



PwC

Insights

On Technology

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Foreword



Over the past few years, disruption has become the new normal. It is coming from new business models, start-ups, regulations or even the geo-political environment. Emerging technologies are the new windows of opportunities. Organisations that embrace, rather than resist these emerging technologies will reap the benefit of disruption.

The very nature of work then is being redefined, and so is the workforce. Evidently we are living through a fundamental transformation in the way we work. To be prepared for this, it is imperative to understand it. Understanding generates a power of perspective, driven by introspection and adoption of a multidisciplinary approach that places the human component at the centre. It entails striking a fine balance between the business (B) need, technology (T) as an enabler, and experience (X) of the end human beneficiary – what we refer to as the BXT approach. This is our approach to solving some of the most important problems faced by our clients and building trust in society at large.

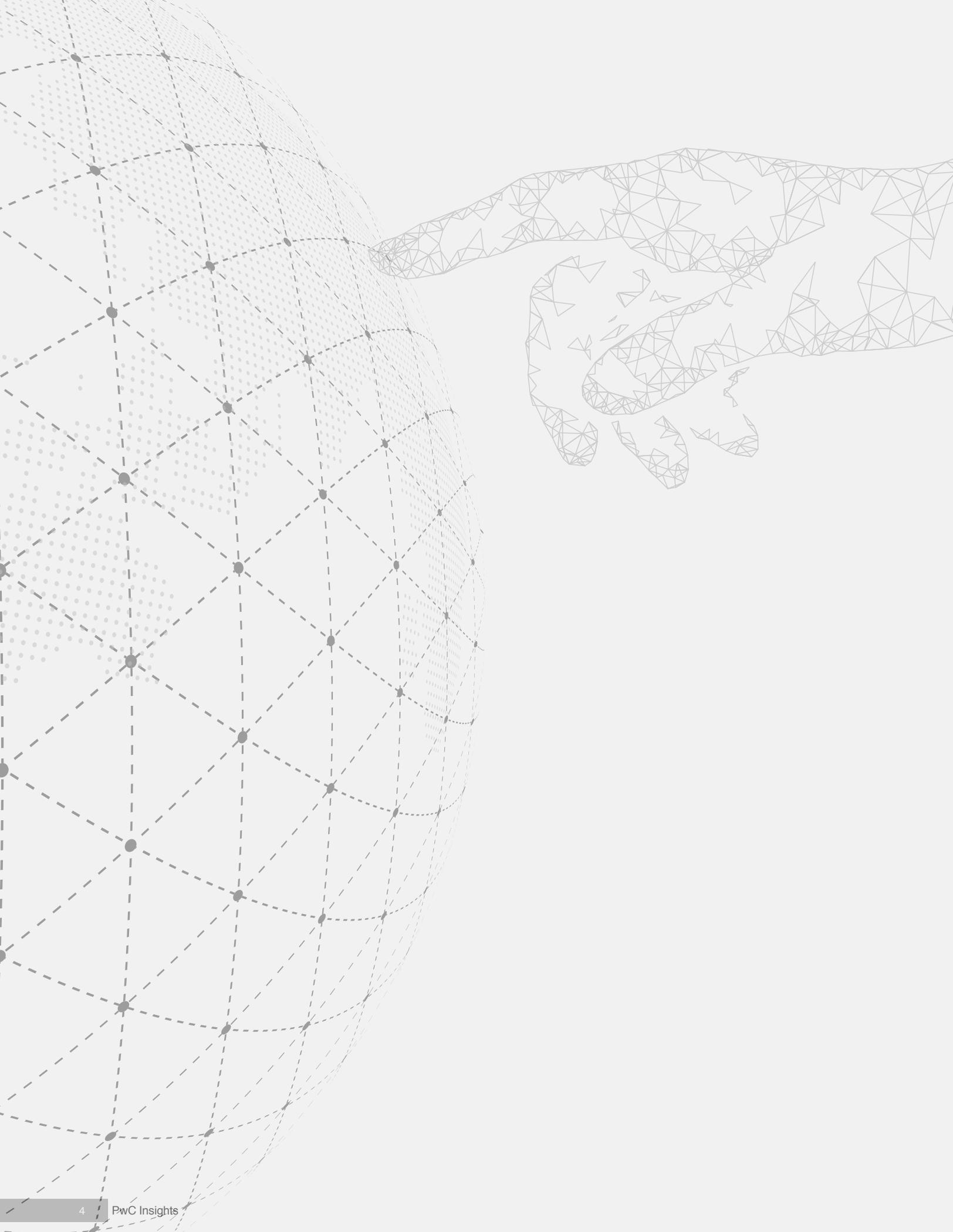
As you – our clients – focus on being ready and prepare for the next generation of consumers, PwC India is proud to be your partner of choice in this transformation journey. The thought papers in this book provide insight into how organisations can stay agile, and elaborate on how we - as trusted advisors - can collaborate with our clients to keep pace with change.

Find out more about:

- **Digital transformation:** How to do business smarter and faster, measuring digital outcomes and bringing new skills to the workforce
- **Design thinking:** How to create products and solutions that are relevant, memorable and more meaningful
- **The cloud paradigm:** How to use the model to enable rapid innovation cycles in enterprises
- **Artificial Intelligence (AI):** How to use AI to improve efficiency and transform the workplace
- **Cybersecurity:** How can Boards gear up for the new realities and challenges around cybersecurity
- **Scale-ups:** Why entrepreneurs should talk about failures and draw lessons to become more resilient

I hope you will find this publication interesting, informative and insightful. I look forward to your thoughts on the topics my colleagues have discussed at length. I'd be happy to deliberate on how we can join hands to shape and make a better tomorrow.

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Sprinting towards digital transformation

Digitisation presents organisations with transformational opportunities. However, organisations will need to gear up to be able to take part in this ‘transformational sprint marathon’



The first wave of automation and global connectivity began in early 1990 and continued to late 2000. This brought about a fundamental change in business models of large global companies. Words like ‘offshore’ and ‘outsourcing’ became popular parts of business lexicon. Businesses embarked on ambitious, transformative programmes aimed at capturing new market opportunities, reorganising business units, creating shared service organisations, implementing enterprise IT systems and more.

The rate of change that technology has brought has only accelerated over the last decade and this change is forecast to grow at an unprecedented scale. Advancement in how data is created, managed, stored and shared by individuals and businesses, has created both an exponentially growing range of opportunities as well as threats for organisations.

Picture this scenario

- As AI apps like Alexa and Google Home enter our daily lives, Gartner predicts that by 2020, 85% of business to customer interactions will not need a human
- A new cloud server is added for every 600 smartphones or 120 tablets in use. Smartphones are quickly beginning to outnumber the people on the planet. In order to facilitate this proliferation, new cloud servers have to go up so that more people can have access to data
- Cybercrime was the second-most reported crime, across the globe, last year, says a PricewaterhouseCoopers (PwC) survey adding that by 2020, 25% of cyber attacks against enterprises will involve IoT devices

Fourth industrial revolution

The ‘Essential 10’ emerging technologies – are most commonly now referred to under the catch-all term of ‘digitisation’, also sometimes referred to as the Fourth Industrial Revolution or Industry 4.0. This rapid change and technology evolution is driving unprecedented digitisation across industries – integrating value chains from suppliers to distributors and within organisations, from the shop-floor to the front-office.

Industry leaders are making serious investments in developing strategic views on their digital priorities – creating new digital business models, products and services, implementing digital technologies to enable cost efficiencies and capture new markets / market share and securing their “digital assets”.

