**KPMG**

# Are you ready for the next big wave?

**Make the right decisions about emerging technologies**

# Content

# 01 Introduction

Today's businesses are innovating across business models, products, services and customer engagement while disrupting markets and entire industries. Much of this innovation is driven by applying emerging technologies throughout the value chain. It creates great opportunities but at the same time presents significant challenges and unknown risks and consequences to organizations, see Figure 1. Competitors can completely disrupt an industry, or an organization can disrupt itself first and lead a new phase of growth.
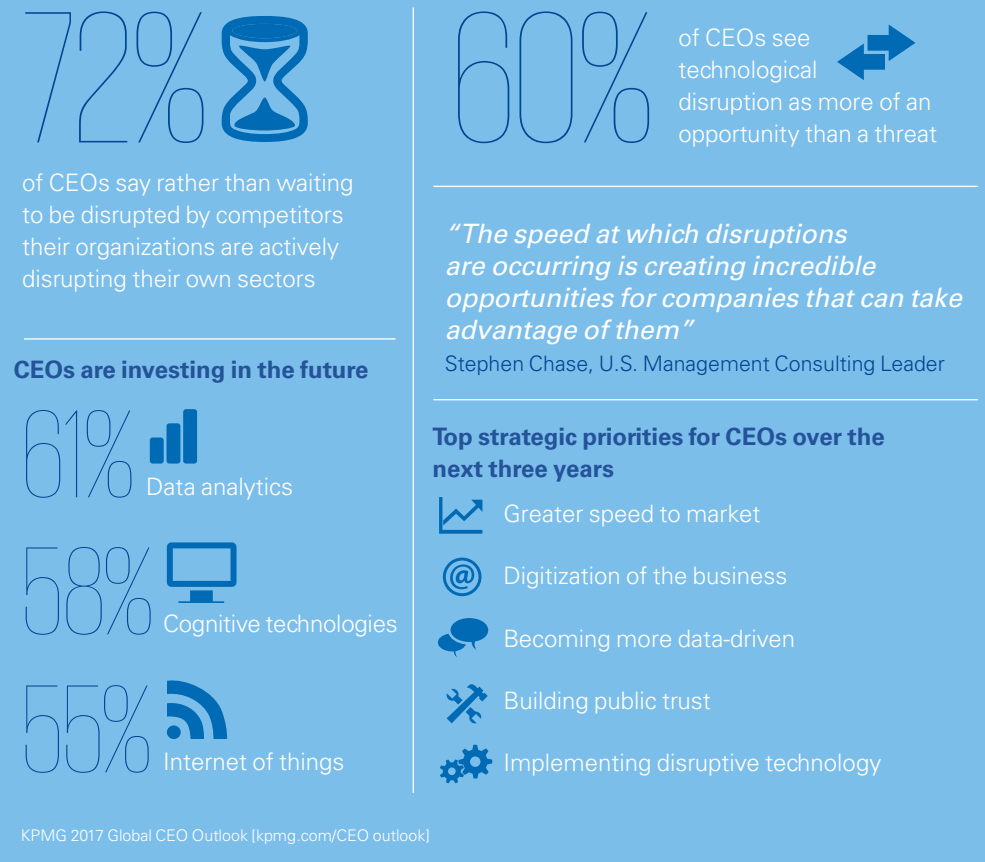
This pursuit of everything digital is happening at an accelerating pace. Speed has become a huge source of value whether measured by faster decision-making or how quickly an organization can go from ideation to revenue. This need to deploy digital capabilities quickly and at scale is the antithesis of IT-led projects that are typically months or years long and, as a result, often out of frustration, the business is increasingly sidestepping the IT function to procure new technologies. The combination of an increasingly tech-savvy population combined with the proliferation of cloud-based software as a service (SaaS) solutions has greatly simplified this process. In this race to harness emerging technologies and innovate it is easy to forget about governance and that can lead to significant costs and risks.

Understanding when, how, why, and what new technologies are introduced to an organization is critical to both maximize the opportunities that they present and minimize the inherent risks.

Establishing a governance framework that embraces disruptive technologies and encourages innovation while ensuring risks are identified and managed is essential to an organization's ability to survive and thrive in a digital world. Innovation / Emerging Technology Councils comprised of the right mix of internal and third party experts can ensure that the right approach is taken, investment is available and prioritized, and opportunities can be scaled.

The unique characteristics of emerging technologies - their diverse applications, the myriad concerns raised by some new capabilities, the need for public engagement, and the challenge of effective coordination between governance players - create the need for a new governance approach and a new lens through which to view risk management.

Figure 1: Companies are embracing disruption with innovation

**72%** of CEOs say rather than waiting to be disrupted by competitors their organizations are actively disrupting their own sectors

**60%** of CEOs see technological disruption as more of an opportunity than a threat

*"The speed at which disruptions are occurring is creating incredible opportunities for companies that can take advantage of them"*
Stephen Chase, U.S. Management Consulting Leader

**CEOs are investing in the future**

**61%** Data analytics

**58%** Cognitive technologies

**55%** Internet of things

**Top strategic priorities for CEOs over the next three years**

- Greater speed to market
- Digitization of the business
- Becoming more data-driven
- Building public trust
- Implementing disruptive technology

KPMG 2017 Global CEO Outlook [kpmg.com/CEO outlook]

# 02

# The paradox of emerging technologies

Over the past ten years emerging technologies, also known as disruptive technologies, have fueled innovation that has transformed entire industries, given birth to over 100 unicorns (companies valued at $1B +) with a combined value of $360 billion in the U.S. alone, and enabled the platform economy with a total market value of over $4.3 trillion![1] Some of the technologies have been commercialized for years, e.g. cloud, mobile, social media, while others are relatively immature, e.g. IoT, 3D printing, cognitive automation, and blockchain. Furthermore, the pace at which new technologies are introduced is accelerating.

