Where's my cloud?
Creating value up high

mazars

Message

Mr. Bharat Dhawan
Managing Partner,
Mazars in India

2020 has been nothing short of a revolutionary year. We were all forced to step out of our comfort zones and make life work in this new journey. Today, as we reflect back upon our experiences from last year, it would be fair to say that we have become ever the more stronger and resilient.

Within this, the nature of work has also taken a completely new meaning, with all of us re-arranging our homes to fit our personal and professional lives in one domain. While this was not easy at first, it has given us a fresh perspective to the way we work, whirling in a host of new opportunities and avenues for growth.

One profound area of growth lies in technological acceleration, which is rampantly re-shaping practices across multiple avenues. For businesses, the development and deployment of digital work platforms has become key, with many looking to embed remote-working as a core operational norm and facilitate a hybrid work environment.

Cloud computing is one such platform that has gotten much acclaim in this regard, both in the global and Indian context. Organizations across a range of industries, structures and sizes are migrating their information and processes into the cloud and building efficient, agile, and effective practices for the long-term.

Our paper, *Where's my cloud?*, aims to highlight the growth of cloud computing and touch upon core focal areas that companies must consider when designing their own cloud adoption strategy – both within and after migration. Mazars believes that the crux for any organization, as it treads upon moving into the sky, lies in finding its own cloud.

I would like to thank The Exhibitions India Group for having Mazars as a Thought Leader for the 28th Convergence India and 6th Smart Cities 2021 expo, co-organized by India Trade Promotion Organisation (Ministry of Commerce & Industry). We are delighted to present to you our report and hope it presents pertinent insights.

This also marks our much sough-after opportunity to be able to get-together and collaborate on a shared platform post the stringent lockdowns and social distancing last year. I applaud the expo's unique hybrid edition that allows us to interact freely with each other across the world with all safety precautions in-tact. I am sure this will mark a landmark event, making way for even more opportunities in the future.

Wishing Convergence India and Smart Cities India 2021 all the very best!

Message

Ms. Chandrika Behl

Managing Director,
Exhibitions India Group

While the year 2020 disrupted many projections and trends, some predictions still ring true. Cloud Computing will continue to be a transformative technology, driving progress and helping citizens manage the uncertainties and sudden transitions in life and work imposed over the last year.

Cloud is the very foundation of the data-driven, app-based technological ecosystem that's pivotal to managing life in today's global climate. Be it the Work from Home standard or e-learning & digital education services, contact tracing and e-hospitals in delivering public health solutions; cloud services have formed the backbone in continuity of life and essential services.

Bolstered by an accelerated demand for the cloud, the Indian public cloud services market has nearly tripled since 2016. As enterprises prioritise becoming more agile, flexible and resilient; the need for cloud platforms, infrastructure and Software-as-a-Service (SaaS) tools will take centrestage. Businesses that adopted cloud and other digital technologies did better to survive the strain of the pandemic as compared to more traditional IT systems, demonstrating that digital transformation is crucial to thriving.

The *Where's my Cloud?* Knowledge Paper produced by Mazars will provide critical analysis of growth in the cloud market thus far, focusing specifically on the Indian demographic, and examining key aspects for enterprises to consider as part of their cloud adoption strategy.

The Knowledge Partnership between Mazars and Exhibitions India Group is an appreciable opportunity, with a mutual commitment to furthering the growth of India's Cloud Computing ecosystem. We are optimistic that this synergy will be instrumental in promoting important dialogue, innovations, best practices and new opportunities in cloud services.

Contents

Aiming for the sky and reaching the clouds is no longer a far-fetched dream. Whether it be people, concrete goods, or even abstract bodies of data, just about anything and everything can be moved "upwards." The key lies in understanding the atmosphere, shaping the right pathway, and building a strong cloud-to-ground harmony.

Digitization and *digitalization* is at an all-time high, coupled with a new era of work reshaping practices across the world. New-age technologies are taking even the most physical business procedures largely online, which is in turn creating a new ecosystem of both risks and opportunities.

