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How Indian business are adapting to Cloud Products for Smarter Disinvestments, Efficiency & Simplicity

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ABSTRACT

During the last few years, IT professionals in many different organizations in India have witnessed and accustomed themselves to cloud adoption. Cloud computing usage is gaining momentum in India mainly because of government support, vendor offerings, and proven best practices, which have resulted in many organizations in India planning to move to the cloud on priority.

Only until a few years ago, not many would have anticipated how big cloud computing would be by 2020. In this competitive world that tackles network issues, avails top-notch services on the internet with better functionality without the trouble of adding any additional cost of infrastructure and software, you need Cloud Computing.

With increasing market competition and globalization, Indian multinationals and SMEs have shown enormous curiosity to deploy Cloud solutions including Cloud ERPs to integrate their business processes. Deploying Cloud application/s is a favoured option due to lower infrastructure & maintenance cost, data availability and security. Indian Conglomerates largely evaluate a Cloud solution from Economical, Technological and People standpoints with the factors that measure them. A factor can either be an "Advantage" or a "Risk".

This research provides a "Advantage – Risk" framework and assessment on Economical, Technological and People perspective that Indian Conglomerates perceives while selecting Cloud product. The framework is validated, and it suggests that Economical and Technological are two key parameters for evaluating Cloud Solutions for Indian organizations.

INTRODUCTION

Cloud Computing in India has a considerable presence over the internet world and is quickly growing to a fully-fledged environment. Earlier companies competed in marketplace on basis of performance objectives like price or quality. However, market now demands customer satisfaction and service flexibility along with competitive price and quality (Yusuf et al., 2004). Cloud computing enables consumers as well as business establishments to utilise applications without installing them and get access to their personal data / information across the internet.

Though Cloud computing in India is not very old, its impact is creating a beeline for the internet market, so that it can gain more avenues offering better solutions for the industry and become more worthwhile for the Indian SMEs and Enterprises.

In addition to that, COVID-19 has shown how demonstrably important data connectivity is in the managing of global challenges, and therefore cloud's value in enabling remote data access and store has become even more demonstrable. As cloud computing has become an essential part of the technology stack across the economy, it merits greater coordination across sectors and across jurisdictions.

Where regulators and supervisors were already increasingly recognizing the benefits of cloud, the COVID-19 experience has also highlighted cloud's value as a crucial risk mitigant. Cloud has not just offered a way to maintain service continuity but has also proven to be an enhancement tool for working away from the physical office (e.g., collaboration tools) combined with other technology for customer service and changes in regulatory requirements (e.g., wet ink signature replacement for signing contracts using cloud services). Several organisations are reviewing their long-term 'future of work' strategy, for which increased cloud adoption may be the key enabler.

Cloud has moved from being a relatively back-end (storage) to a front-end (business facing) technology, enabling on-demand access to resources, flexibility in scaling, cost reduction and business continuity. It is not just a crucial innovation platform for companies and countries, it even helps address societal problems.

Over the last decade, as software has become increasingly central across industries, enterprises have been undergoing a transformation, specifically digital, to adjust to this shift. Three digital technologies—cloud computing, cybersecurity and big data analytics—are at the heart of this transformation.

This paper focuses and explores the option of cloud computing in India by finding out various factors that needs to be addressed while selecting Cloud Solution and how the country can carve itself a unique identity as a global hub for cloud solutions.

1. Factors Influencing selection of Cloud Solution.

1. Technology

Chosen technology and the cloud platform of intended service provider should align and support organizations cloud objectives. Cloud services, standards, and architectures must suit the organizations management and workload preferences. Also, an organization needs to evaluate the necessity for customization and the level of re-coding that may be required to make the companies workloads and business processes fit as per the cloud platform.

2. Cloud Security

Cloud security refers to the technologies, policies, controls, and services that protect cloud data, applications, and infrastructure from threats. Meticulous consideration should be done towards legal requirements for the security of data hosted in the cloud service, especially considering GDPR regulations. The data should not be accessed by unauthorized persons on the network and within an organization. The general perception of lack of security is a major threat to adoption of Cloud Solution.

3. Architecture

When choosing a cloud provider, the biggest evaluating parameter is how the architecture shall get incorporated into the existing workflows now and in the future. For example, if the organization has already invested heavily in the Microsoft universe, it might make sense to proceed with Azure, since Microsoft gives its customers licenses (and often some free credits). If an organization relies more on Amazon or Google services, then it may be best to look to those vendors for ease of integration and consolidation.

