEs have sought the assistance of external consultants, IT professionals, and IT vendors to formulate their IT strategies. These external IT professionals and vendors play a critical role in implementing information technology infrastructure within SMEs. Sometimes, issues can arise if these external teams fail to understand the specific needs of SMEs. Conversely, vendors with a robust technological footprint that assist SMEs with their marketing strategies are more aware of global challenges and their solutions. They introduce elements of quality, identify training needs, and ensure the sustainability of IT setups and operations. This encourages SMEs to implement top-tier IT solutions to boost their business performance [9, 10].

The duties assumed by these external IT professionals encompass IT project management, requirement analysis, design blueprinting, hardware and software provisioning, and encouraging end-users to familiarize themselves with new systems. These external consultants or IT specialists act as intermediaries to compensate for IT skill shortages in SMEs and facilitate the successful implementation and usage of information technology functions.

Cloud Technology, with its numerous benefits, has emerged as a trend and has been a lifeline for SMEs during the challenging times of the pandemic. The adoption of cloud technology transcends just a technological platform. It's essential to create a compelling value proposition when crafting a cloud adoption strategy. Here are some of the typical considerations for SMEs adopting cloud technology. SMEs look forward to use emailing solution (Software as a Service) and storage (Storage-as-a-Service) to begin with at smaller stake over big enterprises.

The cloud hosted certified hardware and software with regulatory compliance will be a motivational factor for meeting the regulatory provisions. Cloud provides control over purchase. You can limit the usages or rent a service for required duration. This is much beneficial option for SMEs. Cloud service provider offer customization services tailoring to your business requirement. The benefits SMEs as sometimes they lack in internal IT capabilities. Cloud service provider are partnering with multiple vendors providing the best offering for you under single window. Cloud provider are also benefited due to economy of scale.

### **3. Preparing cloud strategy for SMEs**

We can outline various stages in defining cloud strategy for SMEs driven through collaborative efforts between business and IT teams. This includes proven method to formulate and validate your strategy. Enterprise architectural function comprised by internal business team and inhouse or external IT staff will identify, prioritize cloud use case, create a roadmap, and formulate governance for cloud adoption. This is iterative process handled through agile methodology for continuous improvement. Each stage builds new capabilities upon previous stage and utilize the lessons learned from earlier stages.

#### **3.1 Vision**

The strategy for cloud adoption should have mission and vision statements that will set the direction. This will be common language across all the stakeholders and assist to understand the big picture. Definition of cloud technology has pursued from various perspective, the most common view about cloud services as an IT enablement technology using internet connection for hosting virtual landscape which brings high level of automation, speed, agility, elasticity, and cost saving options [17]. The next step is to find an opportunity to increase business value by means of technology usages. The vision statement should allow innovation and provide direction for achievement end objective [18].

#### **3.2 Use Cases**

The outcome-based scenarios are typical called out as cloud usage cases. This is illustration of ways the cloud

computing is adopted to realize the benefits. e.g business process optimization, skill enhancement, process re-engineering, re-plat forming, usages of emerging technology such big data and AI for supply chain improvement [19]. The use case need supporting business drivers and right mapping of key stakeholders.

### **3.3 Innovation**

Cloud technology itself is an innovative technology and provides multiple deployment options. The technology provides tool and techniques to overcome typical challenges and issues arriving during business innovation. The technology is helping to anticipate potential challenges, try to simplify complexities and assisting in expedite problem resolution. Cloud technology provides wider levers for business innovation which are out of reach for SMEs due to lack of budget, IT expertise and experience in those areas [20].

### **3.4 Projected ROI and TCO**

There has to be focus on business values while preparing cloud adoption strategy. The business values can be brought by many means such as IT cost reduction or process optimization to increase financial benefits [5].

Returns on investments (ROI) defines the efficiency of financial outcome over investments. This is a key measure for cloud deployment business case. Another financial aspect is total cost of ownership (TCO), your strategic benefits should remain relevant in the future. This need market research for your business use case, Cloud service provider will assist you in identifying your investment requirements and TCO for years to come.

