Architectural disruptions set to alter the technology industry
A framework for technology companies to capitalize on the trends
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For several decades, established technology companies have grappled with the unexpected threat that entrants have posed to them through their innovative products and business models. Entrants, on the other hand, have faced the risk of losing out to incumbents with a solid preexisting customer base. Cognitive computing, Internet of Things (IoT), and enterprise mobility could change the technology industry landscape in the next three to five years, given their magnitude of impact, and the market opportunities they present to the technology industry.

CEOs and CSOs of technology companies, whether established or new, can use the framework outlined in this article as a roadmap to steer their companies through what we are referring to as the latest set of architectural disruptions. Architectural disruptions typically originate in one of three ways (See figure 1.).

1. When the old technologies advance (e.g., the smartphone, which was an advance over first generation cell phones in terms of computing capabilities, user interface, and multimedia functionalities).
2. When different technologies are combined (e.g., cloud, which was developed from the aggregation of software and hardware virtualization and the Internet).
3. When new technologies, such as 3D printing, are introduced.

Figure 1. Schematic illustration of an architectural disruption

How technologies evolve

- Advancement over old technologies
- Aggregation of underlying technologies
- Inception of new technologies

Can lead to a step change that ends up being disruptive

Architectural disruption

HIGH IMPACT

Impacts broad set of industries (e.g., IoT being used in retail, transportation)

Creates new economies (e.g., smartphones created app economy)

Iterative advancements

LOW IMPACT

Can be an iterative process that ends up being non-disruptive

Source: Deloitte research
Companies that lead architectural disruptions create a wide impact through their products and services, and often lead to the creation of new economies. They derive significant utility and value, measured by metrics such as cost-saving, adoption rate, penetration level, and customer satisfaction. Cloud, for example, has helped reduce the up-front capital expenditures (CAPEX) for many businesses at various occasions.\(^1\)

In the case of smartphones, the EBITDA\(^1\) margin of the top two smartphone companies (by market share) exceeded that of their peers by 19 percentage points in 2015. During 2007-2015, the share price of these two companies grew at a CAGR\(^2\) of 18 percent, versus a 7 percent decline for peers (refer to appendix A). Both these companies used specific strategies to achieve superior results. While one adopted product innovation and vertical integration to build a tight-knit proprietary ecosystem that helped reduce its time to market, the other company embraced strategic partnerships and geographical diversification to offer an open source and democratized platform. Together, these strategies helped both these companies to find their own sweet spots in the smartphone architecture.

Not all types of technology evolution, however, lead to architectural disruption. Some of them may take much longer to evolve after going through several iterations, and can end up being non-disruptive. For instance, the impact of the technological advances of pagers over radio communications were short-lived and mostly limited to a few industries such as health care and public services.\(^2\)

Architectural disruptions are those disruptions and trends that have the potential to radically change the way technology products are created and delivered across businesses, which may require technology companies to rethink their business strategies.

Cognitive computing, IoT, and enterprise mobility: The next major architectural disruptions

In the technology landscape, several architectural disruptions are under way and opportunities for technology companies are unfolding. Cloud, advances in semiconductors, digital payments, 3D printing, and smartphones/connected devices offer opportunities to capture new markets and customers. In this article, we have selected three architectural disruptions to present—namely cognitive computing, IoT, and enterprise mobility, based on the scale of impact, opportunities for business model transformation, as well as the market opportunities for the technology industry.

Cognitive computing\(^3\) has been enabling organizations to eliminate existing tradeoffs between speed, cost, and quality by performing tasks that traditionally required human intelligence.\(^3\) Global venture capital (VC) investment in this field reached $2.5 billion in 2015; roughly a nine-fold increase from 2011 levels.\(^4\) IoT\(^4\) has attracted businesses across industries, given its potential to monetize data generated by a number of connected devices. Between 2010 and 2015, corporations and their venture arms have cumulatively invested $3.2 billion across 266 deals globally in this space.\(^5\) Enterprise mobility\(^6\) similarly, has been transforming the workplace, leading to greater employee productivity. We believe enterprise mobility is the next disruptive force because employees no longer need to be tethered to their desks to be productive at work. On average, each employee of a multinational technology company saves 57 minutes a day by using mobile devices.\(^6\) The revenue of global enterprise mobility market is expected to reach $510 billion in 2022, growing at a CAGR of 24.9 percent between 2014–2022.\(^7\)

