



Adopting an ecosystem view of business technology

Driek Desmet, Niels Maerkedahl, and Parker Shi

To fully benefit from new business technology, CIOs need to adapt their traditional IT functions to the opportunities and challenges of emerging technology “ecosystems.” Here’s how it’s done.

IT has traditionally functioned as the foundation to keep a company running. One of its core functions has been to protect company operations with firewalls and encryption to keep external technologies out. With the advance of technologies, however, a vast array of capabilities and sources of competitive advantage are emerging beyond a business’ traditional walls. Those capabilities are coalescing in a wealth of new ecosystems (see Exhibit 1).

These ecosystems often overlap. A social payment app, for example, may be part of the mobile, social, data, and banking services ecosystems. The Internet of Things (IOT) is an ecosystem where multiple applications communicate with each other as a network.

Exhibit 1

Ecosystem archetypes: Explosive growth

	Objectives	Examples
Sales	<ul style="list-style-type: none"> Allow users to interact with each other socially Primary angle is to attract as many customers and social interactions as possible 	<ul style="list-style-type: none"> Individual social platforms such as Facebook, Tencent Wechat, Instagram, Twitter, Line Professional social platforms such as LinkedIn
Data	<ul style="list-style-type: none"> Sharing data using standard data definitions Providing additional data-and analytics-based services Primary focus is to capture and use external and proprietary data 	<ul style="list-style-type: none"> IOT efforts by John Deere, Caterpillar Minestar, and GE Aviation Apple iHealth P&C insurers (e.g. using weather data patterns to assess fire risks)
Technology	<ul style="list-style-type: none"> Enablement by industry standard software and hardware Better/faster IT delivery through broad range of specialist IT firms and technologies 	<ul style="list-style-type: none"> Consumer mobile such as Apple iOS and Google Android Enterprise technology platforms such as SAP ERP, Microsoft Office, Oracle ERP, SAP Hans Visa/MasterCard's payment processing platforms, and blockchain
Customer journeys	<ul style="list-style-type: none"> Leverage company's core commerce functionality and value proposition to attract large number of customers Additional capabilities to complete the customer journey and experience can then be added to create network effect 	<ul style="list-style-type: none"> Ride sharing platforms such as UBER and Lyft Shopping platforms such as Amazon Travel platforms such as Airbnb Banks allying with FinTech players in value chain, e.g., SME app players linked via APIs into bank
Services	<ul style="list-style-type: none"> Integrate multiple companies' services together to holistically address customers' pain points and make the initial product/services much more attractive for customers Bundling can be done either transparently or explicitly 	<ul style="list-style-type: none"> Transparent add-ons such as Slack and Amazon Alexa Explicit services platform such as Salesforce.com and the salesforce ecosystem/AppExchange

By plugging into these ecosystems, companies can get access to entire networks. They can, among other benefits, find new customers, tap into new sources of data, and improve established business processes.

CIOs and IT organizations have a huge role to play in capturing these opportunities. But they can't do it through "business as usual." In an ecosystem environment, an exclusive focus on "protecting the center" can limit a company's ability to capitalize on emerging opportunities. To adapt their complex business-technology architecture to function in a world of ecosystems, CIOs will have to figure out how to simultaneously draw external technologies closer while managing security issues and getting a handle on the accelerating stream of technological innovations.

IDC predicts that by 2018, more than 50 percent of large enterprises—and more than 80 percent of enterprises with advanced digital-transformation strategies—will create or partner with industry platforms.¹ At the same time, there will be more than 50 billion connected devices expected by 2020, according to Cisco.

These numbers point toward a radical reframing of what IT is and how CIOs manage it—not as an internal collection of information technologies (IT) but as a broad network of ecosystem technologies (ET). For the CIO, this shift also creates a significant opportunity to work closely with the CEO on business priorities and to become a prime strategic partner.