### **3.5 Technology Offerings**

The cloud service providers take benefits of economy of scale and provide best technology options for their consumers. The consumers need not to worry about maintenance of product and services, they will have to pay based on pay as you go metered services. The Software as a Service (SaaS) offering provides many benefits for SMEs compared IaaS and PaaS.

### **3.6 Ecosystem**

Consider cloud technology adoption as means of achieving short term and long terms objectives. You may start with small services such as shared storage to email applications. You may prepare for advance deployment options which will bring business values at each level of adoptions. SMEs need to choose cloud supplier carefully who show greater interest, holds credentials and play a role of strategic IT partner. Cloud provider is bringing lots of experience and best practices around integration, process adherence and regulatory compliance. The matured relation among the stakeholders will benefits everyone for their own means. Hence developing ecosystem within organization along with key stakeholder and outside alliances during cloud adoption journey playing important role for growth of SMEs [18].

### **3.7 Stakeholders**

The strategy preparation is act of management function, but it needs open minded close co-ordination and communications among teams. The identification of right stakeholders for preparation and evaluation cloud adoption strategy is very important for its success. If you manage to involve your business stakeholders, suppliers and consumer of services actively in the strategy evaluation and building process then your strategy will be more effective and sustainable. The continuous engagement of these stakeholders is also essential for developing long lasting, value driven cloud adoption strategy [13].

### **3.8 Metrics**

The metrics provide you means of measuring effectiveness of your cloud adoption strategy. You must have deeper understanding of your existing business key performance indicators and link inference of cloud adoption to them. Each of metric should be measurable and it should clearly call out the impact over business outcome. You can define further metrics for your availability, uptime and turnaround time for your services [12].

### **3.9 Governance**

The effectiveness of cloud strategy remains on quality of governance around it. The implementation of governance will ensure consistency across data usages, adoption of integration patterns and compliance policies. Your cloud strategy should be subset of your enterprise's governance. Governance should establish decision making process and the key roles who are authorized make decisions during predefined or unforeseen circumstances. The steering committee establishment and their collaboration with stakeholders assist to establish effective governance around cloud adoption strategy. The governance model assists for planning and refinement of roadmap of cloud journey.

### 3.10 Roadmaps

The driver for roadmap preparation is to start initiate the groundwork and lay down foundation for technology usages to realize the cloud vision. The roadmap helps as a reference baseline for implementing and tracing the cloud strategy. The roadmap helps to establish cloud strategy aligned to organization's technology, communication and business strategy focused on effective business outcomes [20]

The roadmaps include activities to be performed on timescale along with milestones and measuring key success criteria. The matrices play key role in measurement of these success factors and assist in necessary adjustment for making the cloud strategy relevant from business outcome perspective.

## 4. Conclusion

In the current era of globalization, businesses grapple with shifting demands. Survival without the adoption of emerging technologies is implausible. Cloud technology, characterized by its scalability, ease of adoption, and cost-effectiveness, is a clear choice. It fulfils enterprise IT requirements and aids in achieving business goals. A cloud adoption strategy should delineate the value proposition, the chosen deployment model, appropriate service offerings, risk mitigation plans, cost implications, and a vital strategic roadmap. Agile cloud adoption strategies, relevant for the future, need to be based on market analysis.

Effective cloud adoption calls for commitment from the senior leadership team. Disciplined efforts, timely decision-making, and handling exceptions through a dedicated governance process are essential for successful deployment. A strong partnership with a cloud service provider and a diverse cloud deployment model can help mitigate business risks. An effective cloud strategy should leverage key benefits of cloud technology, like 'pay as you go' pricing, swift infrastructure provisioning for immediate use, and on-demand scalability. These benefits can increase business agility and positively influence an organization's ability to respond to market changes.

However, due to a multitude of service offerings and a lack of technical expertise, SMEs may find it challenging to choose the right cloud adoption strategy. The approach discussed in this paper aims to guide SMEs in making informed decisions, maximizing return on investment, and maintaining a low total cost of ownership.

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