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I. EBITDA stands for Earnings Before Interest, Taxes, Depreciation and Amortization

II. CAGR stands for Compounded Annual Growth Rate

III. “Cognitive technologies is a product of field of research known as ‘artificial intelligence’ - the theory and development of computer systems able to perform tasks that normally require human intelligence.” For further reading, to know more about cognitive technologies and the opportunities they present, please read [Cognitive technologies: The real opportunities for business](https://www.mckinsey.com/business-functions/mckinsey-technology/our-insights/cognitive-technologies-the-real-opportunities-for-business).

IV. Internet of Things (IoT) can be related to “ubiquitous computing” a world in which objects of all kinds could sense, communicate, analyze, and act or react to people and other machines autonomously, in a manner no more intrusive or noteworthy than how we currently turn on a light or open a tap”. To know more about IoT, please read [Inside the Internet of Things (IoT)](https://www.mckinsey.com/business-functions/mckinsey-technology/our-insights/inside-the-internet-of-things-iot).

V. Enterprise mobility is a trend that enables employees to work from any location using their mobile devices and technology, without the need to be tethered to their desks.
Technology companies can navigate these three architectural disruptions and capitalize on the opportunities by adopting specific strategies and tactics. We present a framework that will likely help technology company executives to apply specific strategies based on the disruption wave (IoT/cognitive computing/enterprise mobility) that they are navigating or on which they plan to capitalize.

**Strategic recommendations: A framework for technology companies to navigate the three architectural disruptions**

Based on our analysis of disruption-management strategies adopted and implemented by 33 technology companies across various subsectors (including software, semiconductor, and computer hardware) over a 35-year period (1980 and 2015), we developed a framework (see figure 2) that encapsulates two dimensions: (i) the type of company—established or entrant; and (ii) the architectural disruption that the company intends to take on.

Together, these two dimensions help companies determine the strategies they can use/adopt to navigate these architectural disruptions. Our research shows that these were among the most frequently used strategies by companies that were successful in these select architectures. The strategies are illustrative and serve as a starting point for technology companies to gain a foothold within these disruptions (refer to appendix B for detailed methodology).

**Figure 2. Strategy framework**

An illustrative framework for technology companies to navigate the select three architectural disruptions

<table>
<thead>
<tr>
<th>Type of company</th>
<th>Architectural disruptions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Established</td>
<td>Cognitive computing</td>
</tr>
<tr>
<td></td>
<td>Vertical integration</td>
</tr>
<tr>
<td></td>
<td>Strategic partnership</td>
</tr>
<tr>
<td></td>
<td>Product diversification</td>
</tr>
<tr>
<td></td>
<td>IoT</td>
</tr>
<tr>
<td></td>
<td>Strategic partnership</td>
</tr>
<tr>
<td></td>
<td>Product diversification</td>
</tr>
<tr>
<td></td>
<td>Vertical integration</td>
</tr>
<tr>
<td></td>
<td>Business model innovation</td>
</tr>
<tr>
<td></td>
<td>Geographic diversification</td>
</tr>
<tr>
<td></td>
<td>Strategic partnership</td>
</tr>
</tbody>
</table>

Note: Elements present in the above green boxes are the illustrative strategies that can be used by established companies and the entrants present in the technology sector to navigate the three architectural disruptions—cognitive computing, IoT, and enterprise mobility.

Source: Deloitte research
Architectural disruptions set to alter the technology industry
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How have technology companies embraced these strategies?

Riding the wave of cognitive computing
Since 2011, the technology sector’s interest in cognitive has exploded, with a roughly six-fold increase in the number of acquisitions and a nine-fold increase in the total funding raised by start-ups (see figure 3).

Figure 3. Number of M&A transactions and total start-up funding in cognitive computing space worldwide

Source: Compiled using data from CB Insights.
How can established companies embrace cognitive computing?