NEI – A case in point

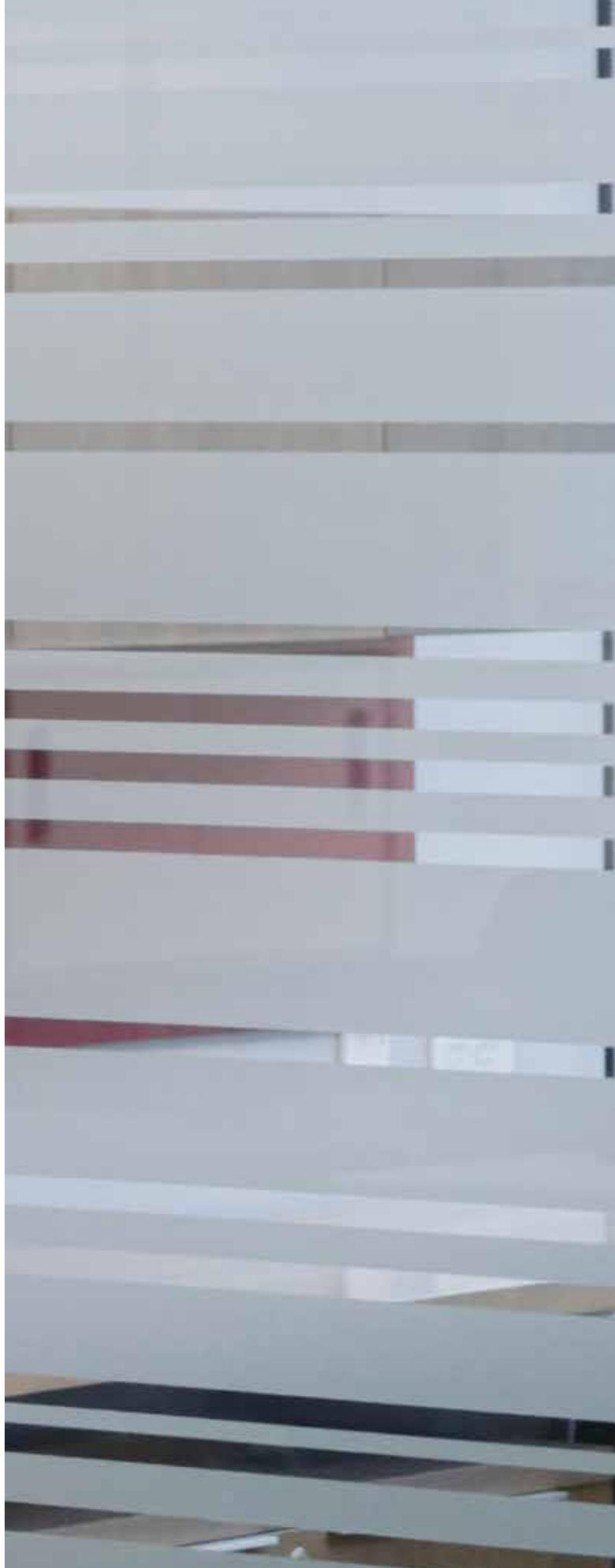
Take the case of the precision manufacturing company – National Engineering Industries (NEI) that in the light of automation, global connectivity, and increasing government policy and regulatory activism, recognised the need to develop a comprehensive roadmap to prioritise its projects and investments in order to build a truly digital business. The company focused on five key tenets – Efficiency, Flexibility, Agility, Employee enablement and Innovation.

The need was to

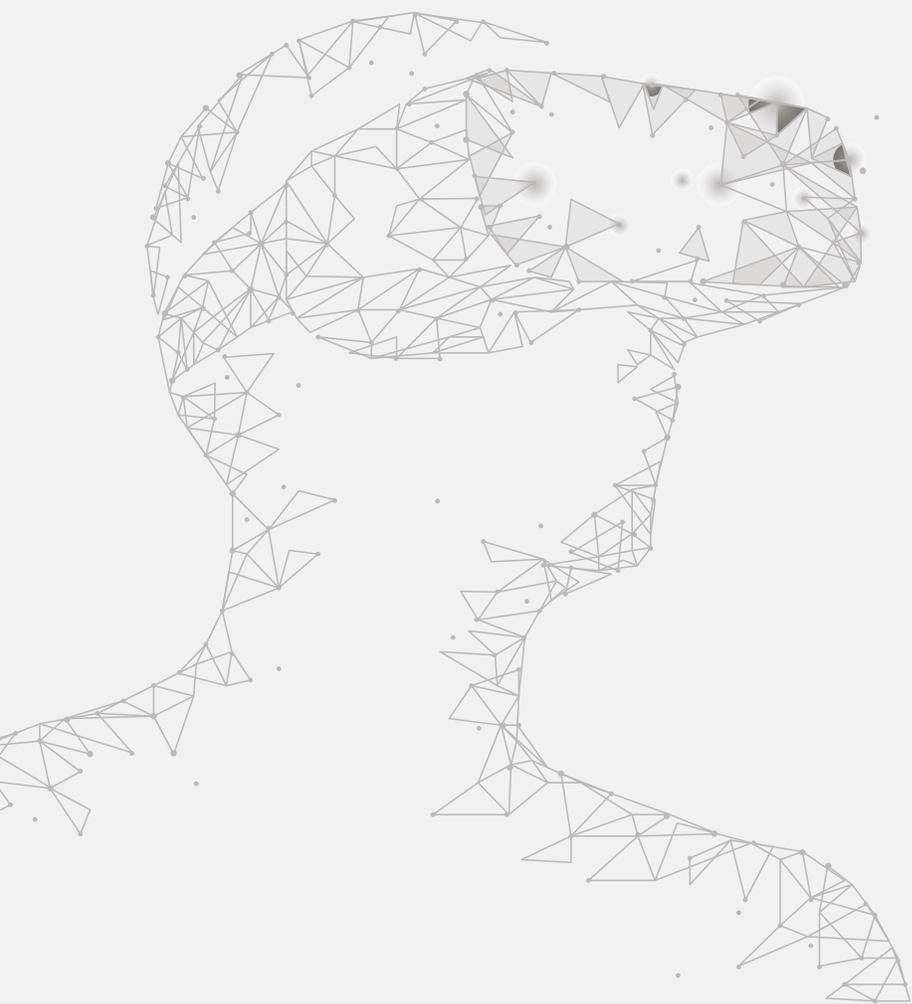
- Increase operational efficiencies
- Maximise customer reach
- Create a culture that promotes knowledge curation and sharing
- Develop smart solutions that are in sync with the emerging trend of connected products

Explained NEI CEO Rohit Saboo, “We are on a digital transformational journey to develop smart solutions that are in sync with the emerging trend of connected products. We have also created a digital incubation centre to improve our implementation strategy and ensure seamless digital operations across our operations. We are confident that these new waves of innovation will collectively build sustained levels of superior performance over time.”

Digitisation thus presents organisations, not only with transformational opportunities, but with significant threats as well – some of which have been discussed in the global media over the past few months – data privacy and cybersecurity and the rise of artificial intelligence being two prominent ones. And while every organisation may go through its own unique journey albeit at a different pace, it is increasingly clear that maintaining the status quo, is not an option any longer. Organisations will need to build a long-term outlook, as well as short-term execution capabilities to be able to take part in this ‘transformational sprint marathon’.







Design Thinking for entrepreneurs

Design thinking helps us find the right problems to solve and to design and deliver products/services/experiences that are not only memorable but also meaningful at the same time



How would you define customer experience? Speed? Convenience? Personalisation? Efficiency? Consistency? If you said all of the above, you're headed the right way...but is that all? When a customer describes the experience you delivered using two words – meaningful and memorable – you are in the right place. If you deliver an experience that is only meaningful or only memorable, you have work to do. Lots of it.

So, how can a company overcome this seemingly insurmountable task? This is where 'Design Thinking' and a human-centred design lend a helping hand. A human-centred design can help us lay the foundation for delivering an experience that customers love and also love to talk about. Design Thinking helps us find the right problems to solve, and to design and deliver products/services/experiences that are not only memorable, but also meaningful.

If it is so hard, why bother? Well, it is about a small two-digit number – 16%. According to PriceWaterhouseCoopers' (PwC's) Future of Customer Experience Survey 2017/18, customers are willing to pay price premiums of up to 16% for an unforgettable experience!

Here are four practical ways of leveraging Design Thinking in this digital age to deliver meaningful and memorable customer experiences. And, to get that 16% price premium.



Encourage the challengers

“What if” – two of the most potent words in the English language insipid enough on their own but have the ability to open up a world of possibilities when used together.

- What if we help people be ‘mobile’ without actually getting into a vehicle?
- What if we were a bank without branches?

It is important to foster curiosity and a culture of asking questions. That is a very big ingredient for helping you identify the right problems to solve. As Charles Kettering said, “A problem well stated is a problem half-solved”. Design Thinking will help you find the right problems to solve or it will help you reframe the context in a way that makes the problem statement significantly more meaningful.