4. Reliability & Performance

Downtime is inevitable and every cloud provider will experience it at some point. It is how the provider deals with that downtime that matters. Cloud provider should have established, documented and proven processes for dealing with planned and unplanned downtime. They should have plans and processes in place documenting how they plan to communicate with customers during times of disruption including timeliness, prioritisation, and severity level assessment of issues. Most important & concerning factor is provider's disaster recovery provisions, processes, and their ability to support companies' data preservation. This should include criticality of data, data sources / instances, scheduling, backup, restore, integrity checks, etc.

5. Support

Support is another parameter that needs prudent consideration. This is important due to dependency on the Cloud Solution provider in cases when the application stops functioning or the data is not detectable. Organization should be cautious about level and form of support they shall have access to before choosing a cloud provider. In some cases, the only support provided is through a chat service or Call Center. This may or may not be an acceptable option for many companies and their IT departments. In other cases, Cloud provider may offer access to a dedicated resource, but there is a good chance there will be constraints on time and access.

6. Costs

While it would certainly not be the single or most important factor, there is no denying that cost play a big role in deciding which cloud service provider(s) companies choose. It is important to consider at both product price and associated costs (including personnel needed to manage cloud instances). A glance at the pricing structure of major Cloud Solution providers:

- **AWS:** Amazon determines price by rounding up the number of hours used. Instances can be purchased in one of three ways:
  - *Pay-as-you-go***:** Pay for what you use, no upfront cost.
  - *Reserved:* Reserve instances for one or three years, with an upfront cost based on utilization
  - *Volume discounts:* Acquire more services and receive volume discounts for specific services.
- **Google Cloud Platform**: GCP bills for instances per second used.
- **Microsoft Azure:** Licencing cost depends on and varies if an organization already has Microsoft 365 then is adding Azure to the stack, especially app is an enterprise solution.
- **Oracle:** Oracle's low base pricing allows provision to choose services and only pay for what you use. Your use of Oracle IaaS and PaaS services is metered hourly and charged only for the resources consumed.
- **Salesforce:** Salesforce offers 4 fully customizable CRM solutions: Essentials, Professional, Enterprise and Unlimited wherein "Enterprise" is the most popular CRM edition.
- **SAP HANA:** SAP determines the pricing based on new or existing customers who hold valid on-premise licence. SAP HANA private cloud service is available as bring your own license (BYOL) or as a monthly subscription based on the number of users.
- **SAP SuccessFactors:** SAP SuccessFactors is broken down into four main products: Core HR & Payroll, Talent Management, HR Analytics & Workforce Planning, Workforce Analytics. Although pricing for each module varies, overall SAP uses a per-user, per-month/yearly strategy.
- **Workday:** Workday has license fee per module, and then a kind of annual training fee, which is an add-on.
- **Adobe:** Adobe Creative Cloud encompasses apps like Adobe Photoshop, Illustrator, InDesign, Premiere Pro and Acrobat Pro plus a management console and instant asset syncing across devices. The pricing model is per user for All Apps which is a cost-effective edition or a single app per user which comes for a greater licence fee.
- **ServiceNow:** ServiceNow does a detailed evaluation of the unique needs of your company and Flexible pricing tailored to your requirements.

7. Cloud Storage

Almost all Cloud Service providers allocate storage space for respective Production instances to customers based on licencing. They have a data archival mechanism wherein data after certain period is archived to enable faster data retrieval and have the latest records / information on top of the stack.
However, with the quantum of data that every organization generates based on number of users, business processes, data entities, pictures & graphics etc. organizations need to proactively envision their cloud storage requirement and accordingly have sufficient space apportioned during the contact agreement and appropriately incorporated in their licence. There is also the possibility to store the data either on- or off-premises depending on the regulatory compliance requirements. Data is also stored in virtualized pools of storage hosted by a third party based on the customer specification requirements to minimise cloud data storage cost.

8. Data Analysis

One of the key aspects offered by cloud computing is the ability to use data analytics to tap into vast quantities of both structured and unstructured data to harness the benefit of extracting business value. Retailers and suppliers extract valuable information derived from consumers' buying patterns to target their advertising and marketing campaigns to a particular segment of the population. Cloud platforms provide the basis for analytics on behavioural patterns that organizations are using to derive meaningful information. SAP SuccessFactors has a module "Data Analytics" purely for analysing employee data with graphical representation help the management and decision makers to better drive company policies, for improved people & Organization management and retain finest resources.