For established organizations these technologies present some formidable challenges. While there are significant opportunities to be realized by exploiting them to innovate and create new sources of value, there are also significant risks that could more than offset any benefits. Furthermore, not all of these technologies are equal. The process by which organizations evaluate, select, invest, and deploy these technologies can make the difference between competitive differentiation and market growth or monetary losses, write-downs, and reputational damage.

## Emerging tech creates opportunities …

Emerging technologies have been used by entrepreneurial startups as well as long-established corporations to innovate and generate value in many ways. In a recent KPMG survey of C-level and Head of Business-Unit executives[2], over 60% identified five emerging technologies including cloud, mobile solutions, AI/machine learning, social media, and internet of things as having a high or very high impact on their business over the next five years. For example, these impacts include:

– **Innovative business models are disrupting entire industries.** Over the past few years new business models built on emerging technologies have disrupted the media industry including record companies, video rentals, magazines, and newspapers. Digitizing content puts it in the hands of consumers more quickly and cheaply (sometimes free), increases its portability, and in some cases disintermediates the traditional distributors. Musicians can now record music in their own home studio and release it directly to consumers. The sharing business model has disrupted the transportation and lodging industries, and online shopping is causing massive disruption in retail.

Ecosystems have given rise to platform business models where value is created by facilitating transactions through connections, providing a way for organizations to create new revenue streams by exposing their digital assets to external partners, and collaborate with individuals and other entities to co-create new products. Several legacy automobile manufacturers have created connected car platforms that enable them to perform remote diagnostics and directly download updates or enhancements. Furthermore, it provides a platform for partners to provide add-on products and services including streaming music, maps, real-time traffic updates, restaurant reservations, and more, providing new revenue streams.

– **Digitization and automation are transforming operating models.** Many internal business processes are being digitized while still others are being automated, with robotic process automation (RPA) reducing costs and cycle times and at the same time improving customer satisfaction. One large insurance client applied RPA within their account processing function and were able to shorten a three hour data reporting process down to just three seconds. Not only do they realize significant reductions in cost, but the access to more timely and accurate data improves decision-making as well.

– **Everything as a service is expanding revenue streams.** Using the internet of things (IoT) combined with powerful analytics, tangible products are being converted into digitally enhanced services. Everything from washer machines to jet engines can now be purchased as a service (i.e., pay by the load, pay by the hour flown) converting one-off lump sum payments into annuity streams. Sensors constantly monitor performance and transmit the data in real-time while powerful predictive analytics assess the data, detect potential problems and automatically dispatch service technicians to perform preventive maintenance before the device fails.

– **Mobile devices, data and analytics are transforming customer engagement.** Mobile devices, social media, and analytics are innovating the way that companies engage with their customers by creating more intimacy, personalized marketing, and highly customized products delivered on demand anytime and across any channel. Walk into a store and it knows who you are, your preferences, your size and automatically sends you offers. The restaurant senses when your car pulls into the parking lot and has your takeout order ready for you as you walk in the door.

[1] Source: https://www.cbinsights.com/research/startup-unicorns-us-map/.　[2] 2017 KPMG Digital Disruption Survey
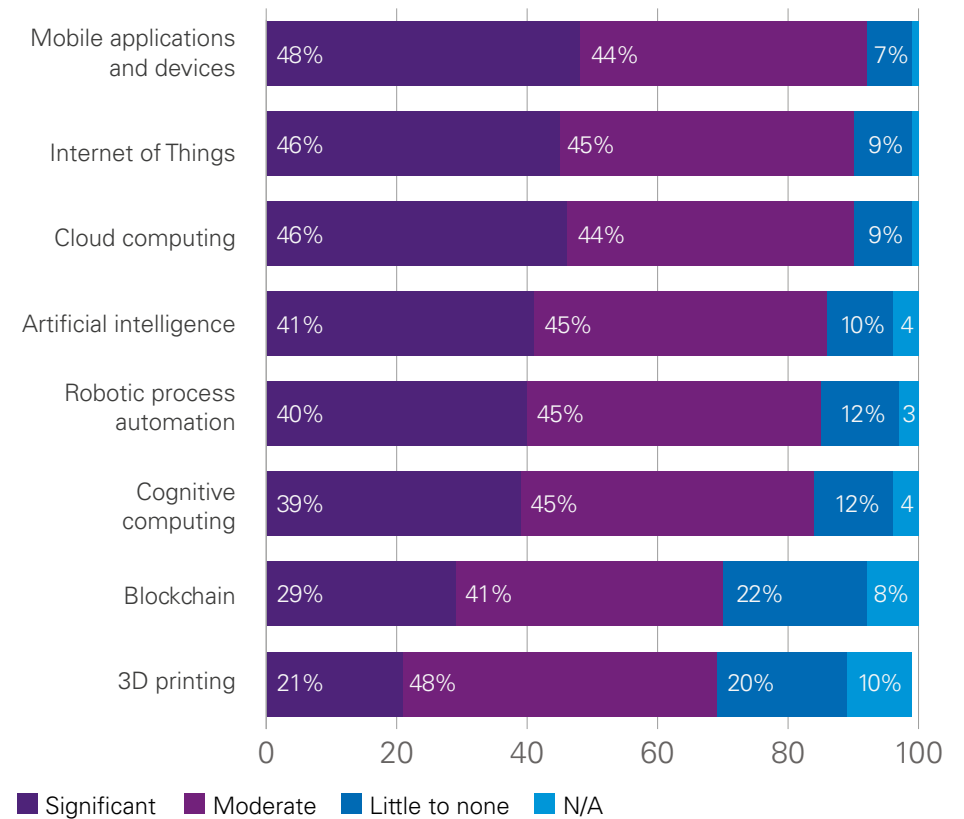
## … but not without risks

Using emerging technologies to innovate can lead to breakthrough performance and significant growth, but they can entail proportionally higher risks when compared with more mature technologies. According to the 2017 KPMG / Forbes Emerging Tech Risk survey (Disruption is the new norm), there is evidence that organizations are making significant investments and adopting emerging technologies but are not including them in IT risk assessments. The emerging technologies most often cited include mobile apps / devices, IoT, and cloud computing (see Figure 2a and 2b). This can lead to significant exposure as there are many potential internal and external risks to contend with including:

## Internal risks

– **Misalignment with strategy.** With so many emerging technologies to choose from and so many opportunities it is easy to go off in many different directions at once. But with limited resources this fragmented approach will most likely end with a few small wins and many failures. It is important to maintain focus and limit pursuits to ones where the usage of the technology is aligned to the strategy.  For example, if increased customer engagement is a key strategic objective, investments should be focused on the use of mobile, social media and potentially other technologies which will drive customer engagement.