Graphic: PwC

Create the 'new', now! Speed is the name of the game. Faster time to market gives companies a tremendous advantage. Clearly, direction is more important than speed, but once you have the direction right, the question is how do you go fast in the right direction? Design Thinking helps companies create a culture of rapid experimentation. Rapid prototyping and testing with key stakeholders allow for 'friction points' to be identified at an early stage, allowing companies to rapidly progress towards a solution that is perfect not only according to the company but is perfect also according to customers.

Embrace technology but... Did you know that 80% of consumers say that speed, convenience, knowledgeable help, and friendly service are the most important aspects of a great customer experience? They don't really care about trendy features, eye-popping designs, or high-end technology unless the core elements of customer experience are met. Don't adopt the latest technology for the sake of it. Instead, prioritise technologies that provide the core benefits.

It is important to know that while humanity has made exciting and huge strides in technologies like AI, machine learning, IOT, robotics, blockchain, etc., only people understand people best. Without empathy, the cornerstone of Design Thinking, one cannot deliver a good customer experience.

Empower your employees: The *Customer Experience Survey* found that almost half of the world's consumers feel that the employees they interact with don't understand their needs. Sixty per cent said they would stop doing business with a brand if the service they received wasn't friendly. It's therefore critical to empower employees with the right attitude, skills, and information – delivered through the right technologies – to serve customers better.

Happy hunting that 16% price premium! Your customers are waiting.

Using Design Thinking

An automotive ancillary client approached us recently to help create a system to accurately record the date of sale for their product. The date of sale was deemed necessary to determine if the warranty was yet valid or not. The client had also developed a list of requirements for the system. An easy enough solution was

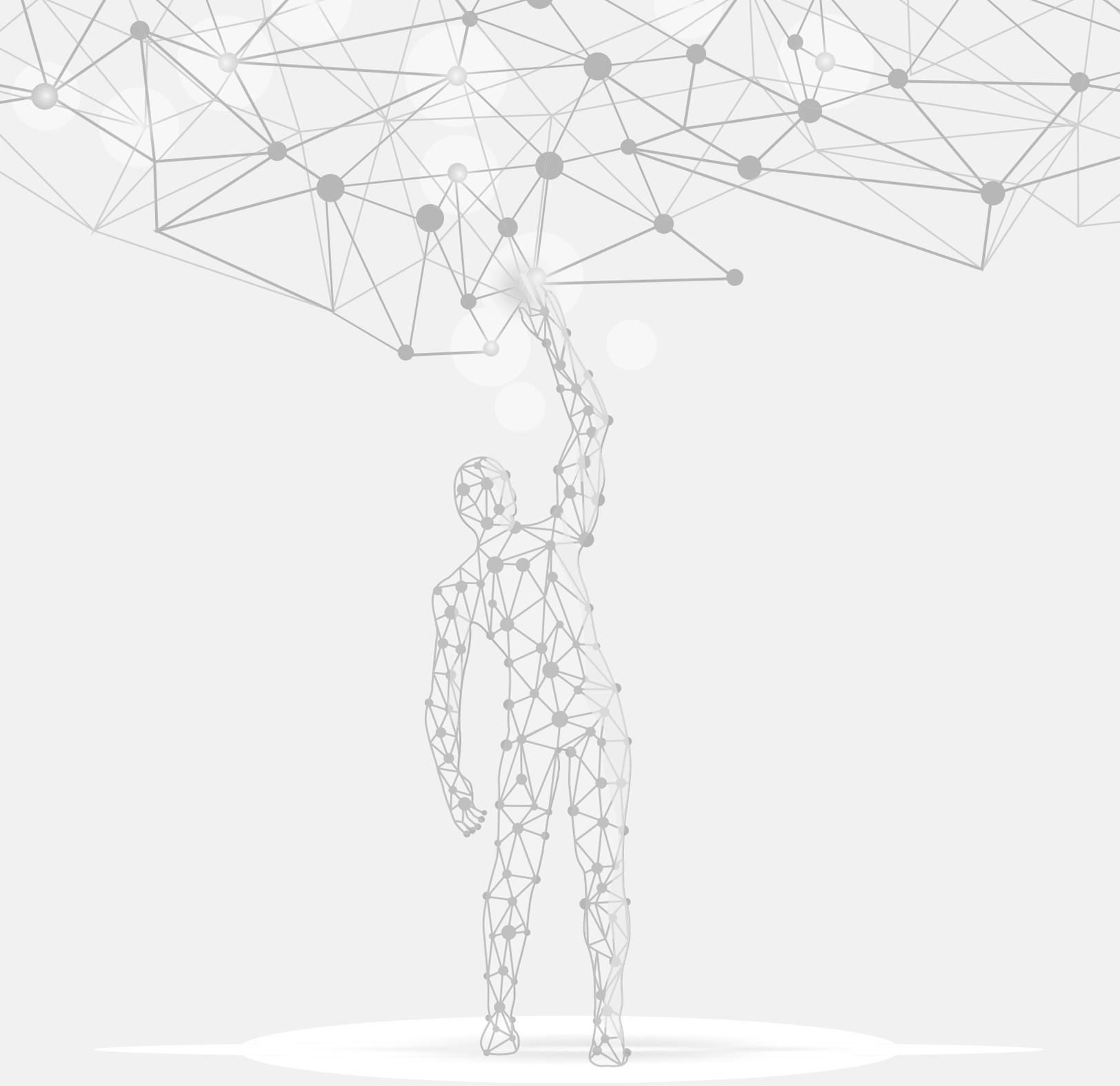
to create the system and an app to capture the date of sales and roll out the solution. We were, however, curious about the "why" more than the "how" of the issue. We decided to get into this using Design Thinking and discover the real problem – which, during the course of our research, we realised, was unorganised sales channels and their motivation (or lack thereof) to record the date of sale accurately. So, instead of simply creating an app like the client initially wanted, we developed a comprehensive yet innovative solution that addressed the obvious as well as the unarticulated needs of key stakeholders.



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Prateek Sinha leads the Design thinking and Consumer Experience practice at PwC India. Having worked with leading retailers and CPG firms across the globe, he has the ability to empathise, ask the right questions, connect the dots, and challenge the status quo to deliver game-changing outcomes.



The Cloud paradigm: Transforming the workplace

Evolution across the technology stack is merging to become a single set of business enabling components, supported by the cloud. A successful cloud transformation is measured by its ability to facilitate faster change and evolve along with business needs.



Organisations across the spectrum are under increased pressure to drive speed, agility and strategic impact for the business. Cloud technologies enable organisations meet these growing needs. More than a cost play or a new third party service, the cloud model enables rapid innovation cycles which accelerate time to market and provide the agility to respond to changes in business requirements and emerging technologies.

In order to take advantage of these new capabilities, IT organisations must evolve from a centralised authority into an orchestrator of business services, with a focus on constant improvement and innovation. We should have a Cloud Operating Model that provides a blueprint for the transformation of IT to support an agile enterprise.

Shifting IT to a cloud-enabled model

This requires a new mindset across several key areas of the organisation. Transformation requires an organic change in the culture and goals of IT, and must be communicated and managed carefully. We are moving from a software defined enterprise to fluid, agile, iterative microservices-based organisation.

This type of fundamental shift will be challenging for any organisation, and the entire transformation may not happen all at once. However, in order to fully take advantage of the agility and responsiveness enabled by cloud technologies, each area must eventually be addressed and aligned to the new model.

Cloud technology adoption

Collaboration between IT and business units will be critical to grow scope appropriately while ensuring that the business does not circumvent the IT organisation in search of better solutions (i.e. “Shadow IT”).

IT must support a fluid, iterative, assemble-to-order approach that emphasises collaboration and innovation. Ideas will come from a cross-functional community of engineers, developers and business stakeholders, through a structured innovation and design process.

The new IT model in the cloud era

Organisations should take a business focused approach, by breaking down cloud solutions into the essential components which make up the service. From the consumer’s perspective, these components are similar to the structure of a typical IT services contract.

Comparing clouds should be the process of comparing these contracts. A primary consideration when introducing new services is how they will be integrated with the existing technology environment. Workflows must have the ability to communicate between different systems and users with transparency.

Enabling the change

As the organisation shifts to a cloud-enabled structure, the governance model must also evolve. Trying to write detailed policy and controls for the cloud environment is unrealistic and acts as a roadblock to innovation. Governance should be lightweight and enough to change quickly, but strong enough to understand and support the security and regulatory requirements of the organisation.