Cloud computing is one such transformative technology, which has dynamically advanced from being a back-end storage service to a front-end business facing gateway. Having access to a vast variety of computing services online, ranging from servers, storage, databases, networking, software, analytics, and intelligence, gives users more than just cost savings and greater flexibility. Companies have an opportunity to become more agile and transform their operating processes, fostering innovative practices and new facets of value creation.

Cloud computing is not entirely a new concept; yet, it has emerged as a core global buzzword in the recent ecosystem of work as a host of businesses – big and small – take their information "up-high."

While cloud adoption has steadily been making its way into Indian enterprises as well for a number of years, its speed of dissemination has gained new wings post the pandemic.

The Indian cloud market, which stood at only USD 2.5 billion in 2018, has the potential to grow multifold over the next two years. Within this, small and medium businesses (SMBs) can become key catalysts for growth.

However, the journey "upwards" is not that simple. Cloud migration is a big move that involves every business function (not just IT), bringing up issues such as data privacy & confidentiality, accessibility, interoperability, regulatory compliance, skill development, process compatibility and a lot more.

While there is a cloud for *anyone* and *everyone*, every cloud pathway, creation, and operation is different. In this sense, "understanding and developing your own cloud" is pivotal.

Our paper, *Where's my Cloud?*, aims to highlight the growth of cloud computing and touch upon core focal areas that companies must consider when designing their own cloud adoption strategy – both within and after migration.

Mazars believes that the crux for any organization, as it treads upon moving into the sky, lies in finding its own cloud. This, in essence, calls for each firm to undertake the following fundamental steps.

1. **Understand the need and purpose behind cloud migration across functions**
2. **Identify the risk-reward profile of the cloud and all underlying implications**
3. **Select the right type of deployment model and service bundle**
4. **Embed the technological gateway into all aspects of the business**
5. **Connect people and processes (from ground to cloud)**
6. **Breathe freshness into the system from time to time**

Ankur Malhotra
Director
Mazars in India

The global cloud spree
Greater shift, greater action

On a global scale, the cloud computing spree has been running headstrong for many years, with on-demand and scalable services becoming popular across different types of organizations and sectors.

Users can choose between public, private, hybrid or community clouds, based on their needs and degree of control and flexibility sought.

In terms of the deployment bundle, the most common cloud computing services such as software as a service (SaaS), platform as a service (PaaS) and infrastructure as a service (IaaS) have further branched into providing users with a wider portfolio of services, hosting different levels of shared responsibility and control.

COVID-19 brought the cloud's value proposition in even greater limelight last year, as businesses battled with remote working, tele-networking, electronic data availability and massive digital transformation, all in one go.