9. Disaster Recovery

Disaster Recovery deals with issues of how and where the organization's data would be stored in the cloud. There should be assured backup of data and in case of data loss or tampering, efficient recovery should be possible. Backup and recovery are a critical part of ensuring data is protected and accessible but keeping up with increasing capacity requirements. Seasonal weather patterns and geographic anomalies affect data centers in different ways. A loss of electricity, including backup power, would take a data center offline. A loss of connectivity to the Internet would also take a data center offline. Cloud service provider should contain & incorporate advanced techniques in monitoring risk, declaring a disaster, and invoking the Disaster Recovery plan.
Cloud solution must include, at a minimum, the following capabilities:

- Offsite database backups to disk (i.e., weekly full / nightly incremental / archive logs multiple times daily to separate storage array); and
- Commercially reasonable efforts to restore service from backups as soon as possible in case of a disaster resulting in loss of the production data center.
- Back-up data is retained for a minimum of thirty (30) days.

10. User Interface

Lastly the most valuable feature the cloud product should offer is a user-friendly interface with possibilities of mobile computing. The mobile app should have all the features and functions that are available via the web browser. The look-&-feel should be consistent to offer a seamless experience to the end user supporting a self-driven methodology so that end user training is not required or is very minimal.
If the users are unable to use the cloud product, the desired ROI falls, acceptability to change broadens and the acceptance of cloud technology develops into a challenge for the management. Users often make mistakes, do not use the features and functions of the cloud product for optimum results and the desired outcome is defeated. Thus, ensuring appropriate UI is an important parameter that is inline with the organizations business processes and aligns with customers' demands.

2. Goals & Hypothesis

Table 1: Organizational Point Of View to be considered while adopting Cloud Solution.

Organizations Perspective	Advantage	Risk
Economical	Flexible Payment	Limited Cloud Storage
	Low Operational Cost	
	Reduced IT Infrastructure Cost	
	Low IT Manpower	
Technological	Scalability on demand	Vendor Reliability
	User friendly	Service Survival
	Platform Independence	Data backup and Recovery
	Customization	Interoperability
		Availability
		Ubiquitous access
		Data Security
People	Tech-savvy staff	Perceived lack of control
		Resistance to change
		Loss of Key Staff

RESERCH OBJECTIVES

Following are the research objectives:

- To find benefits associated with Cloud platform.
- To find threats associated with Cloud platform.
- To study the concerns of organization while adopting to Cloud Applications.

HYPOTHESIS

H1: Economical perspective is the most important benefit while cloud product.

H2: Technological perspective is the most important benefit while evaluating cloud.

H3: People Perspective is the most important threat while evaluating cloud.

H4: Technological perspective is the most important threat while evaluating cloud.

3. Data Collection & Analysis

The primary data was collected from 5 Indian IT companies and their respective business units that are directly engaged in a variety of cloud implementations including SAP, Oracle, Workday, Microsoft Azure, ServiceNow and Google Cloud Apps. The data was collected by interacting with 30 IT personnel and consultants / SMEs from the IT organizations / Implementation partners.

Figure 1 and 2 depicts the mean of various "Advantages" and "Risks" that an Indian Organizations perceive while evaluating Cloud products.