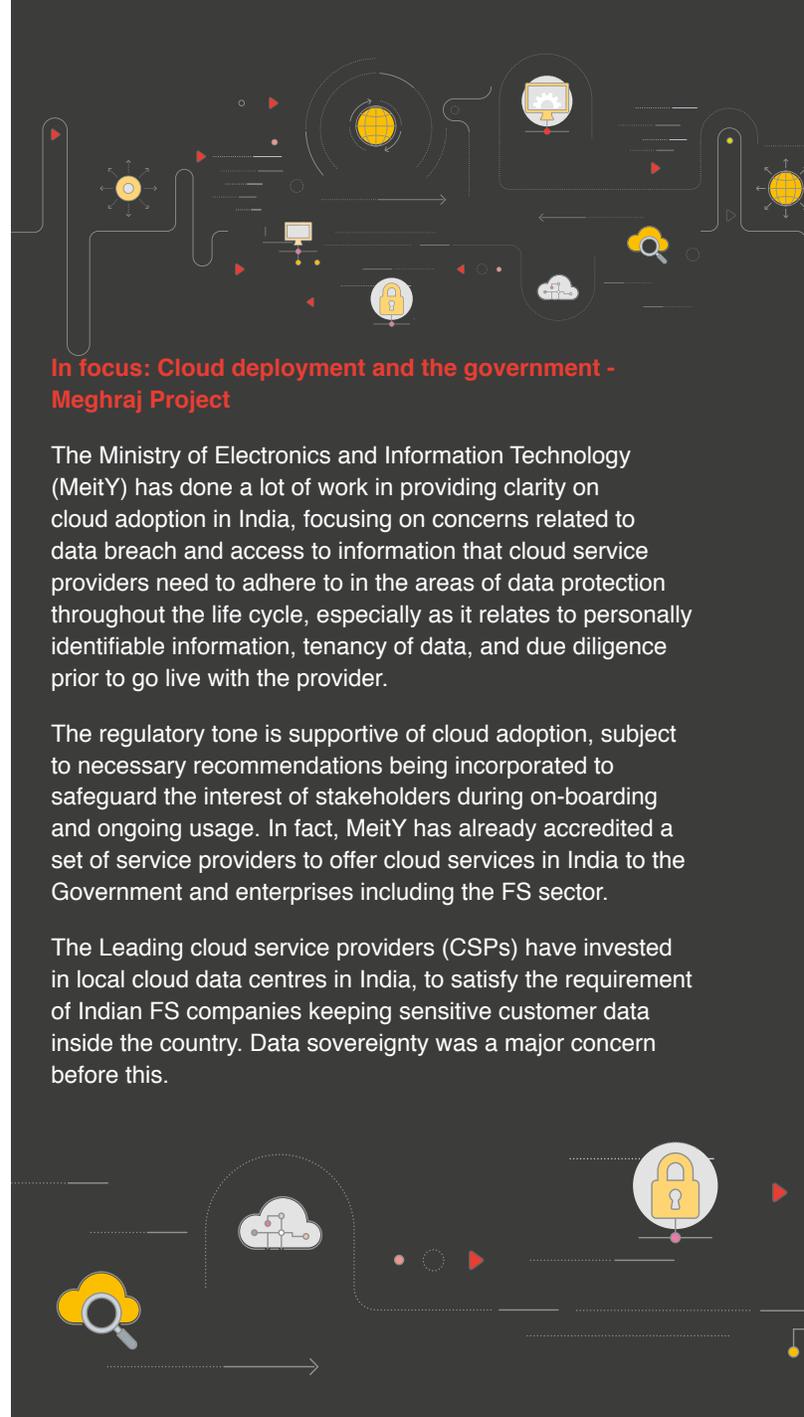
Focus on principles before driving policies

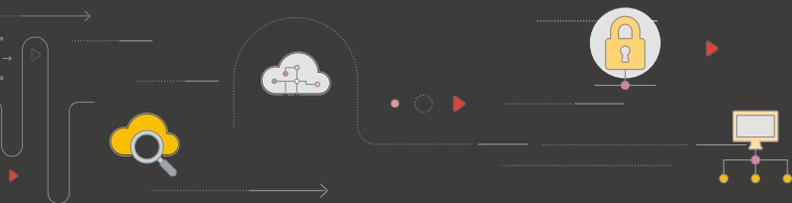
When first defining cloud policies and governance, a “boil the ocean” approach of mapping all existing controls to the cloud environment is overwhelming and results in inconsistent governance. Policies should be aligned to a strong set of principles which can be modified and customised as the cloud environment matures.

Establish a firm-wide, multi-tiered cloud governance early and implement, automate, forward-thinking governance

Organisations should implement a comprehensive governance model at every level of the cloud journey, including a Cloud Steering Committee, Cloud Governance Group, and Cloud Working Groups. Each group should have a defined purpose, set of responsibilities, and cadence. The organisational structure supporting governance must be developed with the adoption lifecycle in mind, as the cloud transformation will change the nature of the decisions and discussions (initially focused on risk and strategy to later focus on operational stability and cost).

The organisation should recognise the significant effort and tackle the most challenging changes in a prioritised order. A Cloud Centre of Excellence (CCOE) can act as the fulcrum for change and help support adoption by demonstrating and socialising value from transformation. CCOE may serve as the centre for ideation, proactively focusing on the most challenging business problems, with a feedback loop to capture and disseminate the learning over the entire end-to-end process as part of the knowledge centre.





Future of cloud transformation in India - Financial Sector

Access to the latest technologies, cost savings, ease of scaling-in and scaling-out, faster time-to-market for deploying systems, enterprise technology standardisation, and the ability to access data and applications on the move are all benefits that are driving financial services firms to adopt cloud computing. Also, the latest innovations in the areas of machine learning (ML) and artificial intelligence (AI) further pushes customers towards the cloud.

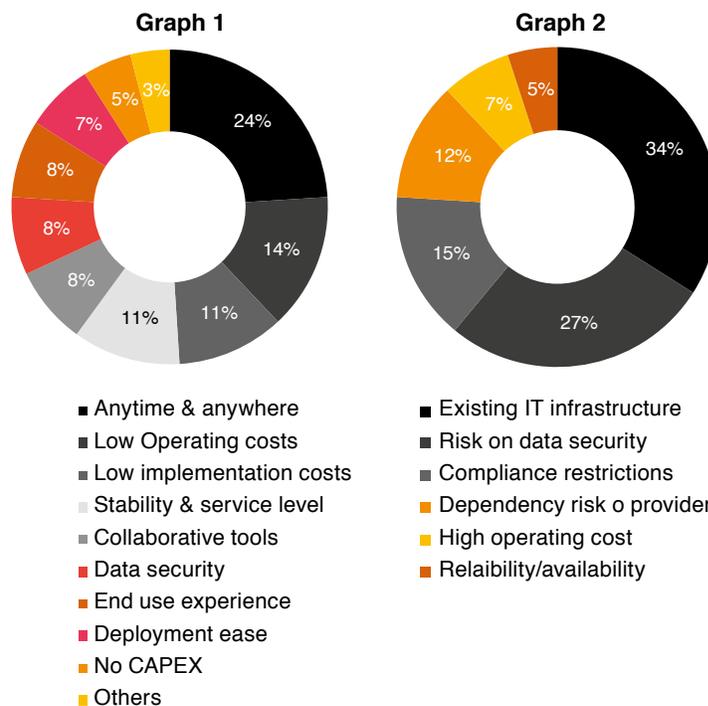
According to the Institute for Development and Research in Banking Technology (IBRDT) established by the Reserve Bank of India there are four factors that need to be considered for cloud adoption:

- Technical adequacy for porting the application to the cloud – assess the application profile to ensure it is a right fit to be ported to the cloud
- Cost efficiency
- Risk including availability requirements, regulatory, compliance and statutory requirements, data sensitivity
- Control over intrusion decisions, vulnerability-monitoring, and denial of service attacks.