– **Lack of adequate funding.** Pursuing innovation with emerging technologies is filled with uncertainty with unknown outcomes and timeframes. With so much competition for funding, safer initiatives with well-defined business cases and positive ROIs can edge out more risky innovation ones, making it difficult to obtain enough funding for a truly innovative program.

– **Lack of executive support.** Client experiences have shown that without high level executive commitment, it is difficult to launch or sustain innovation opportunities. Furthermore, mid-level managers with P&L responsibility are more inclined to stick with the status quo.

### Figure 2a: Emerging tech investment

To what extent will your organization be investing in the following emerging technologies during the next 12 months?



| | Significant | Moderate | Little to none | N/A |
|---|---|---|---|---|
| Mobile applications and devices | 48% | 44% | 7% | |
| Internet of Things | 46% | 45% | 9% | |
| Cloud computing | 46% | 44% | 9% | |
| Artificial intelligence | 41% | 45% | 10% | 4 |
| Robotic process automation | 40% | 45% | 12% | 3 |
| Cognitive computing | 39% | 45% | 12% | 4 |
| Blockchain | 29% | 41% | 22% | 8% |
| 3D printing | 21% | 48% | 20% | 10% |

■ Significant  ■ Moderate  ■ Little to none  ■ N/A

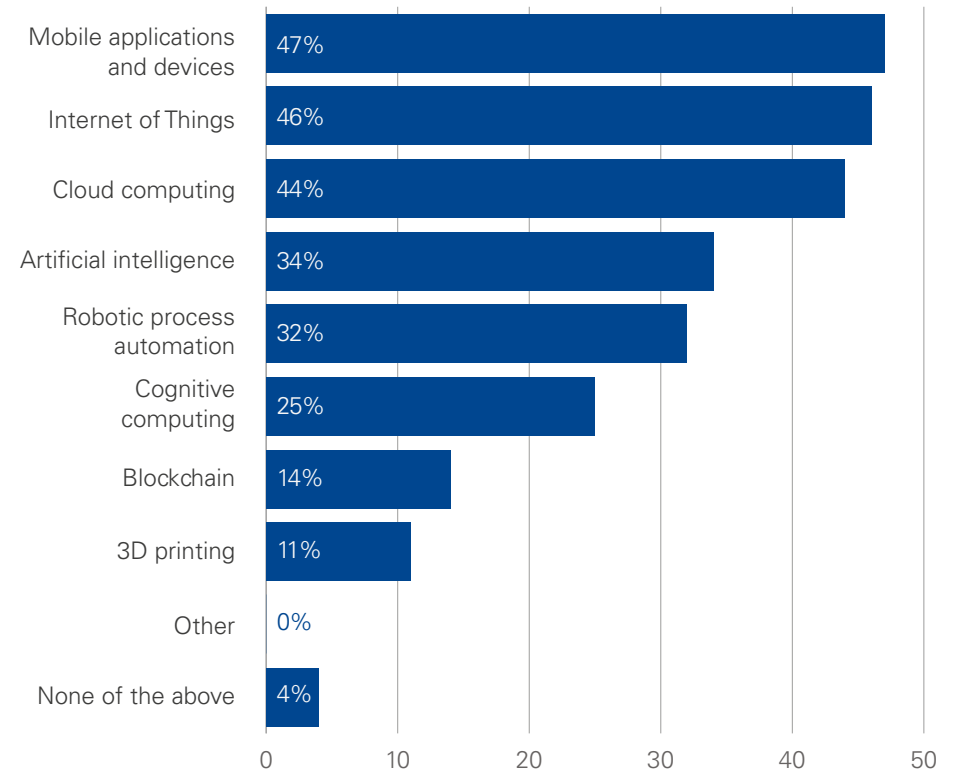*Source: Disruption is the new norm: Emerging tech risk survey report 2017*

## Internal risks (continued)

– **Perceived insufficient returns (ROI).** Often, when initially deploying emerging technologies, higher costs are incurred due to the lack of experience and known good practices. However, over time the associated learning, skills development and experience (intangibles) have value that can be leveraged later in future projects. Taking a short term view and failing to include these intangibles in an ROI analysis may result in abandoning and writing-off promising initiatives.

– **Limited skills and experience.** Emerging technologies often require new skills. Because they are new, these skills tend to be in short supply. There is also a paucity of experience in deploying these technologies. Organizations often find that they do not have staff with the skills they need and are unable to successfully develop or procure them. Alternatively, going outside the organization and contracting with third parties potentially adds yet another layer of risk.

– **Cultural (fear of failure).** Successful serial innovators have a culture that celebrates and encourages failure. If you are not failing, you are not trying and you are not learning. A certain amount of failure is expected. The key is to fail fast and learn from it. However, in most organizations the culture is one where failure is considered a negative and often punished. A fear of failure can sometimes be the biggest risk and barrier to overcome.