As per International Data Corporation (IDC), vendor revenue from IT infrastructure products related to public and private cloud environments increased 34.4% y-o-y in Q2 of 2020.
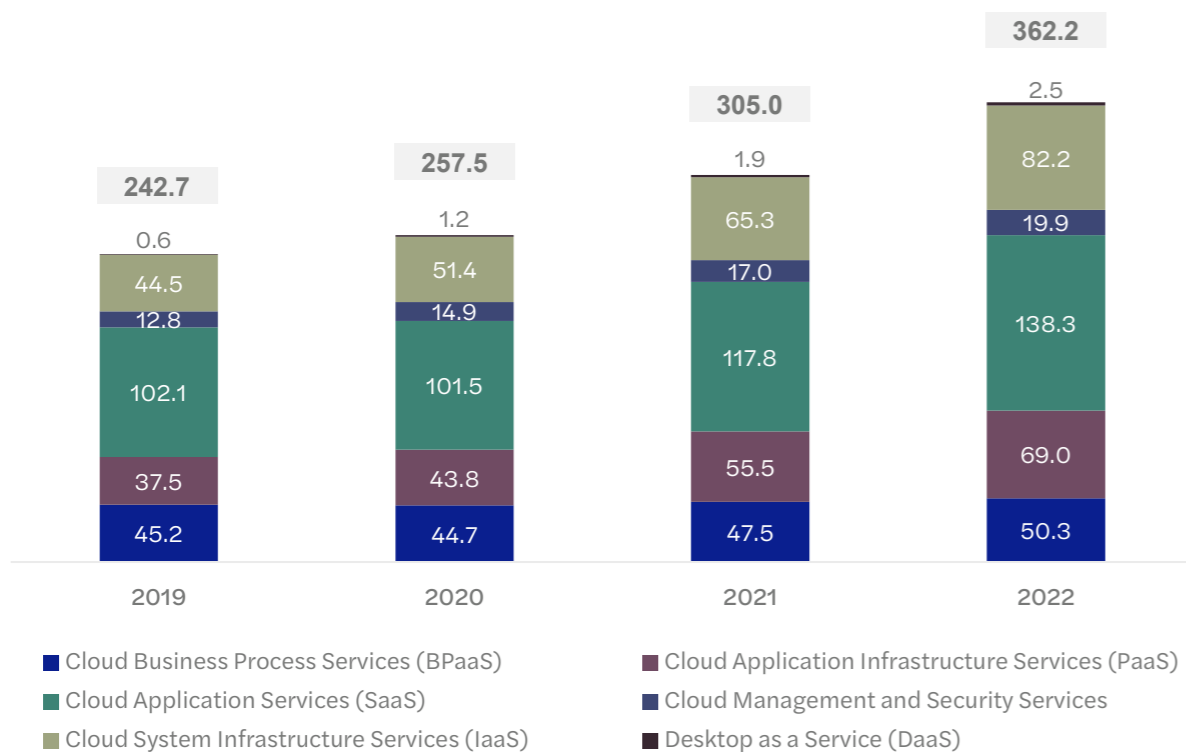
The shift of life, from physical to digital, has been a key trend over the last one year and cloud ecosystems, particularly the public cloud, has had a key role to play within it.

Focus on cloud-related investments and infrastructure is thereby poised to gain even greater footing in the coming years. According to Gartner, worldwide end-user spending on public cloud services is expected to surge from USD 257.5 billion in 2020 to close to USD 305 billion in 2021, registering an 18.4% growth in a year. This is further forecast to reach USD 362.2 billion in 2022.

While SaaS will continue to constitute the largest segment here, growing to USD 117.8 billion and USD 138.3 billion in 2021 and 2022, respectively, PaaS and IaaS will witness the highest growth margin within the time period.

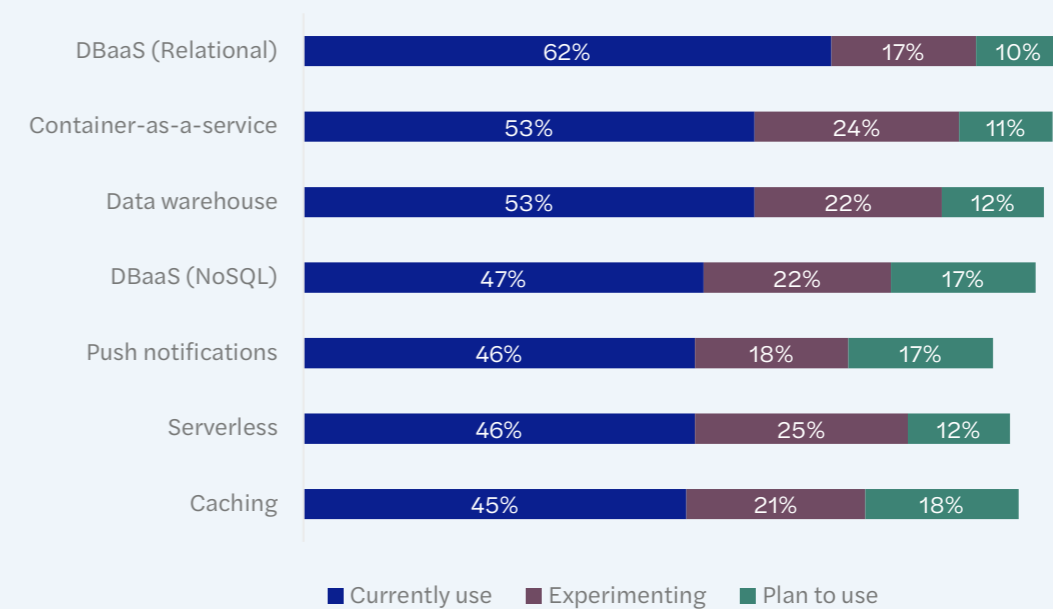### Worldwide public cloud services end-user spending forecast (USD Bn)