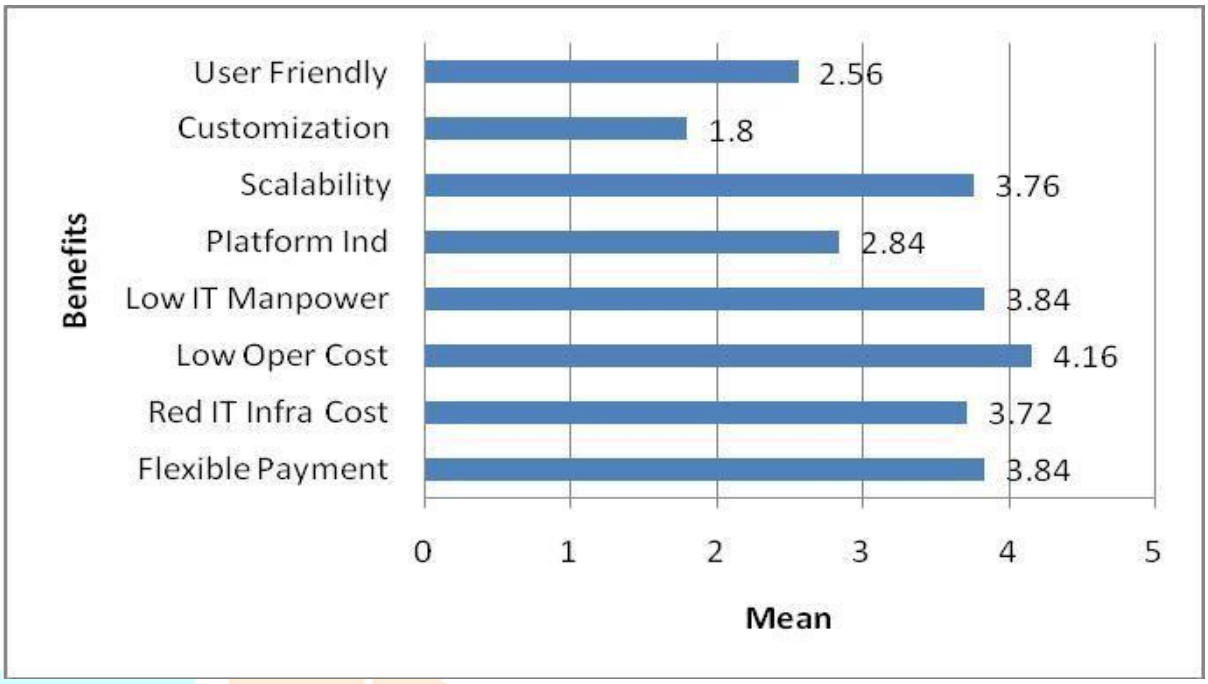


Figure 1: Mean of Factors leading to "Advantages" of Cloud Solution

Due to global competition and onus of establishing a cost-effective model, Indian Organizations have constrained IT budget. Furthermore, if a cloud solution empowers them to streamline their processes at lower operational cost, they would be inclined to adopt such a solution. Hence benefits of reduce cost and low manpower requirement are perceived as important benefits by Indian Conglomerates.

IT spending is only 1.6 of India's GDP for 2020, which is approximately half the global average of 3.0% as per the NASSCOM's "Next wave of growth in India". Also, India's Cloud adoption is currently 6.0%, which is slightly lesser than the global average of 7.9%. This trend suggests that the Cloud adoption in India is at a very nascent stage and is having a promising trend to bloom, both in IT spending as well as the adoption of cloud soon.

Scalability is also another important benefit that they perceive depending upon the software usage and the number of persons using the software. The main idea to deploy Cloud app is to gain operational efficiency. The people in the organization can be trained to use the software.

For Indian Organizations, the biggest threat while considering the options on cloud is with respect to data security, its backup and recovery. They have questions like “Is my data safe?”, “What if someone accesses the data?”, “What will happen if the server crashes?”. Vendor reliability is another threat, and it can be addressed by doing the market survey to check vendor credentials.