Understanding ecosystem technologies

ET encapsulates an expanded set of IT capabilities and functions (Exhibit 2). The CIO still needs to manage the multi-speed IT functions² as well as current bilateral programs. The new layer of ET represents a new set of capabilities as well as the extension of existing ones.

CIOs can define and shape their ET three ways:

1. Opening up internal IT to outside world

This approach is about architecting IT to link internally driven systems and capabilities into external systems. One example of this in action is Delta Air Lines' mobile app, which extends to Uber so travelers can order a car upon landing. Kraft has expanded its recipe app to become a pantry-management tool, generating a shopping list that seamlessly connects with the grocery-delivery service Peapod. Think of it as extending the customer's journey—and the company's relationship with the customer—through integration with other service providers.³

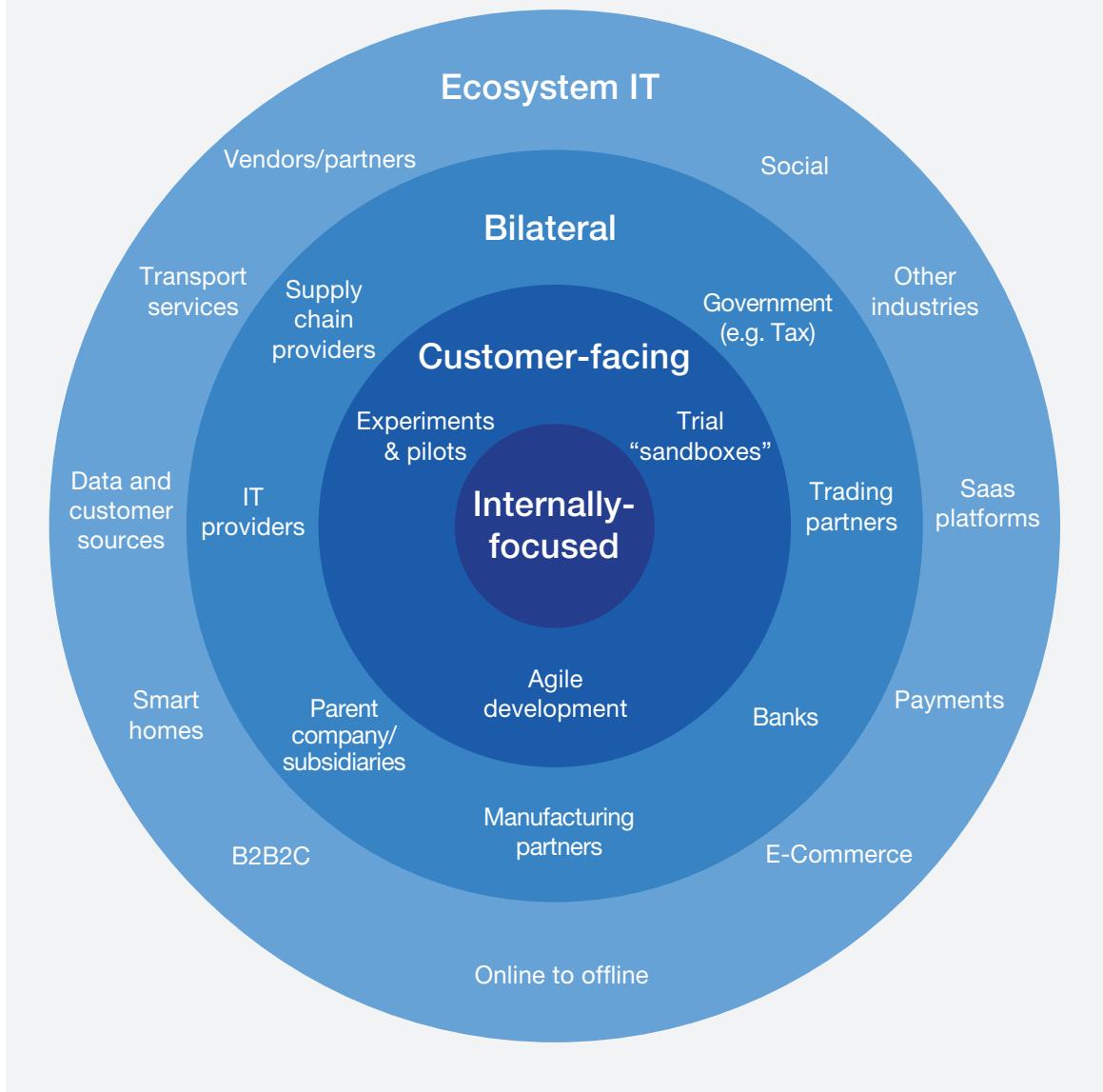
¹ IDC Predicts the Emergence of "the DX Economy" in a Critical Period of Widespread Digital Transformation and Massive Scale Up of 3rd Platform Technologies in Every Industry, Nov. 4, 2015.