	2019	2020	2021	2022
Total	242.7	257.5	305.0	362.2
Desktop as a Service (DaaS)	0.6	1.2	1.9	2.5
Cloud System Infrastructure Services (IaaS)	44.5	51.4	65.3	82.2
Cloud Management and Security Services	12.8	14.9	17.0	19.9
Cloud Application Services (SaaS)	102.1	101.5	117.8	138.3
Cloud Application Infrastructure Services (PaaS)	37.5	43.8	55.5	69.0
Cloud Business Process Services (BPaaS)	45.2	44.7	47.5	50.3

Legend:
- Cloud Business Process Services (BPaaS)
- Cloud Application Services (SaaS)
- Cloud System Infrastructure Services (IaaS)
- Cloud Application Infrastructure Services (PaaS)
- Cloud Management and Security Services
- Desktop as a Service (DaaS)

Source: Gartner

Within organizations, the use of PaaS public cloud services is very much in the picture. As per a global survey carried out by IT solutions firm, Flexera, which spans different sized organizations across varied industries, respondents largely report using relational database as a service (DBaaS), container-as-a-service and data warehouse from cloud providers.

The demand for a large portfolio of cloud services stands quite high as firms look toward integrating the ecosystem across many aspects of their business.

Public cloud services used (% of respondents)

Service	Currently use	Experimenting	Plan to use
DBaaS (Relational)	62%	17%	10%
Container-as-a-service	53%	24%	11%
Data warehouse	53%	22%	12%
DBaaS (NoSQL)	47%	22%	17%
Push notifications	46%	18%	17%
Serverless	46%	25%	12%
Caching	45%	21%	18%

Source: Flexera

India's cloud flight
Leapfrogging into action

The Indian market has been witnessing its share of cloud adoption steadily over the last decade, albeit on a smaller scale in relation to the rest of the world.
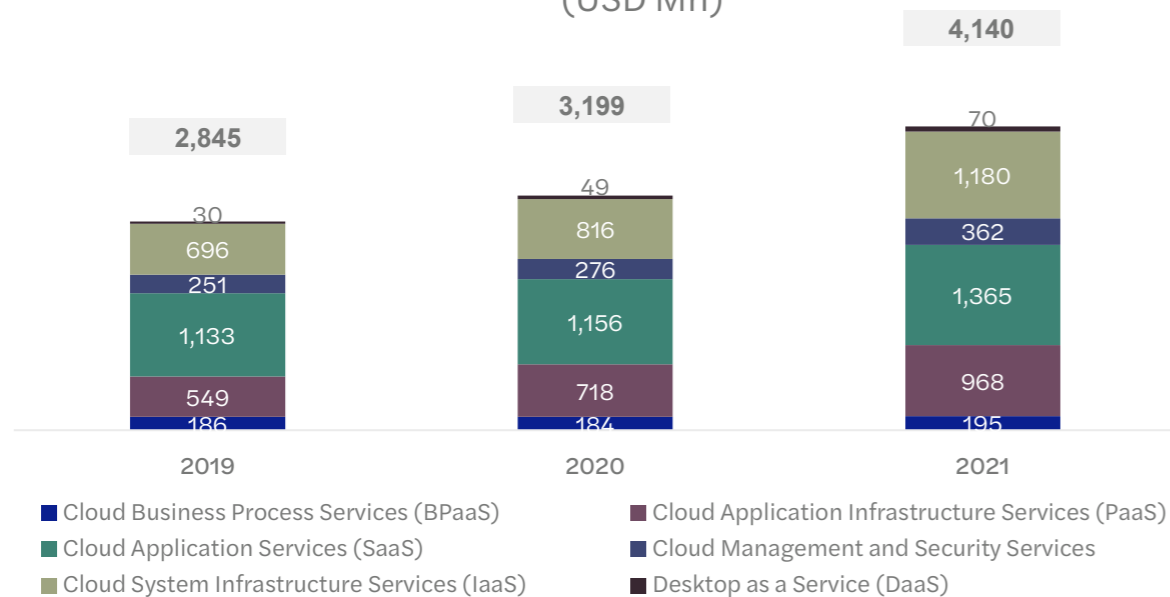
India accounted for roughly 1.2% of the global cloud spend in 2019, registering a slight increase from 2018. However, with physical distancing and virtual closeness becoming the new normal, this flight "up high" can gain unparalleled momentum.