The cognitive computing value chain includes data services to assess and gather relevant information, platform services that offer APIs, content advisory services, and platform components that provide an interface for displaying the analysis and visualization of data. Established companies can grow their presence across the cognitive computing value chain through vertical integration. For instance, to bolster its cognitive capabilities, a major semiconductor company acquired entrants across data services, platform services, and content advisory services. With the company’s core capability in chip-making, the integration of these multiple software capabilities helped the company build a comprehensive cognitive computing portfolio. Due to its multi-disciplinary capabilities, several major PC OEMs adopted the company’s gesture-based human-computer interaction platform.

Cognitive technology has applications across industry verticals. Technology companies can craft solutions to address the demands of different verticals through product diversification. They can follow a platform-based approach to design cognitive solutions that cater to a broad set of industries. For instance, a major IT company in 2014 launched its cognitive platform targeted at health care providers, and then extended that platform to companies in other verticals such as retail, airline, and legal. Since its launch, the cognitive platform has become the company’s fastest-growing new business in terms of revenues.

How can entrants take on cognitive computing?

To provide users with comprehensive cognitive computing solutions, entrants can build strategic partnerships with players providing data services, platform service integration (e.g., language identification, machine translation, and visual recognition), platform components (analytics), and content advisory. CognitiveScale, a software entrant, grew its cognitive computing ecosystem by developing partnerships with content, technology, and system integrators. Within a year, it managed to triple its revenue, employees, and customer base in 2015.

In order to remain competitive within cognitive technologies space, entrants need to be lean and more focused to compete with their larger counterparts. They can invest in product innovation and introduce products in different layers of information technology. For example, 6Sense, a B2B predictive intelligence platform, helps B2B marketing and sales leaders identify new and in-market prospects based on data science. 6Sense patented a machine-implemented system for estimating future sales, opportunities, and leads. The company’s revenue grew three-fold in 2015 as it acquired major customers that included PC OEMs, network equipment manufacturers, and cloud software service providers. To imbibe innovation into its culture, 6Sense recently set up a customer advisory board that includes major B2B brands to help drive customer-centric innovation in this field.
Case study: How Affectiva capitalized on cognitive computing by making the right moves

Affectiva (2009–present, Headquarters—Waltham, Massachusetts)

Affectiva is a developer of emotion-recognition technology that can read people's moods from digitally captured facial expressions. The current method of emotion testing in a laboratory environment is invasive, labor-intensive, and expensive. Also, a comprehensive database containing facial expressions and emotions has limited availability. Affectiva seized the opportunity through the following strategies:

It developed **strategic partnerships** with industry and technology leaders to develop powerful analytics and insights. It has partnered with a company that offers GIFs, auto-encoding all their content for emotions. Affectiva has also partnered with companies, including marketing consultancy firms, companies focused on advertising effectiveness, and biometric research platforms.

The company adopted **product innovation** and developed emotional artificial intelligence capability. The technology inputs digital images and maps them to emotional states. It uses a computer vision algorithm that identifies key landmarks and a machine learning algorithm that analyzes pixels in those regions to classify facial expressions. The company has built the largest patent portfolio among entrants in this field, with seven patents granted and over 30 pending applications.\(^{17}\)

**Affectiva’s success:** These strategies have enabled Affectiva to compile an "emotion" repository using 4.2 million videos from people, amounting to 50 billion data points. The company's solutions have been adopted by about 1,400 brands, which include 32 Fortune 100 companies across 75 countries.\(^{18}\)

Takeaways for technology companies

<table>
<thead>
<tr>
<th>For established companies</th>
<th>For entrants</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Follow vertical integration to expand presence across the value chain of cognitive computing.</td>
<td>• Gain foothold through innovative product offerings, and expanding the patent portfolio.</td>
</tr>
<tr>
<td>• Adopt a platform-centric approach to develop scalable and diversified solutions, catering to different industry verticals.</td>
<td>• Partner with targeted vendors to augment and integrate offerings to develop cutting edge/intelligent cognitive solutions.</td>
</tr>
</tbody>
</table>
**Capitalizing on the IoT trend**

In the last 12 years, the number of connected devices has increased 32 times to 16.3 billion devices as of 2015 (see figure 4), showcasing the breadth of opportunity that IoT offers. To make the most of this opportunity, companies can consider using the strategy framework presented in this article to succeed within IoT. This framework may not be all-inclusive, as there could be additional strategies to attain superior performance.