## Figure 2b: Emerging tech adoption and IT risk assessments

Which emerging technologies has your organization already adopted but not included in recent IT risk assessments?

| Technology | Percentage |
|---|---|
| Mobile applications and devices | 47% |
| Internet of Things | 46% |
| Cloud computing | 44% |
| Artificial intelligence | 34% |
| Robotic process automation | 32% |
| Cognitive computing | 25% |
| Blockchain | 14% |
| 3D printing | 11% |
| Other | 0% |
| None of the above | 4% |

*Source: Disruption is the new norm: Emerging tech risk survey report 2017*

## External risks

– **Regulations are inconsistent, non-existent, or outdated.** Depending upon industry and geographic sector, there are a plethora of regulations that must be complied with. When it comes to new innovative business models, products, and services they may fall under regulatory regimes that never anticipated them. For example, the sharing business model has found new companies competing against established regulated industries such as taxis and lodging, raising questions about whether these new companies must comply with existing regulations or, because of their radical new business models, are exempt. Having run up against these issues, Uber recently lost its license to operate in London in the UK and Quebec, Canada.

Cloud service companies have run into similar problems with respect to cross-border data flows where each country has its own regulations and there is no consistency across them. What may be legal in one country could be illegal in another. Then there are issues relating to how to regulate drones and autonomous vehicles. Often, regulations need to catch up with technology and innovation but until they do it puts companies at risk.

– **Brand equity can evaporate overnight.** Companies spend years and millions of dollars building up the value of their brand(s) eventually enabling them to enjoy premium pricing and competitive differentiation. But it only takes one misstep that goes viral on social media to destroy all that brand equity in a single day. Whether the result of poor quality, a regulatory lapse, or a security breach, once it occurs social media goes into overdrive and by the end of the day the damage is done.

– **Cyber threats are ubiquitous.** While cyber threats have been in existence for years, their variety and number are increasing at an accelerating rate driven by two technology trends – the internet of things and the explosion of data (both of which are on our list of emerging technologies). Emerging technologies are more prone to cyber threats because they have not undergone the same rigorous testing and scrutiny of more mature technologies.

– **Many risks are still evolving**. Because many of these technologies are new and we have limited experience with them, some risks are evolving or haven't been discovered yet. For example, as AI systems become more autonomous, there is an ongoing debate about what risks they may pose ranging from human extinction from a race of super intelligent machines to unintended consequences made because of a wrong decision from poor data or flawed logic. The severity of the impact of this risk is dependent upon the application. For example, an AI-based mortgage review system might deny or approve a mortgage incorrectly which could result in an eventual default or a lawsuit. This is serious enough, but a medical diagnosis system could make an incorrect diagnosis that could lead to the actual death of the patient. Overall, the greatest risk is that there is still so much that is unknown about how AI will continue to evolve and how it will be used.

## And not all emerging technologies are created equal

There is no definitive list of emerging technologies, and what's more they come in different forms including hardware (e.g. 3D printers), software (e.g. blockchain), networks (e.g. IoT), and combinations of these (e.g. AI, VR). Some are general (e.g. cloud, AI) and have broad applicability across all industries and geographies, while others are more limited in scope (e.g. blockchain, VR). The bottom line is that not all emerging technologies are equal and when it comes to their governance, one size does not fit all, i.e. governance must be adaptable and proportional based on several factors. KPMG has defined four attributes that can be used as guidelines when considering the appropriate level of governance, see Figure 3. These attributes include:

**Maturity** – Measures how established and stable the technology is in its lifecycle. Maturity is deemed to be in one of four states: introductory, growth, mature, or decline. Since we are only considering emerging/disruptive technologies in this report, they will either be in an introductory or growth state.

**Adoption** – Measures how widely a technology has been embraced and deployed in organizations. The standard five states of adoption are used here and include: innovators, early adopters, early majority, late majority, and laggards.

**Opportunity** – This is a subjective measure of the potential opportunity to be realized by deploying the technology and is covered in more detail in the next section. An opportunity can be one of three states, low means it is typically limited to a single product line, medium means it is limited to a single business line, and high means it has benefits across most or all the enterprise.

**Risk** – Measures the level of risk which is a combination of the impact and the likelihood that the risk will occur. There are four states of risk: low, medium, high, and critical.

### Figure 3: Four attributes of emerging technology impact

| Technology | Maturity | Adoption | Opportunities | Risks |
|------------|----------|----------|---------------|-------|
| **Cloud Services** | Growth | Early majority | High | Medium |
| **Social Media** | Growth | Late majority | High | Medium |
| **Data / Analytics** | Growth | Early majority | High | Medium |
| **IoT** | Growth | Early adopters | High | High |
| **3D Printing** | Growth | Early adopters | Medium | Low |
| **Blockchain** | Introductory | Innovators | Medium | Medium |
| **VR / AR** | Introductory | Innovators | Medium | Low |
| **RPA / CA / AI** | Introductory | Early adopters | High | High |
| **Mobile** | Growth | Late majority | Medium | Medium |
| **Drones** | Growth | Innovators | Low | Low – Medium |

# 03 A framework for emerging tech governance

Designing a framework to govern emerging technologies involves overcoming some unique challenges. Digital business's need for speed, agility, and scale means that critical decisions must be made quickly in an environment where potential benefits are harder or impossible to quantify and risks are potentially greater. Furthermore, many organizational cultures are wired to avoid or at least minimize risk. By subjecting emerging technology initiatives to existing governance protocols, organizations are more than likely to reject them at a time when they desperately need to innovate to remain competitive, but not subjecting them to any governance could expose the organization to unacceptable risks. A different approach is required.

## Key elements of emerging tech governance

An emerging technology governance framework consists of a number of key elements. First, while emerging technologies are recognized as different, they can't be managed in isolation. Second they must be evaluated within the confines of how much risk the organization is willing to accept. Third, because of their newness and the uncertainty that entails, they require an explicit funding mechanism; otherwise they risk constantly losing out to more predictable initiatives. Finally, the governance approach should be adapted to enable the business to be as technology self-sufficient as possible within clear boundaries.