² Oliver Bossert, Chris Ip, and Jürgen Laartz, "A two-speed IT architecture for the digital enterprise," McKinsey & Company, December 2014.

³ Examples from David C. Edelman and Marc Singer. "Competing on Customer Journeys," Harvard Business Review, November 2015.

Exhibit 2

Overview of four-layered IT



Many companies have already been providing integration capabilities to upstream and downstream partners—technologies such as EDI (electronic data interchange) have been in existence for decades. However, those integration points are often static. They are bilateral connections with a small, preselected group of partners such as distributors and suppliers. Those points of integration happen infrequently and often in a batch.

The future of integration into external ecosystems will force companies to interact with many more partners covering a broad range of functions, ranging from customer sourcing to social

advertising to payment solutions. That's because the low cost of technology and a dynamic start-up environment has led to a massive increase in the rate at which new services are being introduced. This means that the IT function must follow the 'Amazon principle' of making system components available as a service to enable integration with the ecosystem. The interfaces must be open, dynamic, and functional in real time so that they can integrate partners, technologies, and applications on an as-needed basis.

One clear implication is the need to design lightweight technology architecture built on microservices and application programming interfaces (APIs) to allow third parties to easily hook into the new ecosystem. CIOs need to start thinking in terms of platform architecture such as auto-industry OEMs use to allow for future upgrades across the ecosystem. They may even need to offer an 'app store' to allow consumers to pick and choose desired capabilities—and, of course, the infrastructure must be robust and secure.

One example of how this can play out might be found in telecom players that expand their connected services to e-commerce, music, health, insurance, education, media, and smart homes. These services would all be connected into one ecosystem offering the customer multiple services through the telco's technology backbone. Salesforce's AppExchange is already doing this by creating an environment in the cloud where developers can create and release their own apps.

2. Internalizing external IT

This approach focuses on opening up internal IT systems so that the business can plug in the external capabilities available in the ecosystem to better serve its own customers, support its own employees, or create new products and capabilities, often offered via SaaS and APIs. A simple example is integrating a third-party point-of-sale (POS) application into a company's internal payment systems to simplify a customer's in-store purchase process. Or integrating a third-party customer-service chat function into a company's website. Or even integrating Yammer to help with employee productivity.

This approach clearly changes how IT designs and manages its systems. It's no longer about buying software packages and building bespoke solutions on premise or working with a few systems integrators to deliver a business solution. It's now all about understanding the end-to-end customer experience and how external and already available services can be utilized with internal solutions to offer a complete and unique offering. Companies will need to complement internal skills with external specialization integrated deeply into the ongoing fabric of its IT application development and infrastructure management. It's about creating a 24/7 environment that enables product offerings to millions of customers globally.

One leading international travel company, disrupted by start-ups in the market, decided it needed to build up its capabilities to drive its transformation. An important component of its strategy was to use specialized vendors from the external ecosystem to support different capabilities, for example, mobile, search engine, CRM, payments. This approach allowed them to accelerate their

transformation, scale up their services, and tap specialized talent as technologies evolved and demand spiked.