Enterprises have largely moved from legacy systems to public cloud services in 2020, in order to maintain business resilience for the coming time.

This includes moving applications such as email, web hosting, customer relationship management (CRM), enterprise resource planning (ERP) and more, in order to revolutionize information availability & accessibility.

According to Gartner, end-user spending on public cloud services in India is expected to grow from USD ~3.2 billion in 2020 to USD ~4.1 billion in 2021, registering an almost 30% increase in one year. Spending on managed services and cloud infrastructure is projected to make up 8% of the country's total IT spending in 2021.

#### India public cloud services end-user spending forecast (USD Mn)

Category	2019	2020	2021
Total	2,845	3,199	4,140
Desktop as a Service (DaaS)	30	49	70
Cloud System Infrastructure Services (IaaS)	696	816	1,180
Cloud Management and Security Services	251	276	362
Cloud Application Services (SaaS)	1,133	1,156	1,365
Cloud Application Infrastructure Services (PaaS)	549	718	968
Cloud Business Process Services (BPaaS)	186	184	195

■ Cloud Business Process Services (BPaaS)
■ Cloud Application Services (SaaS)
■ Cloud System Infrastructure Services (IaaS)
■ Cloud Application Infrastructure Services (PaaS)
■ Cloud Management and Security Services
■ Desktop as a Service (DaaS)

Source: Gartner

India's cloud flight
### Pandemic pushing up company cloud budgets

As per a national survey by software services provider Amdocs, many IT leaders in India are planning to ramp up their cloud budgets, in order to facilitate seamless remote working for the long run. This includes up-skilling current employees on cloud security practices as well as hiring new staff to cater toward increased technology-based initiatives.
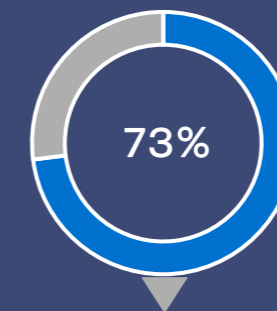
73%
of Indian IT leaders plan to make significant increases in their 2021 cloud budgets for facilitating remote working
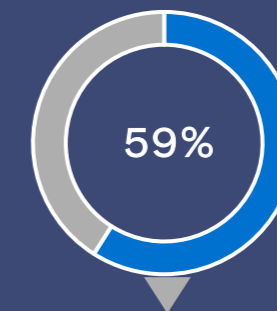
59%
of Indian enterprises aim to upskill their staff in cloud security practices
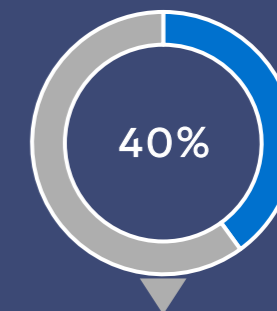
40%
of enterprises plan to hire new data engineers. An equal proportion say they will be hiring data scientists

- Demand for hybrid models is kicking in high. As per a study by cloud infrastructure firm Nutanix, the pandemic has resulted in more Indian enterprises tuning in for a hybrid cloud model.
- The Enterprise Cloud Index found 63% of Indian enterprises to have increased their investment in hybrid clouds as a direct result of COVID-19, in comparison to 46% enterprises globally.

