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A two-speed IT architecture for the digital enterprise

Delivering an enriched customer experience requires a new digital architecture running alongside legacy systems.

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Digital business models have become essential for companies across a range of industries. With social networks and e-commerce websites setting new benchmarks for speed, agility, and user-friendliness, consumers expect similar online performance from banks, retailers, and telecommunications companies. Attackers born in the digital age give consumers what they want, but many older companies struggle to meet customer expectations. For them, going digital is now a prerequisite for surviving and thriving. Success requires strong capabilities in four areas.

First, because the digital business model allows the creation—and shorter time to market—of digital products and services, companies need to become skilled at digital-product innovation that meets changing customer expectations. One such new offering for consumers is car-insurance policies enabled by geolocation-

tracking technology, where the price of the policy depends on how much and how aggressively a person actually drives.

Second, companies need to provide a seamless multichannel (digital *and* physical) experience so consumers can move effortlessly from one channel to another. For example, many shoppers use smartphones to reserve a product online and pick it up in a store.

Third, companies should use big data and advanced analytics to better understand customer behavior. For example, gaining insight into customers' buying habits— with their consent, of course—can lead to an improved customer experience and increased sales through more effective cross-selling.

Fourth, companies need to improve their capabilities in automating operations and digitizing

Takeaways

Attackers born in the digital age have no trouble giving consumers what they want, but many older companies struggle to meet customer expectations. For them, going digital is now necessary for survival.

To succeed, companies must ensure the digital readiness of their products, enhance their multichannel customer experience, take advantage of advanced analytics, and automate their operations.

This usually requires that they develop a two-speed IT architecture—creating a new high-speed system alongside their legacy IT system. Building a new organization and governance model in parallel will help support the program.

business processes. This is important because it enables quicker response times to customers while cutting operating waste and costs.

A two-speed IT architecture will help companies develop their customer-facing capabilities at high speed while decoupling legacy systems for which release cycles of new functionality stay at a slower pace.

Implications for enterprise architecture

Each of the four levers poses a substantial challenge for IT. For example, many banking-product lines—among them credit cards, investments, and checking and savings accounts—are managed in silos. This makes it difficult to get a comprehensive view of customers quickly, for example, to assess their loan applications. What's more, channels are often managed and tracked independently, complicating matters for customers who wish to use multiple channels as they pursue a transaction. For instance, customers starting a loan application on their smartphones may find that they have to reenter data when they switch to desktop computers to fill in the more detailed information required. Weak systems integration and slow database-access times can prevent customers from enjoying a real-time shopping and purchasing experience. Analytics capabilities are especially difficult to integrate with operational process flows. Manual steps in these processes, such as rekeying and transferring information, present major obstacles to both analytics and automation of processes.

While a few players have overcome some of these hurdles, it is a big challenge for many IT executives to implement all four levers so

customers can, for instance, purchase individually tailored products across multiple channels. One important reason is that the legacy IT architecture and organization, for example, which runs the supply-chain and operations systems responsible for executing online product orders, lacks the speed and flexibility needed in the digital marketplace.

Indeed, the ability to offer new products on a timely basis has become an important competitive factor; this might require weekly software releases for an e-commerce platform. That kind of speed can only be achieved with an inherently error-prone software-development approach of testing, failing, learning, adapting, and iterating rapidly. It's hard to imagine that experimental approach applied to legacy systems. Nor would it be appropriate, because the demand for perfection is far higher in key back-end legacy systems. Quality, measured by the number of IT system errors, and resilience, measured by the availability and stability of IT infrastructure services, comes at slow speed but is critical for risk- and regulatory-compliance management and for core transactional activities such as finance and online sales. In contrast, lower IT-system quality and resilience can be acceptable in customer-facing areas, for instance, when users participate in the testing of new software. For these reasons, many companies need an IT architecture that can operate at different speeds.
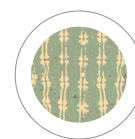
The building blocks of digital-enterprise architecture

In our experience, digital-enterprise architecture needs to accommodate the following elements to deliver the functionality that the digital enterprise requires.

Two-speed architecture. This implies a fast-speed, customer-centric front end running alongside a slow-speed, transaction-focused legacy back end. For software-release cycles and deployment mechanisms, the customer-facing part should be modular, to enable quick deployment of new software by avoiding time-consuming integration work. In contrast, the transactional core systems of record must be designed for stability and high-quality data management, which leads to longer release cycles.

Instant cross-channel deployment of functionality. New microservices defining only a small amount of functionality, such as lookup of the next product a consumer would most likely purchase, should be deployable in an hour rather than in several weeks. Such microservices should also be available across all channels. Ideally, it should be possible to develop these services in multiple programming languages rather than being locked into a single development framework.

Zero downtime. In digital global operations, days-long maintenance windows are no longer an option. Upgrades of systems affecting the consumer's experience should be seamless, using a concept that allows the deployment of a new software or service in parallel with the old version. First, only about 1 percent of the user traffic is routed to the new version. Only when the new version fulfills a set of key performance indicators will all traffic be routed to the new version. Moreover, in daily operations, there should be fallback mechanisms in place so that issues arising in one service do not harm overall operations more than necessary. If, for instance, a retailer's personalized recommendation service is unavailable, a random recommendation in a relevant category would be displayed rather than an annoying web error page.

Real-time data analytics. Customers generate data with every move they make within an app. The ability to analyze that information in real time can make analytics an integral part of operational processes and not just a stand-alone capability. For example, one retailer analyzes customers' purchases automatically when they pay with their credit cards; along with the receipt, the business provides a savings coupon for a

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product the customer will probably be interested in buying the next time he or she shops at the store.