3. Modernizing IT to scale innovation

We've all heard often enough how torrid the pace of new technologies has become. But it's worth remembering that many of the new tools have the potential to fundamentally change a company's business model, though that may not be clear at first. To guard against being caught unprepared and to adopt a more aggressive competitive posture, companies should begin testing these technologies to be ready to bring them on board as soon as their value is proven and they can work at scale. This may be a matter of "playing" with new technology (e.g., alike open source standards) in dedicated sandlots where the connectivity between the internal IT and external IT can be tested. Furthermore IT leaders will need to actively form partnerships or alliances with vendors and service providers to really understand and evaluate how the technology can be used in their business environment.

It is true that many companies have already been actively investing in emerging technologies. For example, many financial-services companies have set up internal corporate venture-capital funds to invest in technologies such as blockchain and the IOT. However, companies have demonstrated less progress—and success—in integrating those technologies into their existing IT infrastructure and successfully extending the value proposition to their customers. The start-ups often have immature technologies that cannot scale, and they often leverage external cloud services that may not be compatible with companies' own cloud infrastructure. Therefore it's important for companies to think through how they enable a smooth integration of both technical solution and working culture to fully capitalize on the products that the start-ups are offering. If not done correctly, companies will create the next wave of spaghetti IT infrastructure.

Given the scale of innovation, it would be virtually impossible to keep up unless the CIO designates specific analysts or architects whose job it is to identify and assess the compatibility of external technologies. The DBS Innovation Group, for example, has established a fintech SVP role responsible for identifying, integrating, and managing potential eco-system members. This person leads and drives fintech engagements locally and regionally, and reports to the global head of partnerships.

Regardless of which way—or combination of ways—the CEO and CIO choose, IT moves to the forefront not just of technology but also of business-model innovation.

Getting started with ET

While building out ET is complex and based on many interdependencies, we've found that focusing on the following six elements gives CIOs and CEOs a big advantage in getting the most value from it:

Questions the CEO can ask the CIO

- Have you identified the set of technologies, platforms, and vendors that can help us accelerate our digital strategy?
- How quickly can a potential partner integrate our services into their services?
- How quickly can we add a new vendor/partner today to accelerate a specific capability such as live-data connectivity?
- What are the three most important sources of value that the external ecosystem can provide?
- What talent and capabilities have you identified that we need to succeed in the ecosystem? How are you building them?
- Do our cybersecurity policies and practices cover external partners? And their partners?
- How are we ensuring that our services are exposed to and can interact with the broader ecosystem?

1. Rethink the business' strategy. Which way, or combination of ways, a company chooses to interact with various ecosystems (or create its own ecosystem) depends on three things: its strategy, the market environment, and the risk appetite of the overall enterprise. This in turn requires the CIO to work closely as a partner with the CEO and C-suite to help shape the business strategy by identifying emerging technologies and ecosystems that could disrupt the marketplace, determine where future sources of value are, and develop necessary strategic actions to capture it. This dialog is a two-way and constant exploration in which technology and business strategy are inextricably linked. The CIO's role is not just to determine feasibility but to help the business determine what threats and opportunities exist in engaging in ecosystems. (see article "The economic essentials of digital strategy").

2. Develop the infrastructure. The new bidirectional integration of technologies is dynamic in nature; it happens in real time with thousands of invoking partners or end consumers. This

requires companies to redesign the next-generation integration architecture to support it and enforce open standards that can be easily adopted by external parties. A company's existing master data-management catalog will also need to be extended to include third-party data and potential integration with external master-data providers. There has to be a clear data architecture and governance in place to ensure data cleaning, rationalization, and standardization for the systems to work.

3. Reinvent customer-management processes and structures. When customers call with technical issues, it will be challenging to figure where the fault points are in an ET environment. Is it the company's systems, a third party's services, the cloud that houses the service, the network—or some combination of the above? This reality will require companies to fundamentally rethink their infrastructure-support processes.