**Figure 4. Number of connected devices worldwide**

<table>
<thead>
<tr>
<th>Year</th>
<th>Number of connected devices (B Billions)</th>
<th>Connected devices exceeds number of people</th>
</tr>
</thead>
<tbody>
<tr>
<td>2003</td>
<td>0.5</td>
<td>Connected devices exceed number of people</td>
</tr>
<tr>
<td>2010</td>
<td>12.5</td>
<td>Connected devices exceed number of people</td>
</tr>
<tr>
<td>2015</td>
<td>16.3</td>
<td>Connected devices exceed number of people</td>
</tr>
<tr>
<td>2020E</td>
<td>26.3</td>
<td>Connected devices exceed number of people</td>
</tr>
</tbody>
</table>

Source: Deloitte analysis based on data from following reports - [Cisco, IoT 2011](#), [Cisco IP Network Forecast 2015](#)
How can established companies embrace IoT?

Product categories are emerging across the IoT landscape in vertical industries such as connected cars, homes, wearables, and smart cities. Investments in IoT are expected to generate significant returns over next several years across businesses. A report suggests that an investment of $6 trillion on IoT solutions over the next five years will likely result in a return of $13 trillion by 2025. To gear up for such demand, technology companies can pursue product diversification to help expand their portfolio of solutions to include diverse data sources to extract insights. As a case in point, a major search engine provider has introduced solutions for wearables, smart homes, and autonomous cars.

A company’s products need to operate in multiple layers of IoT, ranging from devices, sensors, networks, security, analytics, and the cloud. As it is difficult for a company to have specialized capabilities to operate across the layers, it is essential to build strategic partnerships with companies that are present in other layers. An American conglomerate fostered partnerships with system integrators, software vendors, and telecom and technology providers to increase the adoption of its industrial IoT platform. These partnerships helped the company to offer IoT solutions with lower time-to-value (TTv) and higher convergence between IT (information technology) and OT (operational technology). The platform helped the company’s software division generate close to $6 billion in 2015, recording a CAGR of 20 percent between 2011–2015, and helped establish a strong customer base.

How can entrants take on IoT?

Cellular networks, standardized mobile access, and the advent of cloud-based technology are the key enablers that support the growth in the number of IoT/connected devices and products worldwide. With IoT breaking geographic boundaries to deliver solutions to businesses, an appropriate geographical diversification strategy can enable entrants to unlock value from those markets that offer higher growth potential. Greenwave Systems, a US-based IoT platform developer makes products that interact with connected devices including doorbells, phones, televisions, and smoke detectors through a single command. To grow its global footprint and customer base, Greenwave opened R&D facilities in Europe and Singapore. Western Europe and Asia-Pacific regions are expected to outpace North America in terms of IoT revenues and installed base through 2020. The company achieved growth by winning top telecom and software giants as its customers. Its platform offers services to 8 million households, and its revenues are expected to touch $100 million by 2017.

Entrants can pursue product innovation as they look at developing new solutions for issues related to connected “things” such as wearables, which lack interoperable data interfaces. IoT solutions providers can develop products that help integrate disparate data streams from various devices and mash them to deliver unique insights. As IoT evolves, the need for introducing advanced functionalities like remote control (rather than just monitoring and reporting) is increasing. Innovation within IoT is visible through examples like Fit Pay Inc., a developer of a contactless payment platform that has patented a technology that allows users to pay through their wearable devices.
Case study: What Ayla Networks did to take advantage of IoT

Ayla Networks (2010–present, Headquarters—Santa Clara, California)

Ayla Networks, an IoT vendor, serves manufacturing clients with products in heating, ventilation, air-conditioning, fire and safety, and lighting using its platform-as-a-service (PaaS) solutions. These manufacturers are often time-strapped as they depend on integrators, device control gatekeepers, product design vendors, and security vendors for IoT enablement, leading to a significant increase in time to market. Additionally, IoT PaaS vendors have an opportunity to expand to other geographies outside their domicile markets, which can potentially serve as a major revenue driver. To address these challenges and opportunities, Ayla Networks adopted two key strategies.

It went in for geographical diversification by expanding its IoT cloud base to China, Japan, Taiwan, and Europe. China and Japan are expected to become the second and third largest IoT markets in terms of revenue by 2025. Ayla became the sole provider of a licensed Internet Content Provider (ICP) platform in China, which allows it to collaborate with other IoT players and work toward a country-wide IoT platform. Ayla plans to add a fourth IoT cloud service for the broader Asia region in addition to the ones operating in the United States, Europe, and China, to create a network effect that benefits every manufacturer connected to the Ayla IoT cloud.