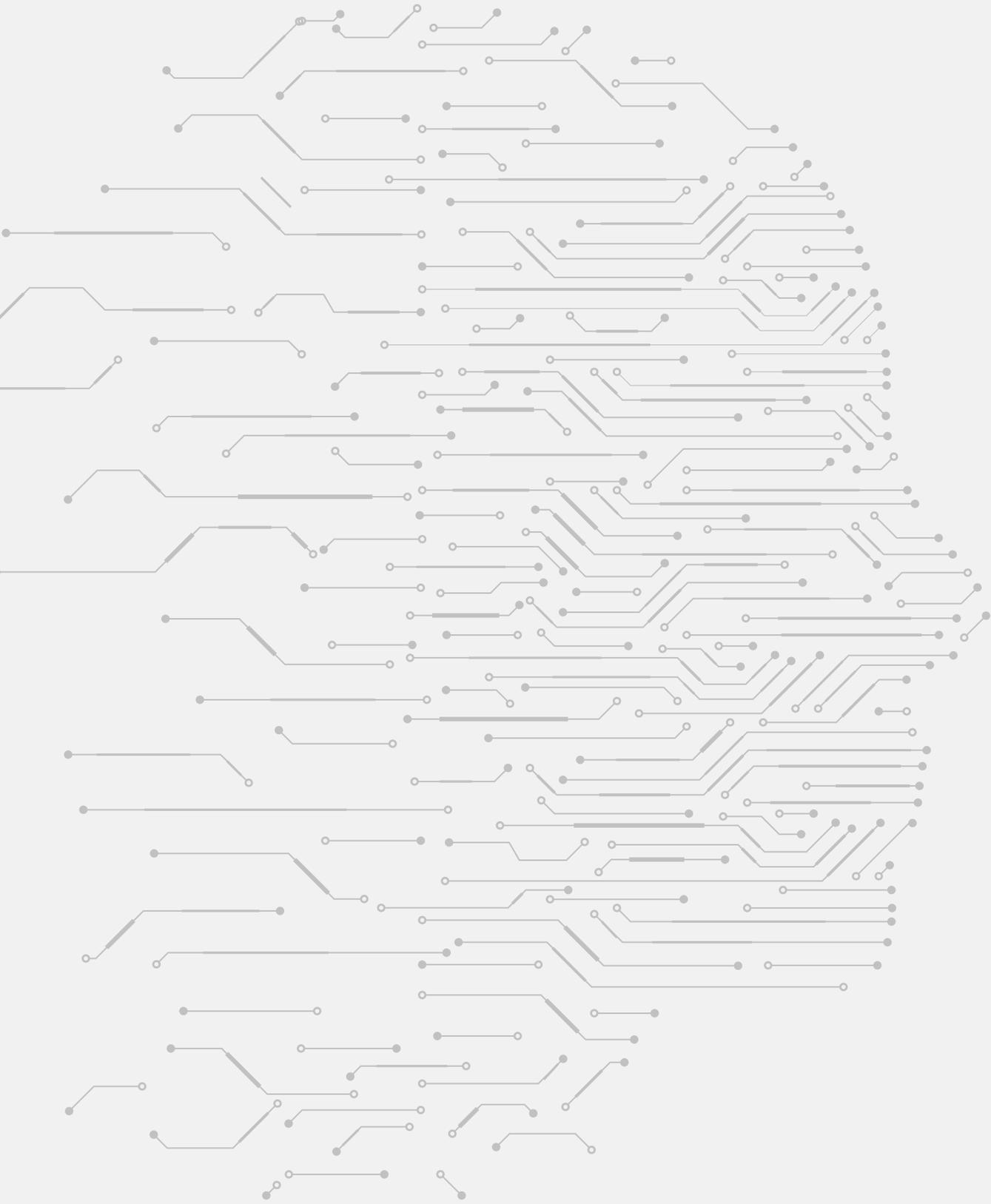
While the Financial Services (FS) sector has been slow to adopt the cloud for the right reasons, we may have reached a tipping point in terms of significant movement to the cloud in the next three to five years across banking, insurance and NBFCs. It is important that FS companies invest time in defining their cloud strategy and adoption roadmap, along with their cloud policies and operating model, which will provide a lot of clarity on the boundary between the cloud provider and the company. FS companies should also spend time evaluating their application portfolios that have been built up over the last several years and then come up with a meaningful migration strategy to the cloud.

According to a PwC global survey of FS organisations, the following interesting insights have come out. Graph 1 illustrates the main reasons why respondents said they are adopting cloud, and Graph 2 are the main challenges as per respondents in adopting cloud.



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Pawan Kumar S is the Technology Consulting Leader for PwC India. With around 27 years of experience in the industry, Kumar has a deep knowledge of the data and analytics area and emerging technologies and has helped multiple large clients in their transformation journey.



AI: Possibilities of transforming the workplace

As the Artificial Intelligence (AI) market in India matures, firms are looking at unavoidable changes in their workplace. The market is seeing technology leaders and large firms investing in this space. At the same time, a number of AI startups have mushroomed in India in the recent years. To stay competitive and relevant in the market, organisations would do well to rethink existing practices and develop newer business models and offerings. This would involve making use of technologies such as machine learning, deep learning, computer vision and natural language processing among others to power intelligent systems.

A brief overview

As per a recent PwC India Survey, 55% of business decision makers highlighted the benefits of AI for businesses outweighing its potential downside. The benefits include boost in productivity, access to strategic insights for decision making and accelerated growth.

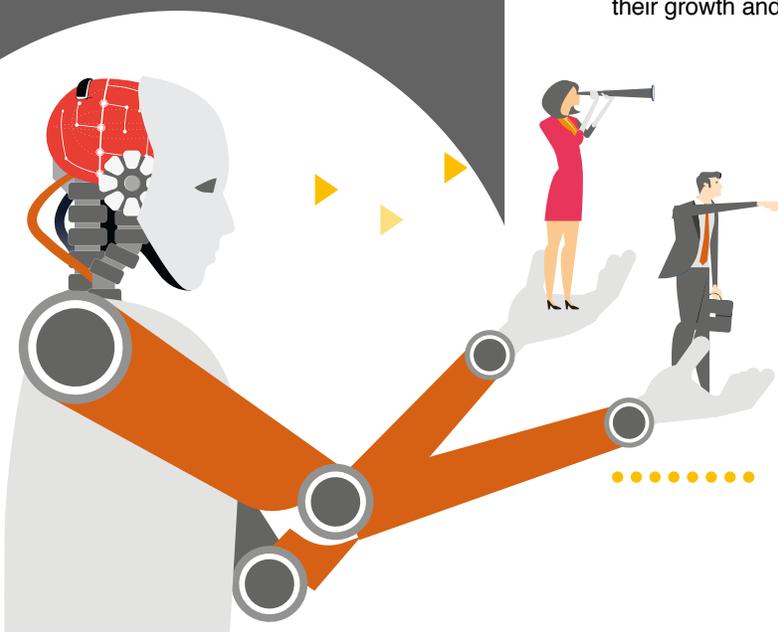
Over 70% of business decision makers indicated that the productivity and efficiency from AI powered solutions such as digital assistants can be brought about by outsourcing repetitive job elements like writing and responding to emails, entering timesheet hours and scheduling and updating calendars, to name a few.

Can AI improve efficiency at the workplace?

At the workplace, the advent of AI-powered solutions (such as digital assistants) are expected to hold the potential for automating a number of time-consuming, repetitive and less value-added tasks. It can be expected that these automations would free up employees' times to pursue new innovative opportunities. At the same time, AI advisors (machines and systems that gauge employees' progress and performance and are responsible for their growth and deliverables) at the workplace are expected to help create a more balanced workload and increase working flexibility.

Business decision makers across industries and functions are actively exploring the benefits of humans and machines working together. When asked about which AI-powered solutions they perceived to be of high impact, nearly 51% responded by choosing Machine Learning, while Virtual Private Assistants, Decision Support Systems, and Automated research and information aggregation solutions closely followed as some of the other solutions with high perceived impact (nearly 40% of responses each).

At the workplace, the advent of Artificial Intelligence (AI) powered solutions (such as digital assistants) are expected to hold the potential for automating a number of time-consuming, repetitive and less value-added tasks



Will businesses be comfortable with an AI powered appraisal system?

An AI advisor assisting in promotions and pay raises was also met with positivity. About 83% of the decision makers showed faith in AI advisors to be either more or at least equally fair in giving promotions and raises compared to their human counterparts. At the same time, 75% of the decision makers trusted either an AI advisor only or a combination of human and AI advisors over a purely human advisor to make the ultimate decision regarding their promotions.

How can an AI system's actions be understood?