Creating SLAs that clearly define issue resolution and escalation protocols that all parties agree to will be crucial. Creating standard identifying tags or 'tripwires' and integrating them into participating ET services, partners, and technologies will be important to locate issues quickly so they can be resolved.

These standards and agreements, however, are not an excuse for shuttling customers from one partner to another and another. The customer-facing company needs to solve the issues behind the scenes and spare the customer the complexity of navigating the partners' ecosystems.

4. Define the parameters for cybersecurity, legal, and partnerships. As a result of the extended infrastructure, internal cybersecurity policies and processes will need to include third-party partners and vendors. A new set of security standards should be defined and agreed to that clearly articulates how the integration will take place and what kind of data can be exchanged with whom.

Working with a broad range of third parties will raise other legal questions as well. IP, liability, privacy, profit sharing, and regulatory/compliance issues all have the potential to severely impede potential benefits from engaging in the broader ecosystem. Licensing issues have already emerged between cloud companies and on-premises hardware and software businesses because of competing and different business models. Data ownership and customer management in particular will be crucial given the need for companies to access both.

This will call on significant negotiating skills and a commitment to develop and apply a broad set of standards to avoid constant renegotiating with each new partner or vendor from scratch. Setting up an app-store approach where standards are clearly stated, tools provided, and agreements specifically made at the beginning may provide a useful model.

Engaging with a network of vendors also requires changes in skills certification and vendor performance management. Companies will need to clearly define the standards and procedures under which vendors must operate and guidelines that define how the vendor will be included in the delivery lifecycle. Home Depot is developing standards with the manufacturers of its products

to ensure compatibility with the Wink connected-home system. Companies that do this most effectively treat vendor relationships as partnerships with strong transparency. The internal-supply and vendor-management functions will need to be restructured to work more like M&A, which can integrate new partners or establish new alliances quickly and efficiently.

5. Cultivate an “open” mind. CIOs have traditionally focused on protecting systems and ensuring that they run well. But the new digital world demands more active engagement with the outside world to understand competitive threats and sources of value. CIOs should start with developing a much more externally compatible view of the current IT infrastructure and thinking about how to design new ways of meaningfully integrating external systems. Spending a long time building overly complex ‘bulletproof’ systems is counterproductive; testing an application or new platform environment should take a matter of days or weeks.

6. Invest in new capabilities. As businesses increasingly engage with external ecosystem technologies, full-stack architects and convergence infrastructure engineers are needed who can provide expertise in third-party packaged software, have fluency in multiple best-of-breed technologies, and bring experience integrating multiple technologies. ‘Translator’ capabilities will also be crucial to bridge the gaps between business goals and technology requirements to be provisioned through the ecosystem. Any new function within the enterprise architecture should work closely with business to understand how external services can be integrated with products to extend the customer value proposition.

With the advancement of cloud computing and infrastructure as programmable software, infrastructure resources (e.g., networks, servers, storage, applications and services) can now be rapidly provisioned, managed, and operated with minimal effort. That requires DevOps (the integration of development and operations) and cloud engineers, who have the experience to navigate a rapidly changing cloud computing ecosystem and program software, as well as data scientists, automation engineers, and enterprise architects. Companies will also need to find a few senior developers who can set up app-store development standards.

Companies have outsourced many of these capabilities. But due to the increased importance of engineering and automation skills, many are rethinking that approach as IT evolves from utility to enabler.



Integrating a company’s IT with third-party capabilities creates opportunities to capture substantial new sources of value. But until IT expands to become ET, the vast majority of those opportunities will remain out of reach.

Driek Desmet is a senior partner in McKinsey’s London office; Niels Maerkedahl is an associate partner in McKinsey’s Singapore office; and Parker Shi is a senior partner in McKinsey’s New Jersey office.