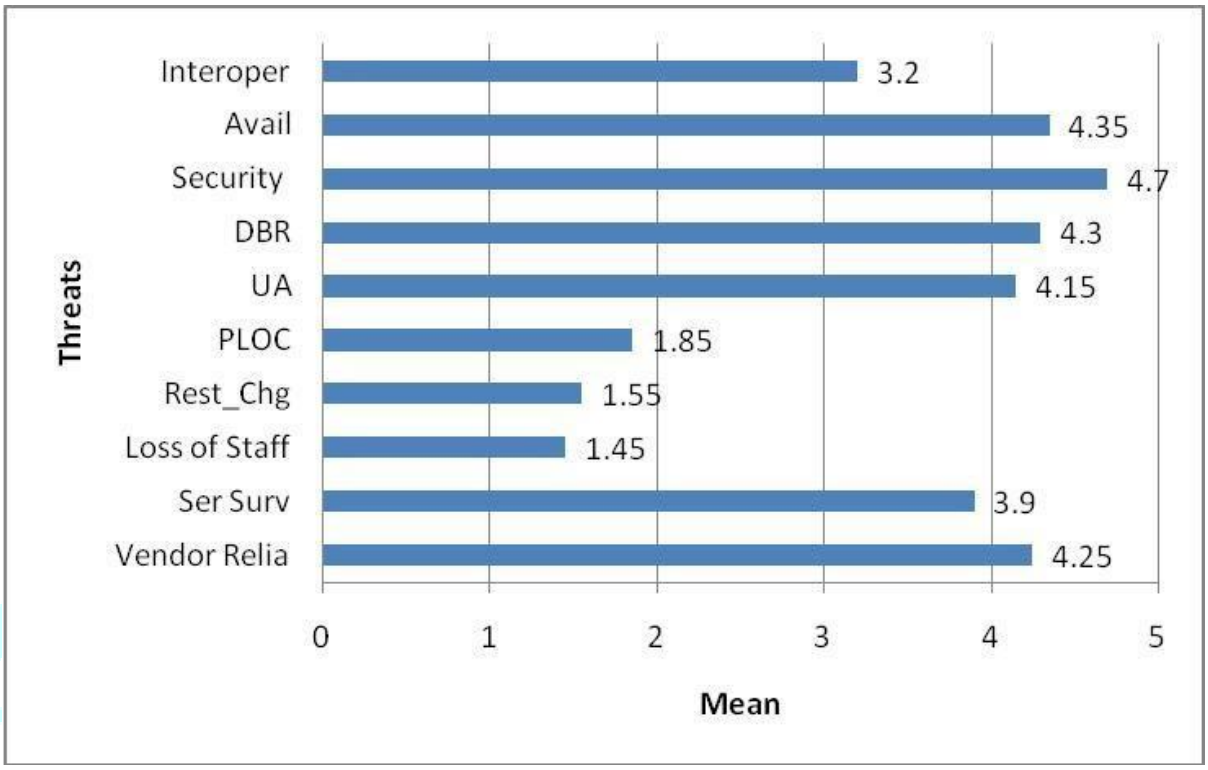


Figure 2: Means of Factors leading to “Risks” of Cloud Solution.

Hypotheses H1, H2, H3 and H4 formulated to find out Indian Conglomerates perspective for selection of cloud products are validated using one-tailed sample t-test. These hypotheses are tested by verifying whether the scores the respondents assigned to the organization perspectives were significantly better than the middle score on the Likert scale for an item (Condori- Fernandez, 2006). Initially, the scores of each subject were averaged over the different items that are relevant for a perspective. Three mean values were obtained for each subject for each perspective. One-tailed sample t-test checks the difference between the mean of each perspective and the value 3 (middle score). The statistical test was applied with a significance level of 5% (alpha=0.05).

4. Corporate Transactions in the Cloud

One development that has proven versatile and ideal in a variety of business scenarios is cloud technology. And it is becoming increasingly clear that the cloud is the way forward in all areas of business IT. Information technology research firm Gartner found that four out of five enterprises worldwide already use cloud services or intend to use them soon. With all these companies on board, it makes sense that business processes, Enterprise planning, divestments, mergers, and acquisitions should also take place in the cloud as well. But how exactly does a cloud ERP system simplify and expedite these processes?

- How Does the Cloud Provide Competitive Benefits?

Software hosted in the cloud is a very efficient way for many businesses to organize their IT. Requiring nothing more than Internet access and a standard web browser, businesses can carry out complex corporate transactions on a secure, agile, and powerful platform. Investing in internal infrastructure or extra headcount in IT is unnecessary.

- **Enterprise-class technology:** Even SMEs can run big-business software – no need for complex internal server infrastructure.
- **Mobility:** Processes and functions can be accessed remotely, from any device, at any time.

- **Flexibility:** Additional functions and user subscriptions can be added or removed as needed – enabling the software to keep pace with the company's growth.
- **Speed:** New configurations can be up and running within hours or minutes.
- **No capex, low opex:** Cloud services are subscription-based, meaning no up-front costs. And according to PWC, the average total cost of ownership (TCO) over a ten-year period is 50–60 percent lower than for an in-house installation.

With a surge in the adoption of Cloud-based services in India, Software-as-a-Service (SaaS) is one area that is growing faster than ever before. This is because businesses from large to small have realised that SaaS solutions are scalable, agile, and secure.
SaaS will be the biggest Cloud market and will double to $75 billion by 2022 globally, says Gartner. In India, the SaaS business grew at the rate of 33 per cent (year-on-year) since 2017.