Reasons for the shift include...

Better control over IT resources

Increased speed to meet business needs

Better support to customers

Source: Amdocs – Survey consists of 250 senior IT professionals across India

Nutanix – Study explores the impact of COVID-19 on current and future IT decisions, surveying 3,400 IT decision-makers globally

India's cloud flight
Government activities and initiatives

Activity is in full swing across both the public and private spheres. Google is setting up its second cloud region in Delhi in 2021; Amazon Web Services (AWS) has announced plans to expand its second region in Hyderabad by mid-2022. Meanwhile, Microsoft, having cloud presence in over three regions across the country, is introducing specialized solutions in the retail space.

As part of its overall stride toward the Digital India mission, the government continues to encourage and implement cloud-based frameworks across various avenues of e-governance, operational management, and information delivery.

The Cloud Vision for India 2022 aims to develop the country as a global hub for cloud computing, content hosting and delivery, as well as data communication systems and services.

Key government cloud-based initiatives

E-Gram Panchayat	To improve the quality of governance in villages, the government initiated an e-governance scheme known as ePanchayat. The cloud model of the e-Gram Panchayat module, which covers 34 different areas related to village management, depicts a high-level architecture intended to facilitate internal government operations.
The government's Kisan Suvidha enables farmers to receive instant pertinent information such as weather, market prices of seeds, fertilizers, pesticides etc. In this cloud-based agro system, all information is stored on a cloud, enabling seamless communication and enhanced security.	**Kisan Suvidha**
NIVARAN	Cloud computing has led to vast advancements in the railway network, with various ticket authorization and checking techniques managed using cloud storage. 'NIVARAN-Grievance Portal' was the first IT application to be launched on the Rail Cloud in 2017.
"GI Cloud" is an ambitious initiative by the government, named as "MeghRaj." Focus is to accelerate delivery of e-services in the country while optimizing the government's ICT spending. This will ensure optimum utilization of the infrastructure and speed up the development and deployment of eGov applications.	**GI Cloud – MeghRaj**

DigiLocker	DigiLocker is a public cloud-based document storage platform of the government. It allows for the issuance and verification of documents & certificates for Indian citizens in a digital way, eliminating the use of physical documents. Users and verifying authorities can easily access the files and complete validation.
E-Hospital is a cloud-based healthcare project implemented by the government, with the aim to ease healthcare management. The platform allows hospitals to store and retrieve information such as patient data and easily access it remotely. It allows for inventory management and tracking, at lower cost and increased efficiency.	**eHospital**

Source: Government of India & Press Articles

India's cloud flight
Small players soaring high

With India hosting a vibrant range of micro, small and medium enterprises (MSMEs) across industries, the scope for smaller-sized players to make a bigger digi-impact cannot be underscored.