AI systems entrusted to conduct critical functions, such as performance evaluations, need to be both responsible and explainable. Responsible AI ensures that its workings are aligned to ethical standards and social norms pertinent to the scope of operations. This helps to prevent, or at least minimise, potential biases in outcomes. Explainable AI, on the other hand, ensures that the inner workings of the AI system are transparent and well understood by the system owners and administrators. Thus, its outcomes can be explained beyond reasonable doubt or ambiguity, in the above case, helping build trust among employees.

What are the barriers in utilising AI?

While the above observations underline the favourable impact of AI integration for businesses, potential barriers were also identified. The most common being high costs. Other concerns included skill gap (i.e, the lack of technical abilities among employees), lack of quality data for building effective AI applications, privacy and trust. As AI innovation and the overall technology ecosystem advances, hardware and platforms for storage and data processing are becoming more affordable. Hence, cost as an inhibitory factor may become less relevant over time.

In conclusion

To bridge the skill gap, it is imperative for organisations to invest in the right talent. Skilled employees such as data science professionals, statisticians, robotics engineers and domain experts are among highly sought-after professionals in the field. To tap them might require a combined strategy – hiring specialists in the field, keeping in mind the most impactful use cases for organisations while simultaneously training employees in-house. Tie-ups with academic and professional institutions providing specialised training could also be valuable in this regard.



Finally, AI innovation and implementation for businesses must align with its existing 'needs'. This could be addressing challenges or making core processes more efficient rather than creating the need to fit AI powered applications. A potential strategy could be identifying pilot projects to make use of readily available data that can help realize quick benefits from AI driven applications. These could then serve as the pathway to early successes thereby facilitating buy in from leaders, investors and other stakeholders for the AI journey.

Job elements that can be outsourced to digital assistants



Role of individuals

Considering the pace at which technology is evolving, it may be difficult to predict the skills that will be needed even five years from now. Hence, employees and businesses need to be ready to adapt. Inevitably, most of the responsibility will be borne by the individual, who will be required not only to adopt to organisational change but also acquire new and upcoming skills and capabilities throughout his/her lifetime. This will help him/her in learning new tasks and even retaining himself/herself at the middle of his career.

Role of businesses

As the use of AI increases within companies, it would help if employees are aware about the complete AI ecosystem, rather than only their function. A unique way for tech companies to increase the number of jobs available to people could be by using technologies such as cognition and natural language processing and generation to break down interconnected systems and tasks and, as a result, sieve out creating innovative tech jobs for humans.

Innovation will play a significant role for businesses in future. Fostering a culture of innovation driven by rewards and recognition has become vital for organisation to identify solutions to their challenges and use technology to address them. Timely skill development of employees through training will ensure smooth transition into new roles within a digitally transformed organisation.

Role of educational institutions

Considering the changes in the technology landscape and in companies, academic institutions need to play a role in skill development by creating an interface for students to connect with industry professionals. Academic institutions can also encourage and inspire students to work in the industry sector on different real-life challenges pertaining to current technologies and practices. These initiatives will help organisations to evaluate their prospective employees and students to get more hand-on industry experience.

Another activity that academic institutions could undertake is upgrading the curriculum, workshops and laboratories with the current industry requirements. Advanced technology infrastructure and equipment have been installed in a few premier institutions. This should be replicated across other institutions as well.



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Sudipta Ghosh is the Data Analytics Leaders for PwC India. Ghosh has more than 19 years of consulting experience in the field of Data and Analytics and Enterprise Performance Management (EPM). He is responsible for defining the product/ solution strategy, go-to-market initiatives and incubating differentiated solutions from an industry perspective at PwC India. He is also a member of the PwC Global Data and Analytics Leadership team.



The great Indian start-up stage play

It is important to talk about failures not only from the ‘therapeutic’ perspective, but also to help future entrepreneurs understand where these start-ups went wrong.



India’s entrepreneurship story has been promising. We see many successful entrepreneurs in India today, some well-known, some less known. However, it seems there is a flip side to all this success. Have we turned into a nation of ritualistic script adopters, becoming part of a play that is fully scripted—the performances of all the actors, directors and producers repeatedly tried and tested—and the audience unfazed because they do not have new expectations? In this sort of a theatre, we often do not notice or hear about failed actors or starving artistes who did not quite make the cut because they took a different cue. Similarly, there are entrepreneurs whose stories may not have unfolded as they anticipated. Their stories are not spoken about, even when the players spring back to action.

As a nation of start-ups, there are a couple of attitudinal changes that are required to overcome the taboo of not talking about failures. Unlearning taboos requires cultural recalibration. Hundreds of years of colonialism and pseudo-socialistic views have left us impregnated with a standard ‘philosophy’—the notion of survival of the fittest. This starts with our educational system. We are conditioned to believe that only the best make it to the top. This conditioning also decides our career paths as well as our nuptial roadmaps; there is seldom any room for failure.

The good news is that millennials don’t seem to care for such pressures. They ‘own’ their aspirations and most importantly, are willing to take risks. This is where the start-up story becomes interesting.

We need to start writing new scripts with this new mindset. This would mean that a bunch of entrepreneurs who haven’t quite ‘made the cut’ will be able to act out their parts again. The community of developers, designers, and employees will now have the chance to take part in something new and untested. It could be that the new script translates to a lot less theatre-goers and consequently less ticket sales. But this appetite for risk is the foundation of today’s start-up ecosystem.

Start-up rebounds and learning from others

It is important to talk about failures not only from the ‘therapeutic’ perspective but also to help future entrepreneurs understand where these start-ups went wrong. Most often, it is the lack of focus on the right phases and avoidable stress on the less important phases that lead to such shortfalls. Even the smartest ideas can fail without the right implementation and scale.

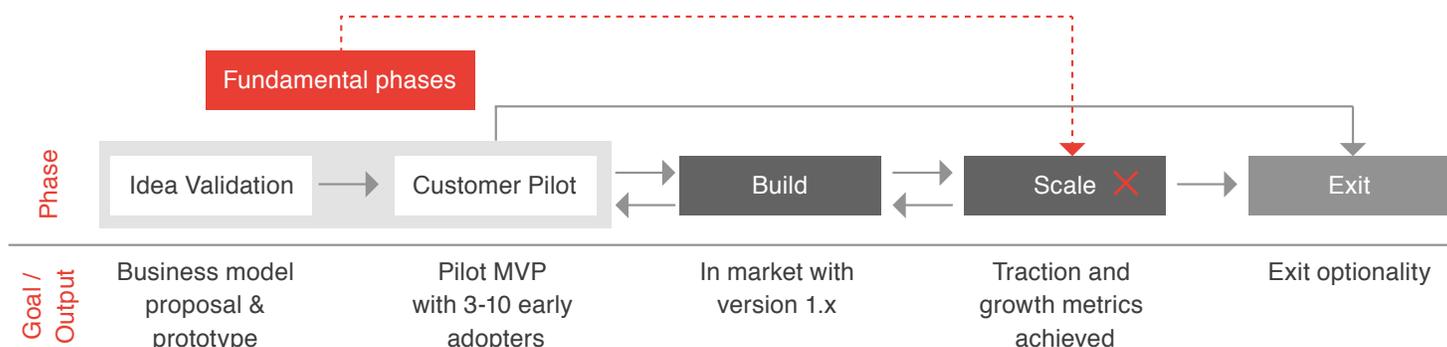
A number of start-ups rush to build products and scale, ignoring the pre-build and scale phases. Product building is not always the first stage. Idea validation and customer pilot phases (see graphic) are fundamental to succeed at the scale stage.

Once the idea takes shape, functional prototypes are adopted to test it and once validated, entrepreneurs can shift their focus to a wider customer base. They have to identify potential clients to pilot test the idea and incorporate their findings into the Minimum Viable Product (MVP). By creating a feedback loop from the initial group of customers, entrepreneurs can refine their business model and pricing strategy to align with market needs. A number of founders have shut shop primarily because they didn't understand their customer's needs and were thus unable to arrive at the right solution.

In the next build and scale stages, entrepreneurs receive large-scale funding to build the complete product and invest in marketing, sales, and distribution. At these stages, the product/offering moves into production and becomes commercially available. Though most start-ups initially begin showing revenue growth and profitability, they eventually fail due to their failure to capture the right customer feedback mix.