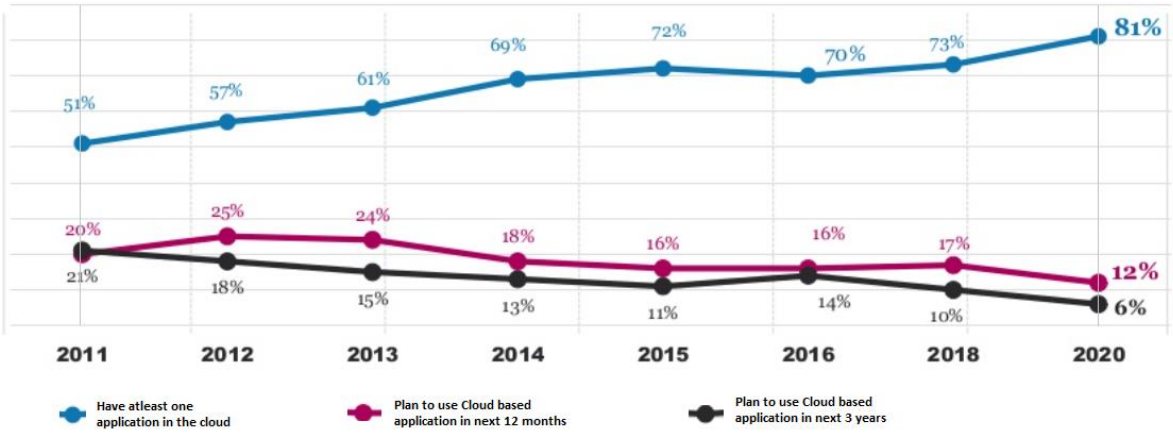
SaaS will meet burgeoning customer expectations in India as well as globally. India has witnessed the shift in customer mindset, primarily because of the benefits that some of the Indian multinational engaged in EPC Projects, Hi-Tech Manufacturing and Services have managed to achieve by implementing and rolling out SaaS-based applications.

"Initially, Indian customers used to have apprehensions about SaaS solutions, but today Indian organisations across sectors are open to considering cloud applications to meet their expectations.

According to the International Data Corporation (IDC), the SaaS segment holds nearly 69 per cent of overall Public Cloud market share globally.

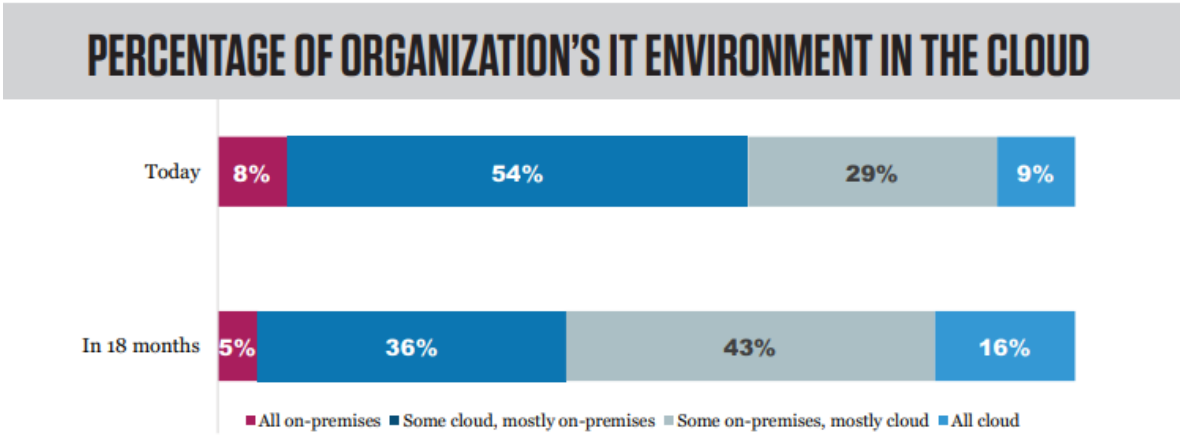
From the largest firms to start-ups, everyone is looking at Cloud or at least at the Cloud-first approach.

All of this is a deviation from traditional on-premises computing which is done via a local server or personal computer. These traditional methods are increasingly being left behind. In fact, the IDG's recently published Enterprise Cloud Computing Survey (2020) found that 81% of organizations have at least one application, or a portion of their computing infrastructure already in the cloud & 12% plan to do so within the next 12 months.



5. Efficiency – for Better Speed and Bigger Savings

Nonetheless, 92% of organization's total IT environment is at least somewhat in the cloud today. Currently, 29% is mostly in the cloud with some on-premises while 54% is mostly on-premises with some cloud and only 9% is cloud-only. It's also likely that the 8% whose IT environments are entirely on-premises include the 6% of organizations planning to adopt cloud-based apps in the next 3 years, given that ITDMs expect the shift to cloud to continue accelerating.



Eighteen months from now, 16% expect their IT environment to be entirely cloud-based, 43% expect to be mostly in the cloud, and 36% expect to be at least somewhat in the cloud, with only 5% expecting still to be entirely on-premises. Enterprises are significantly less likely (10%) than SMBs (22%) to expect to be all-cloud in 18 months, possibly because smaller organizations have fewer departments, applications, and systems to migrate.