As per a study by Nasscom, small and medium businesses (SMBs) are becoming catalysts of technological transformation in the country, having the potential to account for 28-30% of the national cloud market by 2025.
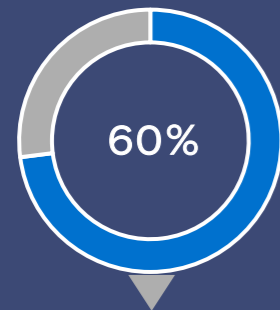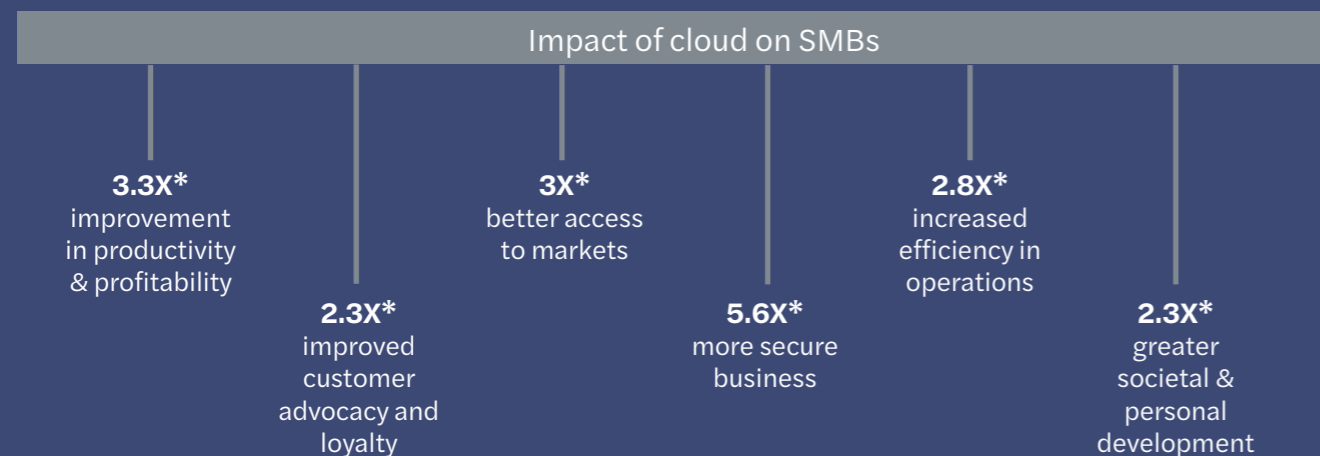
60%

of the 1,000 surveyed SMBs in the study are already on the cloud, at varying degrees of maturity

Cloud adoption has helped many firms drive up productivity by **25-30%** and reduce operational costs by **15-20%**.

Security, analytics and offline to online are three key avenues for cloud adoption.

As per a separate study conducted by Microsoft and the Thought Arbitrage Research Institute (TARI), SMBs improve their chances of better market access and profitability by three times* with high usage of cloud technologies.

- Study exemplifies improvement in market reach, employee productivity, operational processes and work-life balance with increased cloud usage.
- There is a greater than **75%** probability than an SMB will see improvement in various metrics within two years of being on the cloud.

Impact of cloud on SMBs

3.3X*
improvement in productivity & profitability

2.3X*
improved customer advocacy and loyalty

3X*
better access to markets

5.6X*
more secure business

2.8X*
increased efficiency in operations

2.3X*
greater societal & personal development

Source: Nasscom – *Survey consists of 1,000+ SMBs across India

Microsoft and TARI – *Average predicted probability of impact across all indicators measured for each category. Survey involves 275 SMBs across 11 Indian cities.

Pitfalls up high
Knowing the highs and lows

The "Egregious Eleven" threats to cloud computing

🔒 Data breaches

⚙️ Misconfiguration and inadequate change control

☁️ Lack of cloud security architecture and strategy

🔑 Insufficient identity, credential, access and key management

🥷 Account hijacking

⚠️ Insider threat

🛡️ Insecure interfaces and APIs

Weak control plane

Metastructure and applistructure failures

Limited cloud usage visibility

Abuse and nefarious use of cloud services

Source: Cloud Security Alliance

It is never a binary choice when it comes to making big business decisions. The migration of operational data is a big move for any enterprise, bringing issues such as information security and privacy, identity access, interoperability, compliance, and process compatibility to the realm.

Just like any new solution or gateway, the cloud platform brings its own portfolio of risks and opportunities, a sound understanding and assessment of which is crucial for any organization.

As per a survey by the Cloud Security Alliance, traditional cloud security issues under the responsibility of cloud service providers (including denial of service attacks, shared technology vulnerabilities etc.) are now becoming less of a concern for organizations.

Rather, new and highly rated challenges involve issues higher up the technology stack, concerning an organization's own alignment with the cloud strategy, active management, cloud governance and infrastructural support.

These findings suggest that running successful cloud programs and mitigating related risks is much more than covering up data security. As cloud consumers become more aware and mature with the technological platform, they learn that building an effective cloud strategy is pertinent for effective risk management. Having an unsound or unclear cloud pathway becomes the root cause for several other problems.