Through product innovation, Ayla developed a technology that provides an “Agile IoT platform” for manufacturers and service providers. With the help of this platform, it installs its virtual agent on chips of major chipmakers, which immediately connects the machine to the Ayla platform. Manufacturers can buy the Ayla virtual agent chip and use it in their system to connect to the Ayla platform. This method is quick and easy and eliminates costs associated with connecting to the IoT platform. Ayla was the first to develop the Agile IoT platform and holds a patent dated November 2013.

Ayla’s success: Through the above strategies, Ayla became a leading IoT platform provider for manufacturers in home appliances, water heaters, HVAC, water softeners, and safety products. It is also the fifth most-funded entrant in the IoT domain, globally.

Takeaways for technology companies

<table>
<thead>
<tr>
<th>For established companies</th>
<th>For entrants</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Partner with companies across different layers of IoT (such as internet, sensors, cloud) to enhance the value delivery.</td>
<td>• Expand globally into markets offering higher growth potential to foster global IoT standardization.</td>
</tr>
<tr>
<td>• Develop industry-specific solutions that help generate varied data streams, deriving greater insights and value.</td>
<td>• Increase focus on innovation to take a lead in new and evolving IoT architecture.</td>
</tr>
</tbody>
</table>
Embracing enterprise mobility

More and more companies are employing enterprise mobility solutions to achieve productivity benefits and operations improvements. Enterprise mobility management (EMM) software revenues grew by 28 CAGR between 2013 and 2015 (see figure 5). To capitalize on the EMM market, companies can consider using the strategy framework presented in this article—and these strategies can form a part of their broader set of strategies toward achieving superior performance.

How can established companies embrace enterprise mobility?

The enterprise mobility ecosystem is made up of mobility software platforms, mobility solutions, app stores, app lifecycle solutions, professional services, and enterprise software vendors. Established technology providers that have solutions in one field of enterprise mobility can consider adding complementary capabilities to create an integrated solution for their consumers. As Nicholas McQuire, former managing director at the Global Enterprise Mobile Alliance (GEMA), explains, “Bundled solutions have the advantages of cost efficiency and simplification, which have proven valuable to IT departments in the past for more standardized client-server computing.”

Within enterprise mobility, the focus of companies has been to launch flexible, secure, and cost-effective solutions. It is therefore important for these companies to assume control over their ecosystem to maintain both quality and cost. Companies can achieve this ecosystem control by using vertical integration of capabilities. For example, an enterprise mobility solution provider can acquire one or more niche mobile app providers to help craft a complete, end-to-end solution.

How can entrants take on enterprise mobility?

Entrants need to keep pace with the dynamic nature of enterprise mobility. To differentiate themselves from traditional players, entrants can capitalize on their agility to embrace business model innovation to deliver value through their enterprise solutions. Usually, mobile app testing is outsourced to employees working for the quality assurance function of a company. However, Applause, an enterprise mobility entrant, used crowdsourcing to test mobile apps. They have a community of roughly 100,000 people who test enterprise solutions. Since the testing is done in a real environment, the results are a truer reflection of the user experience than those generated in a traditional lab-testing environment. Applause has beaten the industry average revenue growth of 27.9 percent by registering a CAGR of 54.1 percent in the last two years. It has a strong customer base across varied industries that include major search engine operators, multinational e-commerce and cloud computing companies, and large satellite television networks.
In order to support widely used software solutions, entrants need to partner with software vendors and enterprise mobility management vendors. They may not have adequate resources to integrate with players across the value chain of enterprise mobility, but they can build strategic partnerships. Appthority, a software company, formed a number of partnerships in 2012, feeding its solution to Enterprise Mobility Management, Mobile Device Management, and Mobile App Management to deliver risk analysis capabilities to its clients. This helped the company gain significant traction in the enterprise mobility trend. Appthority ended 2016 with a 98 percent customer renewal rate year on year.35

Case study: How Capriza made a breakthrough in enterprise mobility technology

Capriza (2011–present, Headquarters—Palo Alto, California)

Enterprises are redefining user experience as they shift their business processes from desktop-based platforms to mobile devices. Enterprise mobility is expected to not only enable businesses to accelerate the delivery of modern mobile services but to also disrupt the traditional cost structures associated with these efforts. Capriza offers an end-to-end enterprise mobility platform to mobile-enable critical business workflows. In order to address the issues of faster mobility enablement and cost effectiveness, Capriza adopted two key strategies.