Easy process configuration. Business users themselves should be able to change automated processes. This would allow them, for example, to eliminate unnecessary process steps without requiring time-consuming coding by an IT developer.

Product factory. Industries that provide digital products, such as banking and telecommunications, need to decouple the products from the processes. A bank, for example, would implement one sales process and reuse it for all products, such as accounts and cards.

Automated scaling of IT platforms. In a digital business, workloads expand and become harder to predict. Ideally, this load would be balanced across private- and public-cloud environments, with mechanisms in place to ensure that when one provider has an outage, others can take over the workload.

Secure architecture. In a digital business model, cybersecurity must be an integral part of the overall application. Not only does the company have more valuable data to protect, making it more attractive to hackers, but the digital strategy also opens new interfaces to customers, suppliers, and partners—interfaces that can be exploited by hackers.

Moving toward two-speed architecture

Unlike enterprises that are born digital, traditional companies don't have the luxury of starting with a clean slate; they must build an architecture designed for the digital enterprise on a legacy foundation. What's more, while most companies would have been comfortable in the past going through a three- to five-year transformation and not implementing new features in the meantime, today's highly competitive markets no longer allow players to alter architecture and business models sequentially. It is therefore important to realize that the transformation toward digital is a continuous process of delivering new functionality (see sidebar, "A retailer begins the two-speed journey"). Successful digital transformations focus on the following aspects.

Manage a hybrid target architecture with very different platforms. Digital target architectures are heterogeneous, with transactional platforms managed for scalability and resilience coexisting alongside other systems optimized for customer experience. The transformation can be sustained only if a high-level target architecture and standards in critical areas such as cybersecurity are clearly described from the beginning. Without them, the transformation can be slowed down by the complexity of legacy and new hardware and application provisioning.

Plan for ongoing software delivery with blends of methodologies. There isn't time to develop software by using a waterfall model and then separating the transformation into several long phases, as in traditional multi-year IT transformations. Nor is the solution to migrate all delivery to agile methodologies.

The answer is to do both but blend the benefits of agile (iterative development, continuous delivery) into the waterfall model. Now, the software solution for each business challenge has to be constantly developed, tested, and implemented in an integrated fashion. This requires clear segregation of platforms into

A retailer begins the two-speed journey

One retailer learned the hard way why a new IT architecture is required in the digital world. The company tried to launch an e-commerce business as a new unit separated from the traditional brick-and-mortar operation. While the time to market for this offering was short, it was limited to the online channel and could not offer the user experience that many customers expected.

It quickly became clear that the retailer could compete in the digital marketplace only if it could provide a sophisticated multichannel experience that gave customers functionality such as reserving goods online and picking them up in the store. To implement this broader offering, IT leaders had to overcome challenges in both the new fast-speed IT architecture and the legacy transactional systems.

While continuing to develop the fast-speed architecture of the original online offering, new development frameworks and processes were required to speed up the deployment of new software and integrate it with third parties, such as software-as-a-service providers. What's more, the entire IT organization had to adopt agile application-development methods, and the business organization had

to get much more involved in the transformation, particularly regarding the budgeting process and the approval of new projects.

Adapting or replacing some of the transactional legacy systems so that they could support a multichannel offering involved its own challenges. Some of the IT systems were outdated and developed in programming languages that are no longer common among young software developers. In addition, the legacy systems could only offer inventory information via a batch interface, while customers of the online offering require the information in real time. Moreover, some of the legacy systems were costly to maintain.

Balancing the transformation of the transactional architecture with the development of the new fast-speed architecture is one of the main challenges the retailer is facing. Also, both the IT and business sides understand that, unlike most traditional IT projects, building a two-speed architecture is a continuous-improvement program that has to deliver new functionality at early stages of the transformation and will continue to run on an ongoing basis.

domains managed for fast iterative delivery (for example, for customer-experience applications) or for transactional integrity (for back-end transactional systems).

Develop the low-speed architecture, too.
It's important to establish a clear distinction between the two IT models from the beginning and not only focus on the fast-speed part but also develop the transactional back-end architecture. Those systems of record require rigorous development and testing methodologies and must be managed for resilience and scalability, with no compromises.

Build a new organization and governance model in parallel with the new technology.
In the digital enterprise, business and IT work together in a new and integrated way, where boundaries between the two start to blur. This partnership has to be established during the transformation.[1]

Change mind-sets.
By transforming the architecture, technology can become a key factor for a company's competitiveness. Such a development requires increased management attention and usually a place on the board agenda. While IT efficiency clearly remains important, spending levels may well rise as companies transform IT from largely being a necessary expense to being a true business enabler. As such, expenses are managed as investments rather than just costs; this will often require a substantial mind-set shift for the organization.

Run waves of change in three parallel streams.
In a two-speed transformation, it makes sense to have an implementation plan that runs in three parallel streams. The *digital-transformation stream* builds new functionality for the business, supported by the results of a *short-term optimization stream* that develops solutions that might not always be compliant with the target architecture (for example, using noncompliant interfaces). To ease the development of short-term measures and create a sustainable IT infrastructure, an *architecture-transformation stream* is the third necessary component.

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For most traditional consumer-facing companies, building a new digital IT architecture that runs alongside legacy systems makes it possible to compete with digital natives. ○

[1]For more, see Henrik Andersson and Philip Tuddenham, "Reinventing IT to support digitization," May 2014, mckinsey.com.

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