## Categorize innovation as a continuum

To break away from the inclination to view emerging technologies in isolation, organizations need to take a broader view that is aligned with the business strategy and organizational culture, of how these technologies can be used to underpin innovation. With many emerging technologies available (and more on the way) and the potentially significant opportunities they enable, it is easy to become enamored with the technology rather than what value and impact it will have on the business. Furthermore, as we noted earlier, not all the technologies have the same impact or risks and they are at different stages of maturity and adoption. As a result, organizations must view emerging technology and innovation as part of a continuum with all the other initiatives that are planned. For example:

– **Use a common portfolio to plan and track both business as usual investments and innovation**. Organizations find it hard to manage resources if everyday investments and emerging technology-driven innovation are kept in separate, unrelated portfolios. While emerging technology-driven innovation needs to be treated differently, especially in the early stages, initiatives along the entire continuum impact the same elements tracked in a portfolio, i.e. business structures, business processes, technologies, IT resources, risk, partners, and customers. Tracking them in one holistic portfolio makes it easier to manage resources, schedules, and relationships.

– **Don't waste emerging tech innovation funds on limited opportunities.** Looking at the opportunities as a continuum also allows for prudent use of funds. Preserve emerging tech innovation funds for ideas that have the highest potential to deliver downstream value to the business or end customers.

– **Resist the urge to pursue every idea**. Remember that not all innovation is good. Ideas should be aligned with the overall strategy and culture of the organization, or they can become distractions that drain precious resources from the overall effort. Success is more likely when innovation is laser-focused on strategic objectives that provide competitive differentiation.

## Establish the risk appetite

When it comes to emerging tech-driven innovation, good governance requires both a strategic and operational approach to managing risk. While the operational approach focuses on the day-to-day activities around managing and mitigating risk, a strategic approach requires determining the risk appetite and risk tolerance of the organization. This will articulate how much risk the organization will accept and what level of risk will trigger an operational response. Risk appetite and risk tolerance are related, but they are not the same thing.

An organization's innovation risk appetite is a subset of its overall enterprise risk appetite and therefore cannot be developed in isolation. It is ultimately the responsibility of the board of directors to define an organization's risk appetite based on the input and recommendations of an Emerging Technology Council.

Failure to define risk appetite and tolerance undermines any risk management process because it leaves the organization with limited guidance as to when and how to address risks as they arise. Furthermore, it means that any response to risk is likely to be an isolated action and not aligned with the overall enterprise approach to risk.

In practice, the risk appetite and risk tolerance will be used to determine **if** and **when** the organization responds to specific risk events. Operational risk governance will then categorize the risk event and determine exactly **how** the organization responds.

## Enable innovation with separate funding

It's not enough to recognize emerging tech-driven innovation opportunities. They must be handled differently to maximize the opportunity for success. Innovative ideas are new and have no track record, so they are difficult to value, especially at the beginning. If they are forced to compete for funding and resources with all other initiatives, few if any are likely to make the cut. To facilitate getting innovative initiatives started, organizations should fund emerging tech innovations from a separate pool. Fighting for capital budgets is one of business leadership's favorite games, and there are never enough funds to cover everyone's day-to-day wishes – much less truly innovative opportunities with uncertain payback. To keep new ideas from being caught up and crushed in this competition, set up a separate fund for investing in innovation. This can come from the CEO's discretionary budget, be annually funded by the executive committee, or come from the CIO's budget. Data from the Harvey Nash / KPMG CIO survey reveals that organizations spend on average between 4% and 6% of their IT budgets on technology-based research and development activities.

## Change the governance approach: 'rules' to 'guardrails'

The past was about IT organizations building technology-enabled solutions that the business ordered, a relationship that was often strained by projects that were delivered late, over budget, and with poorer functional capabilities than expected. In some cases, the business responded by directly procuring solutions without IT's involvement - so-called shadow IT.

However, the pace required by digital business, coupled with the availability of virtualized and public cloud infrastructure, a large and growing portfolio of SaaS solutions, and maturing tools for automating operations, are now being leveraged to promote a different flavour of shadow IT. CIOs are now working closely with the business to make it as technology self-sufficient as possible within well-defined boundaries. This is accomplished in several ways including: an enterprise architecture that ensures IT investments are aligned with business priorities with consistent usage of technology across the organization; a governance approach that clearly articulates what areas the business has autonomy to pursue its own technology enabled capabilities, and the processes to be used to integrate solutions with the rest of the enterprise; a published catalogue of approved solutions and vendors that have gone through an evaluation and certification process with pre-negotiated contracts and pricing; and former IT roles like business analysts, programmers, data base administrators, and quality assurance (QA) becoming embedded with the business. Senior level business relationship managers provide guidance and facilitate the interchange between IT and business leadership.

Underlying this new model of business and IT is a shift away from rules – specifying exactly what and how all technologies are adopted and applied to business problems, and business then complying – to **guardrails**, where strict rules are maintained for the technologies that matter at the core of the business and a more flexible approach is taken for all other technology, giving the business units who need it greater autonomy. The difference between rules and guardrails may seem small, but it is significant for how they are both viewed:

– **Rules take away flexibility.** Rules are simple: if this, then do that. Rules in their clearest form are easy to understand – and easy to enforce. Because they are one-size-fits-all, they are contentious to define – and for the same reason allow pressure to build without an easy release. For example, mandating the iPhone as the one and only enterprise compliant smartphone.

– **Guardrails provide flexibility within bounds.** Guardrails are rules that define the boundaries. They may restrict complete flexibility, but the evident trade-off of some flexibility for less cost and risk is easier for outliers in business or IT to accept as reasonable. In the case of smartphones, a guardrail might state the following: Any smartphone that supports enterprise management and encryption can access the corporate network.

The traditional rules philosophy assumes that technology is too complicated and the business cannot be trusted with any technology choices. By contrast, the new guardrails philosophy seeks to harness the energy of business innovators as part of an overall innovation strategy by making them more aware and more responsible for their own technology use.