Capriza uses business model innovation to offer several unique pricing models. In one such model, it offers an annual subscription service starting at $15 per user per month for each enterprise application source, whereas most other professional services charge an hourly rate based on the time taken to change the application.36 Capriza’s business model makes the pricing solely contingent on the company’s user base, giving the company more visibility into the pricing structure.

Capriza successfully fostered strategic partnerships with software vendors and EMM vendors to ensure that its offerings support all the widely used desktop-based software solutions. Capriza creates apps on top of web-based business applications of the partnering vendors. Eliminating the need for systems integration or native development efforts, Capriza’s partnership approach helps companies deploy solutions quickly and cost-effectively.

Capriza’s success: Through these strategies, Capriza has experienced strong uptake and success with blue chip companies and is rapidly expanding its customer base. Capriza’s approach to enterprise mobility applications provides enterprises with higher mobility at a lower cost.37

Takeaways for technology companies

<table>
<thead>
<tr>
<th>For established companies</th>
<th>For entrants</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Offer bundled/integrated products that map to different parts of enterprise mobility ecosystem.</td>
<td>• Innovate on the business model, creating novel monetization and pricing strategies.</td>
</tr>
<tr>
<td>• Follow vertical integration to augment existing product offerings, enhancing the customer value proposition.</td>
<td>• Develop go-to-market models and co-selling arrangements with other enterprise mobility vendors, to become a part of their ecosystems.</td>
</tr>
</tbody>
</table>
A few companies have successfully navigated different architectural disruptions over the last several decades. There are still many revenue-generating opportunities that technology companies can capitalize on by enhancing customer value. Among the many key opportunities present before them, we have discussed some that companies can start with.

We have seen examples of how established companies and entrants can apply certain strategies to take advantage of each of the three major disruptions (IoT, cognitive computing, and enterprise mobility). At the same time, companies can even use strategies suggested in our strategy framework to build solutions that blend these architectural disruptions (in different combinations). As a case in point, Greenwave Systems recently combined Natural Language Understanding technology with its AXON IoT platform to make its solutions conversational, supporting multiple languages. To effectively achieve this, Greenwave entered into a strategic partnership with a major software solutions provider to add the cognitive capability. Further, the company has been extending its IoT offerings to new markets through geographical diversification.

**Potential opportunities for technology companies within the three architectural disruptions**

**Cognitive computing**

Cognitive computing offers potential for technology companies to capture value across different industry verticals. By enabling a self-sufficient ecosystem that can collect information, think on its own, preempt problems, and provide feedback, cognitive solutions are augmenting human intelligence like never before.

Potential opportunities for technology companies in cognitive computing:

- **Enabling preventive medication in health care:** Health care companies can gather and use genetic information and other health-based statistics for individuals to help preempt lifestyle-based diseases. By using machine learning and advanced analytics, health care providers can even offer preventive medication for targeted individuals.

- **Creating risk profiles for banking customers to avert security breaches:** Banks/financial institutions can enable safer online and card-based transactions for their customers by analyzing their spending or shopping patterns. By using this data, they can create different risk profiles for their customers and provide targeted alerts to avert any security breach.

- **Enabling targeted product placement at retailers:** Retailers can use video analytics to make their fixtures most effective. By using computer vision technology, retailers can gather and analyze details related to number of shoppers, demographics (such as age, gender), and points of engagement.
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IoT

These applications are making it possible to collect vast amounts of data from connected devices and to extract targeted insights. Additionally, an increasing number of companies are looking to share their IoT data with their customers, suppliers, and competitors. And even individuals are willing to share their usage information as long as they can choose what information to share.