- When do cloud savings start to kick in?

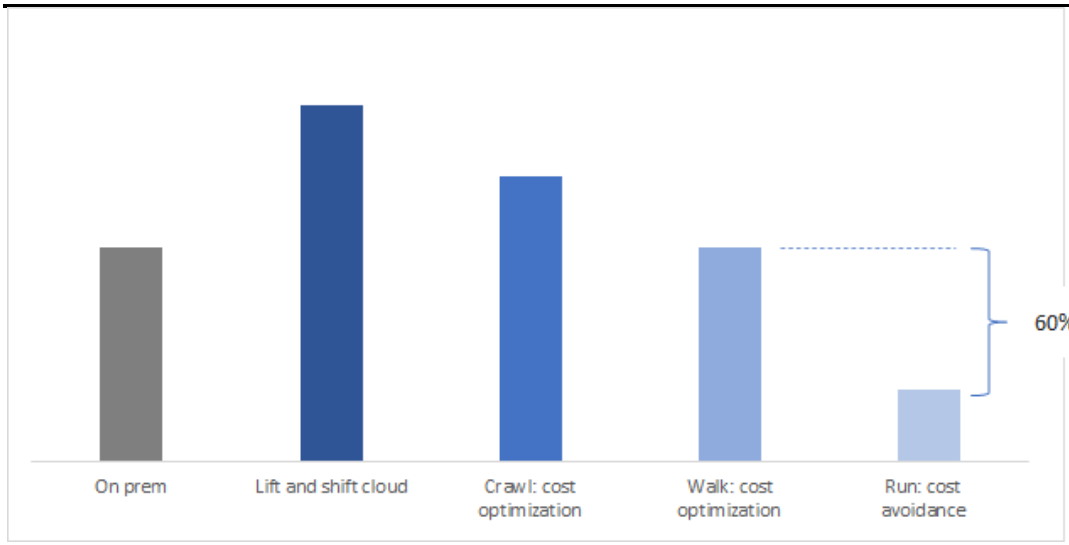
Many organisations start their cloud journey by lifting and shifting existing on-prem workloads to the cloud. Ignoring migration costs and assuming on-prem costs go to zero, the organisation will likely be paying more than they used to on-prem.

The crawl stage of cost optimization is characterized by reactive, non-invasive actions that require no cultural change. Savings are typically limited to 20% because most organisations find it difficult to make 3-year commitments required to unlock greater discounts.

walk-stage activities include turning off non-production resources, some process to fit resource size to what is needed (i.e., right-sizing), and general clean-up of unused resources.

The run-stage of cost optimization is characterized by proactive mechanisms that drive significant cost avoidance. As organisations mature into the run-stage; training or onboarding, tooling, decision making, and operational process, roles, and culture may all evolve to be cognizant of cost and value.

In addition to walk-stage activities, run-stage cost optimization levers may include architectural decisions that balance cost, versus other business/customer requirements, installation of cost anomaly detection systems, use of serverless and spot, application of IT infrastructure automation, and a shift towards open-source and microservices.



6. India's Acceptance of Cloud Services

Cloud Computing in India has a significant presence over the internet world and is rapidly growing to a fully-fledged environment. Cloud computing facilitates consumers as well as business establishments to utilise applications without installing them and get access to their personal files across the internet.

Though Cloud computing in India is not very old, its impact is creating a beeline for the internet market, so that it can gain more avenues offering better solutions for the industry and become more worthwhile for the Indian SMEs and Enterprises.

Most Manufacturing & financial institutions in India are yet in early stages in the cloud adoption process, however, the covid-19 has been an accelerant of all digitalization strategies where cloud appears as a key enabler. Scalability and elasticity of the cloud has shown the limitations of legacy applications and infrastructure to support the challenges in the global markets during the crisis.

Cloud computing has been a key enabler for Indian organizations adapting to the digital world in recent years. Some Indian industries (e.g., Information Technology, e-commerce, travel) were early adopters, with highly regulated sectors such as financial services and health starting this journey a little later. While the financial services industry's adoption of cloud is still in a relatively early stage, COVID-19 has suddenly and dramatically magnified the focus on resilience and the increased the need for agility and digital scalability. The disruption has visibly demonstrated the importance of cloud and its benefits.