Guardrails aren't effective by themselves – it's not enough to define and publish them. Business units won't automatically refer to these guardrails or come to IT when they have an idea or see an opportunity. IT must embrace these solution creators to facilitate their self-sufficiency when appropriate, and engage the IT function when necessary.

In KPMG member firms experience, the biggest challenge is the prevailing culture, especially in large enterprises that have implemented formalized governance frameworks like ISO 38500 and COBIT that rely on standard policies and processes to maintain control over IT investments. Changing this culture and getting people to engage in behaviours that have been expressly prohibited before is difficult at best. This is one of the reasons it is so important to get senior executives involved from the beginning. They need to communicate the desired new behaviours and demonstrate their support by providing "air cover" for innovation teams undertaking risky emerging technology initiatives and establish that failing fast is a desired outcome.

# 04 Four steps to emerging technology governance

Organizations looking to harness emerging technologies to drive innovation need to create an environment where experimentation is encouraged, failing fast is celebrated, and boundaries are tested without exceeding its risk capacity. To get started KPMG recommends the following next steps:

## 1. Get the C-Suite and board engaged and committed

We want to purposely make a distinction between 'support or buy-in' and 'engaged and committed'. The former is mostly passive while the latter is aggressive. Success with emerging technologies requires more than just tacit approval or nodding acceptance. It requires senior executives and board members to roll up their sleeves and actively help. Interviews with subject matter experts repeatedly stressed the need for CEOs and the Board to be actively engaged with emerging technologies. Because the stakes can be so high from both a growth and risk perspective, and organizations tend to be risk adverse and fear failure, a lack of high level executive engagement can be fatal. Senior executives must encourage people to push the envelope and go beyond their comfort zone, reinforce the premise that failure is part of the innovation process, and regularly communicate the importance of innovation to the long-term success of the enterprise. Steps to take include:

– **Name an executive sponsor.** Each emerging technology or key initiative needs an executive sponsor who will function as its champion. This alone telegraphs to the rest of the organization how important it is. The sponsor can also ensure that the team has the resources and political cover it needs to succeed.

– **Make emerging technology a board level topic.** Because of its critical importance to digital transformation and competitive differentiation, emerging technologies require board level engagement. Boards typically have sub-committees for audit, compensation, and increasingly for technology. The technology committee should increase its focus on emerging technologies and their impact on the industry, competitive environment, and opportunities. Committee meetings can also include an update from one of the executive sponsors, a demonstration of a promising prototype or pilot, or a presentation from an outside expert about a specific technology. The committee can also ensure that emerging technologies and innovation are tied to business objectives.

– **Formalize success.** Make sure to take a moment to recognize successful initiatives and communicate them across the enterprise. Rewards and celebrations do not need to be elaborate or expensive. Much of this is cultural change so it is important to incentivize and promote the new behaviours so that everyone can see what the new definition of "good" is.

## 2. Charter the governance structures

Governance is the act of responsibly making decisions, and while it depends on solid processes, ultimately people make the decisions and are held accountable for them. Governance structures relate to the organizational/people mechanisms created around the decision process. They include reporting relationships; governance-specific positions; and committees, councils, and working groups either created specifically for, or repurposed to execute the governance processes. Effective governance requires having the appropriate organizational structures, assigning responsibility to make the required decisions, and holding parts of the organization accountable for the outcomes of those decisions.

When it comes to emerging technology governance, the two most important governance structures are the Emerging Technology Council as a decision-making body and the Program Management Office (PMO) as a facilitation and support body.
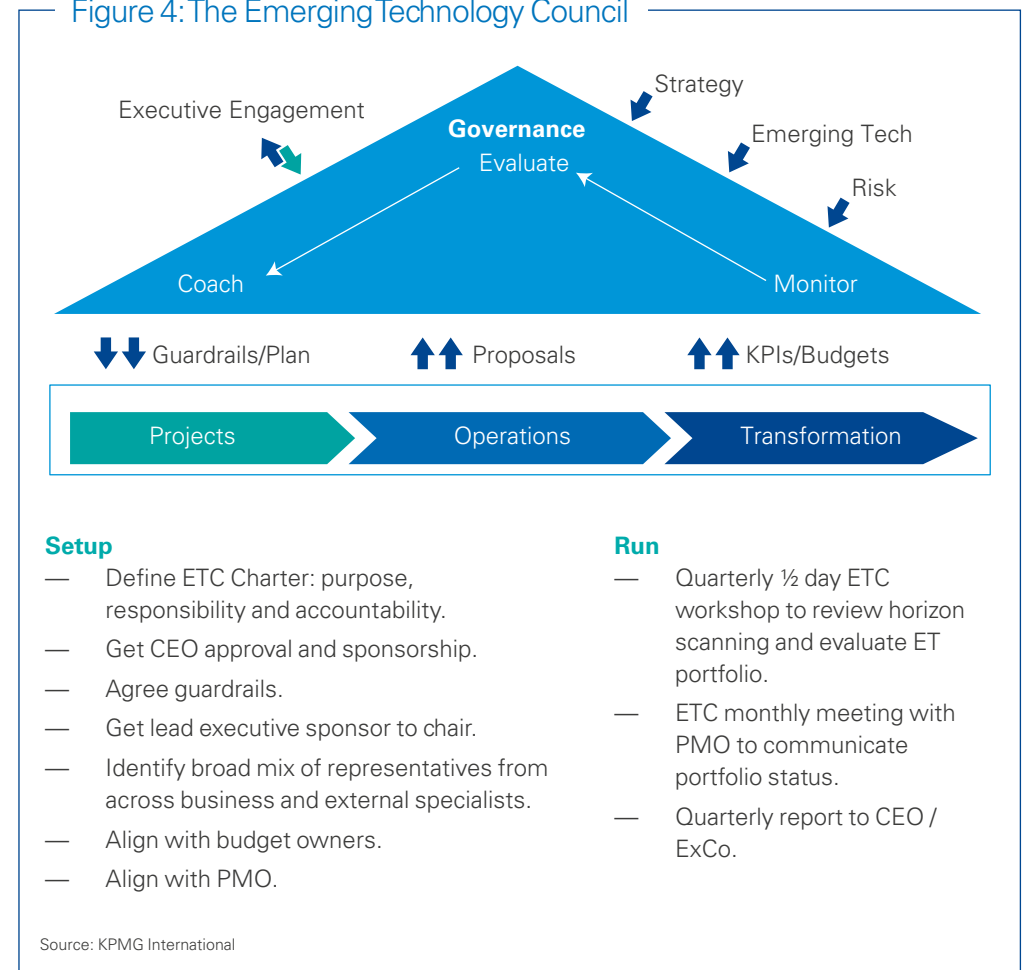
### Create a Separate Emerging Technology Council