The evolution of start-ups

Lack of focus in the fundamental phases is a primary reason for start-up failures in the Scale stage



The role of the investor

The investor's role is like that of the producer in any theatre. However investments apart, he should be able to guide an entrepreneur who is on the cusp of up-scaling operations. Take for example, a first-time entrepreneur who may think that in order to scale up, he needs cost-efficient methods to keep margins low. These assumptions are based on his preliminary market discovery and further cemented by angel investors. This 'seat of the pants' approach completely blindsides the right way to tackle this problem—hire a world-class inside sales team that channelises more sales volume. In this case, spending more money to drive an incentive-based approach to capitalise the intellectual property, enhance new revenue streams through inside sales, and up-selling would be a more strategic approach. The entrepreneur should look at what capital he needs to invest in engineering, sales, and business development. This gets more pronounced in a subscription-based business. As sales deepen, a lot more upfront investment is required in front-loading the engineering team. The need for cumulative cash flow becomes directly proportional to the number of conversions and contract value.

Planning ahead of time

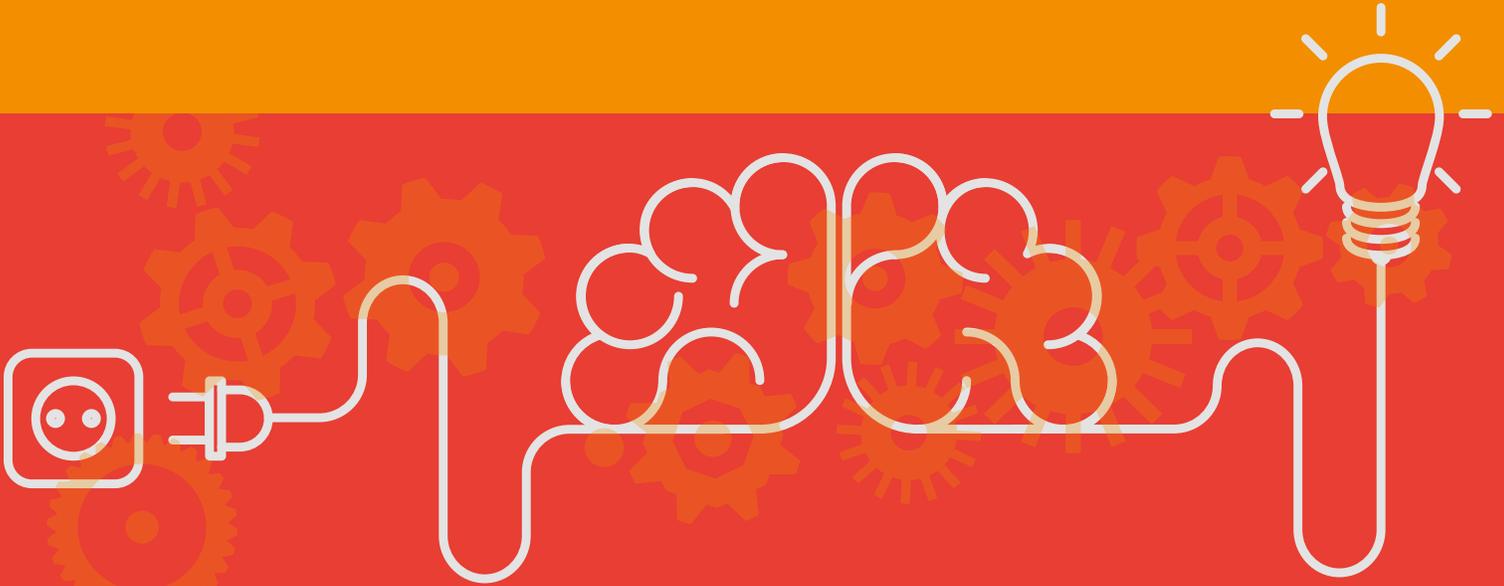
Right from the conception stage to when entrepreneurs evolve into mature businessmen, the mindset of testing the untested, creative thinking, and strategic planning needs to continue. In short, the founders should be able to answer these questions before they move to the building juncture so as to avoid a major cash crunch at the scale and build stages.

- What's your competitive advantage?
- Will people buy your MVP at a set price?
- Have you spoken to actual customers about their pain points? How will you validate the findings?
- Did you define the target market and the size of it?

Therefore, to ensure success, start-ups need to plan ahead of time to scale up and put in a lot of thinking in the pre-build-up stages. Just state-of-the-art technology and a team are not enough. Entrepreneurs need to have the DNA to learn from failure, re-imagine the possible, be bold, and create new models which are sustainable, impactful, and do not necessarily follow a pre-defined script.

Ecosystem orchestration is the way forward

Based out of T-Hub, PwC's Innovation team is co-creating products and services with start-ups across verticals, helping them scale up with market access and industry connects. One notable engagement has been with cyber security start-up Authbase, which uses machine learning and behavioural analysis to achieve continuous monitoring, live mitigation, and self-learning in order to secure smart networks. PwC is leveraging the expertise of its cyber security team to help Authbase develop more market-ready products and services.



About the authors:

Murali Talasila leads the Innovation practice at PwC India. He also leads PwC India's start-ups and new ventures initiatives. Under his leadership, PwC has built a strong community of start-ups, incubators, accelerators, seed funds, angel networks, VCs etc. Talasila was instrumental in setting up the innovation hub at T-Hub in Hyderabad.



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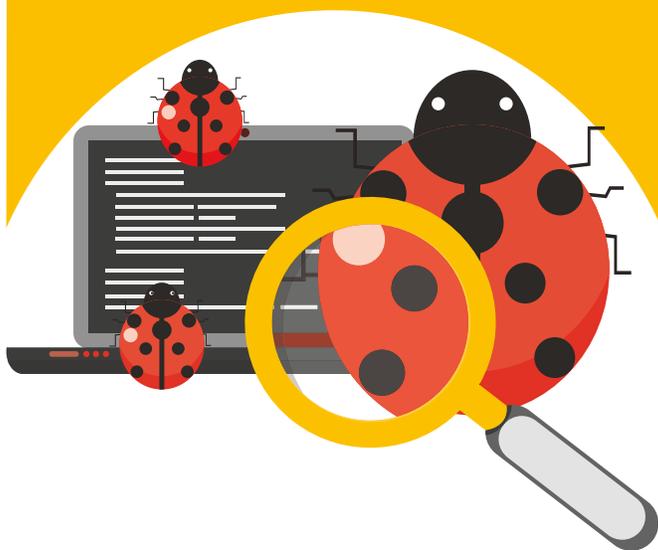
Jay Krishnan

Jay Krishnan is a serial entrepreneur and investor with two successful million dollar exits in the US and India. He has held leadership responsibility in Fortune 100 companies, managed large transformational initiatives, built new product offerings, and helped create scale. As former CEO of T-Hub, he has been instrumental in driving several tech innovations that have aided T-Hub in becoming one of the most coveted incubators in India.



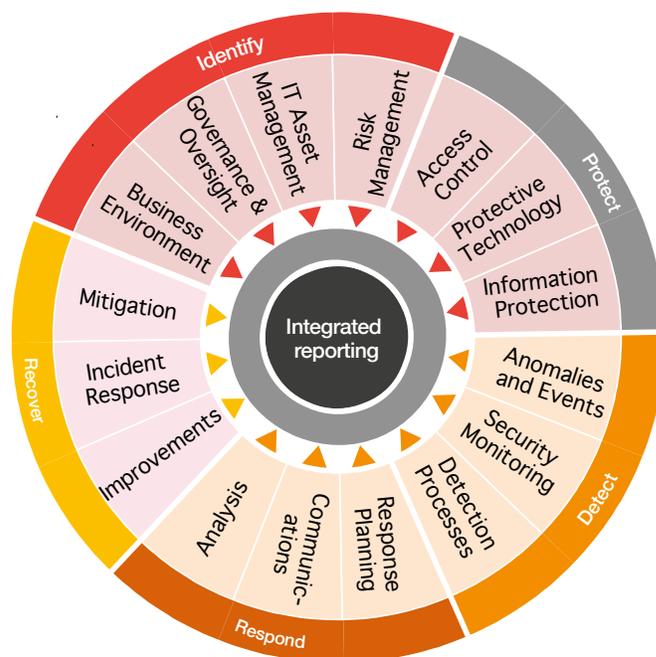
How board members can oversee cyber security

In the digital age, cyber threats are not a technology issue but a business risk, and steps need to be taken to ensure the safety of digital assets



With the threat landscape evolving and making company boards answerable for breaches, it is high time that cyber security became a boardroom agenda. While CIOs and CISOs can take care of the technological aspects and in some cases compliance, the business risk, which is now apparent after the emergence of endless breaches in large conglomerates, can best be understood and managed in the boardroom. **Cybersecurity Ventures - Cybercrime Report 2017**, which forecasts cyber crime losses to reach \$6 trillion by 2021 from \$3 trillion in 2015 – gives enough reasons to consider cyber security a business risk and states why it is imperative for boards to also rise to the challenge.