They are magnanimous, abstract, up-high and contain pitfalls; yet this does not mean clouds cannot become value-changing platforms. It all depends on how steadfast organizations are in addressing their cloud computing needs and crafting a strategy that embeds this platform into all aspects of the business.

What is a firm trying to achieve with cloud computing? Is the goal to take up a particular kind of information on the cloud first or migrate everything at once? Are cost savings a core purpose here or is the firm trying to make the cloud a value driver on its own? What is its level of cloud maturity?

There are multiple cloud vendors, deployment models and service bundles to pick from and making the right choices with organizational readiness and alignment in mind should be the key objective here. Just like no two clouds are alike in the sky, no two cloud strategies can be alike for any two users.

The tradeoff between *shared responsibility and control* is critical.

Public cloud services and particularly SaaS models may be very attractive to young businesses that are looking to scale up their data repositories and get analytical bundles in a plug-and-play format. They may be willing to accept greater shared responsibility over control for cost-effective and ready-made models.

Going for multi-cloud environments is another leading trend among organizations who wish to reduce vendor lock-ins and gain greater control and flexibility over systems.

At the same time, paying attention to in-house tech savviness and the overall organizational culture, business model and way of doing work is very important.

How accepting are a firm's people in migrating to the cloud and are they aware of all strings attached? Would migration in tranches be better than one big leap? Can company culture become a boon or bane in this whole process? The list of questions and possibilities goes on.

Cloud migration is a big move that involves every business function, not just IT. While there is a cloud for anyone and everyone, every cloud pathway, creation, and operation is different. In this sense, "understanding and developing your own cloud" is pivotal.

Mazars believes that the crux for any organization, as it treads upon moving into the sky, lies in finding its own cloud. This, in essence, calls for each firm to undertake the following fundamental steps.

1

Understand the need and purpose behind cloud migration across functions

What do you wish to achieve with cloud computing – cost savings, agility, flexible working, transformational value-driven strategies? Is it only to move data to a new repository or will it become a key driver in all business functions and processes?

2

Identify the risk-reward profile of the cloud and all underlying implications

The cloud offers flexibility, agility, elasticity, efficiency, and a lot more. While it takes away some traditional risks, it brings new, contemporary issues to the forefront. How aware are you of all strings attached and what is your risk management for the same?

3

Select the right type of deployment model and service bundle

Public, private, hybrid or community – which cloud do you wish to fly to? Data sensitivity, control vs cost. What is your tradeoff? Service bundle – do you wish to receive the infrastructure or want it all plug-and-play? Vendor selection? Multi-clouds?

4

Embed the technological gateway into all aspects of the business

Cloud migration is not a stand-alone IT move to simply reduce costs. Are you strategizing it well as a core value driver that connects well with your business model? From IT to Finance to HR to Marketing to all corporate leaders – is everyone aligned?

5

Connect people and processes (from ground to cloud)

Transmission and communication from data to data-handlers cannot be compromised. How aware are your people (at ground level) to reaching the sky? From data availability, movability, compliance – is everything taken care of, across functions?

6

Breathe freshness into the system from time to time

New needs and developments will always crop up. From technological advancement to changing business processes and regulations, nothing remains static. How soundly are you updating your cloud systems along with your business?

Next stop: sky high

In today's day and age, we can be truly limitless, in both form and spirit. Information generation and storage need not also be confined to certain physical barriers and can truly soar high as it resides and moves freely across the world. Cloud technology, being comprised of highly sophisticated and customizable platforms, allows us to do just so.

Whether it be individuals or large-scale companies, accessing, depositing, retrieving, and revolving data has become as simple as a touch of a button.

However, the extent to which we can capitalize upon these contemporary platforms depends on how successful we are in understanding and building our right match in the sky – in other words, *finding our cloud*.

Where's my cloud?

Notes

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Mazars is an internationally integrated partnership, specialising in audit, accountancy, advisory, tax and legal services*. Operating in over 90 countries and territories around the world, we draw on the expertise of more than 42,000 professionals – 26,000+ in Mazars' integrated partnership and 16,000+ via the Mazars North America Alliance – to assist clients of all sizes at every stage in their development.
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