The Emerging Technology Council that makes the decisions and drives the emerging technology governance process should be different than the one that deals with business-as-usual decisions – even though a common portfolio should contain information about both. The goal of this separate council is to creatively review emerging technology-driven innovative ideas and reduce the hurdles they have to clear before they are tested and allowed to develop roots and grow, rather than have them compete with all of the mainstream initiatives before the regular steering committee – see Figure 4. The council should:

- **Draw membership from across the organization.**
  Build the emerging technology decision-making council staffed by creative individuals from across the organization – including IT, business, and functional leaders – and invest them with the appropriate decision-making authority. It is critically important that emerging technology decisions are linked to business objectives and strategy.

- **Strongly consider adding external members.**
  Given the newness of emerging technologies and the stakes involved, getting expertise and perspective from someone outside the organization makes a lot of sense and can create an external, unbiased, outside-in view of the opportunities and risks presented to the organization. In addition to a background in the application of emerging technologies and wide market perspective, members should have a good cultural fit but be strong enough to ask tough questions.

- **Have a clear mandate to promote and foster innovation.**
  The steering committee owns the responsibility for implementing the innovation process and the ongoing management and coordination of innovation across the company. The committee decides the portfolio of innovation projects to pursue, delegates authority for individual efforts, allocates resources, and monitors the development process through its various stage-gate review points.

- **Communicate progress and results.**
  The steering committee develops and maintains an innovation scorecard to capture and report key innovation metrics. This scorecard is made available through the intranet.

Figure 4: The Emerging Technology Council

**Setup**
— Define ETC Charter: purpose, responsibility and accountability.
— Get CEO approval and sponsorship.
— Agree guardrails.
— Get lead executive sponsor to chair.
— Identify broad mix of representatives from across business and external specialists.
— Align with budget owners.
— Align with PMO.

**Run**
— Quarterly ½ day ETC workshop to review horizon scanning and evaluate ET portfolio.
— ETC monthly meeting with PMO to communicate portfolio status.
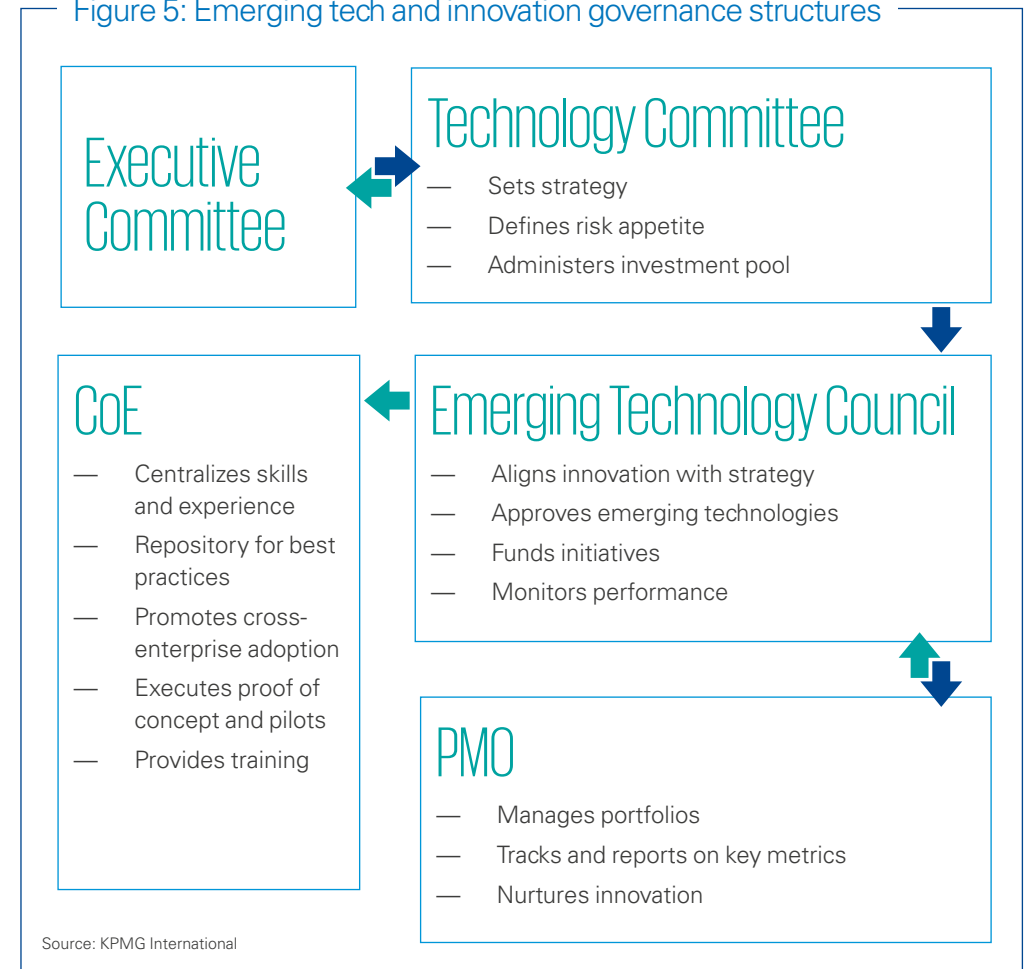— Quarterly report to CEO / ExCo.