Potential opportunities for technology companies in IoT:

- **Enabling an intelligent transportation infrastructure**: As the autonomous transportation ecosystem evolves, the driverless taxis of the future can be connected with a city’s traffic signal systems, allowing for more efficient traffic management and coordination. Moreover, the connected vehicle infrastructure can help alert the fleet/taxi operators to receive timely information related to vehicle diagnostics (including potential breakdowns) and maintenance.

- **Crafting personalized insurance plans**: Smart home solution providers can gather autonomous data about their consumers/users from a range of end-point devices (e.g., mobile phones, wearables). Aggregated data related to food choices and lifestyle, purchasing patterns, and health metrics can help insurance companies craft personalized plans and charge differential premiums based on underlying consumer behavior data.

- **Transforming journeys**: The fully autonomous cars of the future can pre-condition the car settings and environment based on owner’s preferences, and even provide recommendations for personalized infotainment content based on the owner’s online browsing history on another device at home or office.

Enterprise mobility

Businesses are increasingly using connected devices and technologies to enable a mobile workforce. Technology providers can offer mobility solutions for the industry verticals where the workforce is still tethered to desks, and help increase their productivity.

Potential opportunities for technology companies in enterprise mobility:

- **Enabling mobile human services at government agencies**: Government agencies can use various collaboration and connectivity-based technologies to enable mobile human services. They can complement human interactions using virtual check-ins via mobile technology platforms.

- **Fostering digital education beyond classrooms**: Teachers, students, and parents can make effective use of connected devices and tools to foster seamless learning beyond classrooms. Teachers can provide feedback and help students even when the school is not in session.

- **Providing an ambient workspace inside future autonomous vehicles**: Automakers can design their future vehicles to transform into an ambient workspace whenever required. The windshields of connected/autonomous cars can become the new interface for employees to remotely use their work-related applications during their commute.
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Take the next step

Architectural disruptions in the technology sector are likely to have an exponential impact on growth potential and strategic planning for many companies. We have reached a tipping point, where architectural disruptions are transforming businesses.

These disruptions can create opportunities in the form of new markets, new revenue streams, and the emergence of new players. In order to remain competitive in light of these architectural disruptions, technology companies need to define their growth aspirations, identify feasible business growth strategies, prepare to manage near-term transition costs, and ensure alignment and implementation of the suggested strategies.

It is difficult to have a one-size-fits-all approach and a lot would depend on the external and internal environment. While technology companies can achieve superior performance through any of several paths, the strategic framework discussed in this article enables them to take the first step to navigate the three architectural disruptions.

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Appendix

A. Aggregated performance of top smartphone companies

EBITDA margin

Share price performance*

*Share Prices have been indexed to the start of fiscal year 2007 for all the companies

Source: Deloitte Analysis, Yahoo finance, SEC filings
B. Methodology of the study

We identified some of the key architectural disruptions that took place within the technology industry, such as cloud computing, personal computers, smartphones, IoT, and cognitive computing during the period 1980–2015. We then studied 50 case examples from 33 technology companies that were successful in navigating these disruptions. We looked at the strategic actions taken by these companies to uncover any underlying pattern in the way they navigated these disruptions. Our analysis helped us segregate our findings into two cohorts depending on the maturation of the companies—established companies and entrants.

For the purposes of this paper, we narrowed down our focus to three major architectural disruptions—cognitive computing, IoT, and enterprise mobility. We selected these based on the analysis of several indicators such as VC funding, corporate investments, and patents filed. We found that these three disruptions have been transforming the technology industry landscape and present significant market opportunities for the players within the industry. We performed a deep-dive study of disruption management strategies adopted by both established companies and entrants around the three select architectures and developed a framework to provide strategic guidance for technology companies.

How we selected the top two strategies from among the various strategies used by companies

From the complete list of strategies that were used by different companies across various architectural disruptions, we selected the two strategies to be presented in the article based on the following:

- Strategies that were frequently used by the sample set of companies in our study
- The outcome/result that companies experienced by applying those strategies

Here is a summary of major disruption-management strategies used by technology companies, including the ones that have been discussed in this article.

<table>
<thead>
<tr>
<th>Cognitive computing</th>
<th>IoT</th>
<th>Enterprise mobility</th>
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<tbody>
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<td><strong>Established</strong></td>
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<td>4. Product innovation</td>
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<td>1. Strategic partnership</td>
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Endnotes


2 “History of Paging,” Telepage Communication System, October 06, 2004


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