Framework components



Why boards are not fully empowered?

We know that regulators and shareholders have already mounted pressure on company boards to report breaches and material loss caused by them in their filings. The boards of many banks, credit rating agencies, e-commerce and healthcare companies have swung into action – they regularly discuss, review and plan cyber risks in their meetings. However, their numbers are small. More companies need to join the bandwagon. The huge challenge right now is the lack of a robust mechanism that allows the board to oversee cyber security. Boards traditionally assess everything on measurable metrics (performance rating points) but there are none for cyber security today.

Today, the only source of information for the board is the audit committee assessment, which is a historic view. It does not provide a futuristic outlook and therefore isn't helpful in planning ahead. To maintain real time supervision, boards also need to know and have real time access to the number of threats detected in a defined timeframe; the response mechanism including how breach attempts were handled; the number of system outages encountered; the time required to recover from the outages; assessment of system gaps/vulnerabilities (detected and fixed); and if the company has a plan to fend off future unknown threats. Since there are no measurable metrics in cyber security, this information remains unavailable to boards today.

What boards can do?

Probably the only way to address regulatory scrutiny and to play the role of a guardian in the true sense, boards can start by asking the right questions to the management. While boards cannot be expected to know everything related to cyber risk, these pointers can help them get a macro view.

Here are some examples:

Gather information

The management can be asked to facilitate regular meetings with the company's top security owner, CIO or CISO. Besides, they can engage an external expert for additional insights on the security trends and risks. This will help the board understand the company's threat environment and its resistance to cyber attacks.

Make cyber security strategy effective

Boards should ask the management about the company's comprehensive strategy for data security, whether it is effective and whether the programme includes innovative technologies to monitor, identify and respond to cyber threats or incidents.

Protect sensitive information handled, stored and transmitted by third-party vendors

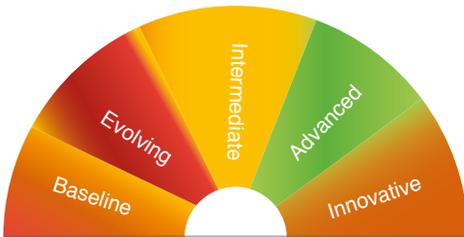
Boards should understand how the company selects, vets and monitors third parties (suppliers, contractors, service providers, etc), and how these parties protect the company's sensitive information. They should also understand the company's legal rights related to the third party, particularly if there is a breach.

Get cyber insurance

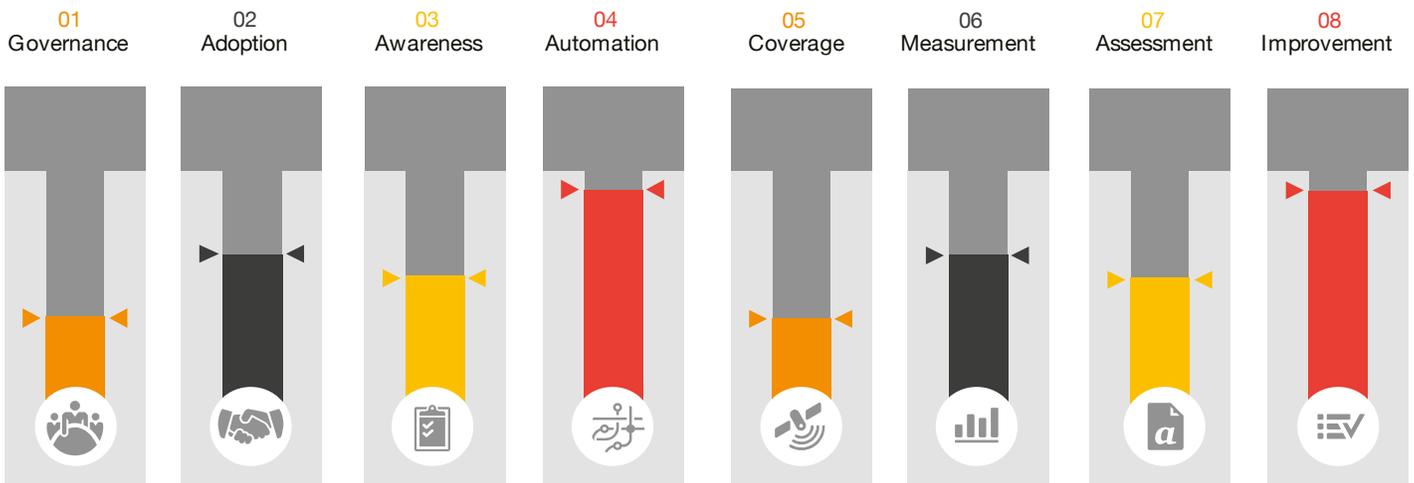
Owing to the frequency and severity of cyber attacks, many companies are considering cyber insurance. Boards need to know about the company's cyber insurance policy (if purchased) and how the cyber insurance market is changing, particularly as underwriters become more sophisticated.

Put a tested cyber incident response plan in place

A security breach can cause serious damage to a company's reputation and financial position. Boards should discuss the company's incident response plan with the management – what it entails, how the management has tested the plan and if it could be made more effective.



Maturity will be derived basis average of all dimensions



Barometric reporting scale

Reporting cyber security

While putting pressure on the management for cyber security resilience is important, companies should adopt a board reporting framework for cyber security, which is based on global standards and incorporates five core functions – Identify, Protect, Detect, Respond and Recover. This will give boards the desired insights – like the number of threats detected, vulnerabilities addressed, breaches handled and the strategy for unknown future threats.

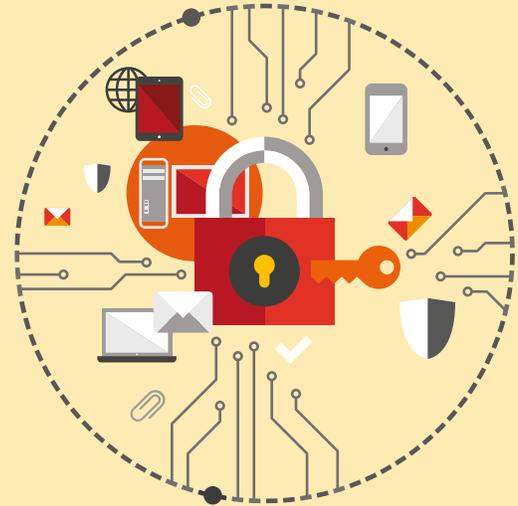
A board reporting framework which is essential for handling and addressing cyber security challenges, has to have four key elements:

Threat horizon: Information about the threat landscape, how it is growing in sophistication as well as complexity and how it challenges their business.

Industry challenges: Overview of the key cyber security trends, threats/ breaches/vulnerabilities overall to their sector and to their company. Besides, it should note what their competitors and the industry as a whole is doing to fight these threats.

Regulatory requirements: Information about changing regulations like GDPR, the Data Protection Bill, RBI guidelines, etc.

Technology evolution: Able to update systems regularly as the technology or threat landscape evolves.



Conclusion

Board members are becoming increasingly answerable to regulators, investors and customers. Adopting a cyber security board reporting framework empowers them with the thorough insights needed to defend companies from external and internal threats and helps them ensure the safety of their digital assets.



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Sivarama Krishnan leads the Cybersecurity practice for PwC India. With over 25 years of global experience across diverse sectors including the government, BFSI, FMCG, energy, oil and gas, metals and mining, infrastructure, healthcare etc, Sivarama Krishnan is actively involved in NASSCOM's Cyber Security Task Force(CSTF). Apart from his role in leading the cyber security practice at PwC, Krishnan also leads the new Product and Services platform for the firm.

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