Source: KPMG International

## Use a PMO to facilitate emerging technology-driven innovation

Traditionally, the PMO has focused on project management planning, methodology, and tools. Next-generation PMOs have extended that focus, taking a more strategic approach to portfolio management, providing support for business-driven projects, and providing visibility into demand for non-project work. The next-generation PMO also empowers organizations by providing greater insight into business and technology portfolios and providing visibility to scout out fertile ground for developing innovation. Next-generation PMOs support emerging technology-driven innovation by:

– **Creating a safe place for ideation and experimentation.** Development teams – especially those involved with emerging technologies – find innovative ways to create valuable software. By folding ideation exercises into the portfolio planning process, the PMO gives teams a platform for experimentation and a way to elevate ideas and outcomes to the appropriate management level to get funding. According to one healthcare industry vice president: "We have tollgates, but [when it comes to innovation] we have to shepherd work the right way so that innovation projects don't get held up – so it's not done a different way but done with a greater eye."

– **Reserving a portion of the portfolio for innovation to spur** "empowered problem solving." Next-generation PMOs that play a strategic role in portfolio management help the business think longer term regarding technology change. While funding is still dedicated to operations and maintenance, companies now understand that innovation is not solely the provenance of new applications or system delivery.

– **Working closely with key stakeholders to involve the right people at the right time.** Ideation is not just an IT exercise. Part of the next-generation PMO's responsibility is to ensure integration between strategic planning processes and the portfolio to drive the execution of the right investment initiatives at the right times. The PMO, business analysts, and the appropriate business stakeholders assess ideas to determine how to fund the right ones.

Figure 5: Emerging tech and innovation governance structures

**Executive Committee**

**Technology Committee**
— Sets strategy
— Defines risk appetite
— Administers investment pool

**CoE**
— Centralizes skills and experience
— Repository for best practices
— Promotes cross-enterprise adoption
— Executes proof of concept and pilots
— Provides training

**Emerging Technology Council**
— Aligns innovation with strategy
— Approves emerging technologies
— Funds initiatives
— Monitors performance

**PMO**
— Manages portfolios
— Tracks and reports on key metrics
— Nurtures innovation

Source: KPMG International

## 3. Implement an agile innovation process

Enabling opportunities for innovative ideas while at the same time managing risk requires an incremental and iterative approach. Using agile methods, cross-functional teams work in small increments to build and test a product or capability and then demonstrate it. The Emerging Technology Council reviews the outcomes and decides to either terminate it, make changes or let it move to the next phase, at which point additional resources and/or funding may be required.

The challenge for innovation is that traditional development processes require a business case early in the life cycle, which is problematic for many innovation initiatives because there is no track record. Therefore, innovation initiatives should take a more granular and incremental approach. For example, many stage-gate processes call for a business case in phase two. For innovation projects, a business case this early would either be highly speculative or lead to rejection due to a lack of sufficient value.

By applying agile methods, innovation projects can first attempt to do a proof of concept and then move to a small-scale pilot for further validation of both the opportunity (demand or need) and the ability to deliver. Upon completing a successful pilot, enough information should be available to build a credible business case with quantifiable value to justify continued funding.

The business case phase is the first time that value and risks are addressed for innovation initiatives. The results from the pilot phase should provide enough information to support a quantitative assessment of the potential return if the idea is implemented as well as the risk. If the business case is approved, the project should then move into the mainstream portfolio.

## 4. Stand up a center of excellence (CoE)

By definition emerging technologies are new so people with relevant skills are hard to find, and use cases and best practices are non-existent. At least in the early stages, setting up an emerging technology center of excellence (CoE) or even a technology specific CoE is a way to leverage scarce resources, and apply learning across the enterprise. The KPMG / Forbes Emerging Tech Risk Survey of C-level and Head of Business Unit executives revealed that almost half of the companies surveyed (43%) have a designated CoE responsible for identifying and assessing technologies.

– **CoEs foster collaboration.** Business staff members who are developing solutions for their own needs will want to tap collective expertise, understand what works for other business areas, and get help for their work. More importantly, they will want to find the path of least resistance when complying with policies and guardrails. A CoE focused on these needs will make this easier. This may take a while to get off the ground but will develop a momentum of its own if both business and IT find it an easy way to see what others are doing.

– **Coaching makes it easier to solve problems within the guidelines.** Ideas depend upon the presence of strong advocates to overcome the natural resistance to change inherent in every organization. These advocates will need expertise and resources to turn these ideas into functioning solutions. They can acquire their own consultants, but easy access to experts within a CoE will help them avoid barriers like data accessibility and security or availability of appropriate application interfaces.

– **Inspection provides education as well as audit.** Inspection is based on the HERO compact; business areas pursuing innovations on their own must show that they are being responsible to both their business management and established technology guidelines relating to architecture, security, standards, etc. The CoE can play the role of the inspector, with clarity that they are acting on the behalf of both business and IT management. Using standardized checklists makes this inspection more objective and enterprise concerns more transparent.

The strategic deployment of disruptive and emerging technologies is critical to the success of any digital business transformation. At the same time, they can significantly elevate the level of risk. By adapting enterprise governance to acknowledge the unique attributes of emerging technologies, organizations can effectively drive innovation and manage risks for optimal value.

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# How KPMG can help

KPMG recognizes that today's CIOs face increasingly complex demands and challenges in becoming the strategic technology partner their businesses require.

KPMG's CIO Advisory professionals can help CIOs, technology leaders, and business executives harness technology disruption, and more effectively manage technology resources to drive agile, improved business performance, enhance strategic position, and improve the strategic value of their technology investments.

If your IT organization is seeking ways to leverage technology as a source of innovation and competitive growth, KPMG member firms can help. For more information on CIO Advisory's service and capabilities, please visit www.kpmg.com/cioagenda

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