Indian IT companies can both consume and provide cloud services to the organisation by leveraging cloud-enabled technology. The foremost computing models are Public Cloud, Private Cloud and Hybrid.

The public cloud services market in India is projected to grow 38% from 2019 total $1.81 billion to $4.1 billion in 2021. The highest growth will be driven IaaS which is projected to grow at 49.2%, followed by 33% in software as a service (SaaS) and 32.1% in PaaS according to Gartner, Inc.

To utilise and harness the benefits of Cloud Computing, Government of India has embarked upon an ambitious initiative - "GI Cloud" which has been named as "MeghRaj". The focus of this initiative is to accelerate delivery of e-services in the country while optimizing ICT spending of the Government.

Indian IT giants like TCS, Infosys, LTI and Cognizant are all building solutions and products on clouds.

LTI's Cloud and Infrastructure Services (CIS) provide reliable, efficient, and proven cloud and digital infrastructure services to clients. LTI's primarily focus is on next-generation technology enablement, automation, intent-driven IT, tool-based service delivery, and operational excellence.

LTI's CIS practice drives this through adaptive converged ops framework. This framework is a convergence of cognitive tools and cross-skilled workforce, lined-up to manage our clients' IT operations end-to-end.

LTI supports the global IT Infrastructure of many Fortune 100 companies. LTI's success across client engagements can be attributed to automation, advanced Digital platforms, and frameworks, in tandem with experience, talent, and tools required to help clients create, run, and manage the next-generation IT Infrastructure.

- **The situation derived from the COVID-19 pandemic.**

The situation derived from the COVID-19 pandemic, as in most aspects of life, has proven to be an accelerant of some trends that were already identified, of some activities that were already underway. It is also a differentiator for those that are and aren't advanced in their adoption of the key technologies.

Cloud has played an important role in managing transition to new models of work, from physical to remote environments, to managing volatile spikes in service demands.

For some firms, cloud architecture has represented a key element to effectively manage the new scenario, supporting a resilient infrastructure in the context of the otherwise limited bandwidth of traditional architectures.

Scalability has been critical in many ways, but we can focus on the aspects that have benefitted more from this characteristic of cloud architecture. These aspects, as mentioned at the beginning of this section, can be divided into two:

- Where cloud computing has made the process simpler and faster. Cloud computing has positively impacted employees and customers alike.

    1. Impact on employees –

       As staff could not reach office during lockdown, providing remote work capabilities and workstations for employees was a must.

    2. Seamless impact on customer service

       Extending secure and reliable access to applications and systems remotely, creating virtual desktops for branch staff or call center agents has been translated into the possibility to provide high-standard customer service without incurring significant capital investments.

- Where cloud computing has been more than a facilitator, it has become a vital enabler to avoid service disruption. Cloud computing has impacted the actual provision of service in an environment of massive market volatility.

Acknowledging that the massive COVID-19 challenge is very difficult to manage in any case, those organizations that had already started the cloud journey (entailing technology, talent and cultural shifts) have been able to face these disruptive times with distinctive tools and capacities.

Two main situations where the elasticity and scalability of the cloud architecture have been an important asset to evolve the traditional model and to make it in a fast and efficient fashion.

CONCLUSION

The main objective of t the study is to provide a framework to find possible Advantages & Risks based on the three enterprise perspectives (Economical, Technological and People) that Indian Conglomerates has while evaluating Cloud solution. The results indicate that economical perspective is the major benefit that Indian companies perceive for adoption of cloud whereas the major threat is the technological issues like data backup, security, availability etc. People related threats are not considered important by many as the number of employees working and using similar applications / social networking sites. This framework can be used by other companies to find out important Advantages & Risks that they perceive while evaluating options on cloud apps.

REFERENCES

- **Cloud Computing**
  By Lizhe Wang, Rajiv Ranjan, Jinjun Chen, Boualem Benatallah
  Publisher(s): CRC Press
  ISBN: 9781351833097

- **Advances in Big Data and Cloud Computing**
  By Elijah Blessing Rajsingh, Jey Veerasamy, Amir H. Alavi, J. Dinesh Pete
  Publisher: Springer Singapore
  ISBN: 978-981-10-7200-0

- **Architecting the Cloud: Design Decisions for Cloud**
  By Michael J. Kavis
  Publisher: Wiley
  ISBN: 978-1118617618

- 2020 IDG Cloud Computing Survey: www.idg.com

- India's Move to Adopting Cloud Services: www.analyticsindiamag.com

- The public cloud services spending in India: https://www.gartner.com/en