Strategic Roadmap for Becoming a Digital Product Delivery Organization

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FOUNDATIONAL This research is reviewed periodically for accuracy.

By Analysts Jason Wong, Thomas Murphy, Keith Mann

Initiatives: Application Architecture, Development, Integration and Platforms

Scaling a digital business requires continuous delivery of value. Achieving this requires application leaders to apply new and emerging approaches to designing, developing and governing software — to turn application development organizations into digital product delivery organizations.

Overview

Key Findings

- Most of the application organizations Gartner encounters have suboptimized development teams and tend to underinvest in modern quality practices, which causes havoc downstream for users.
- Organizations typically lack internal expertise in user experience (UX) design or have fragmented and immature capabilities in this important discipline, which leads to apps being abandoned and backlashes from users.
- “Shadow IT” is rampant in many organizations, and business-led IT is viewed skeptically by enterprise IT users, which puts application leaders in a precarious position, caught in the middle.
- Fragmented application platforms and architectures create silos of inefficiency, which perpetuate technical debt, drive up the cost of ownership and eat into precious innovation budget.

Recommendations

To make progress toward digital product delivery, leaders responsible for application development and platforms should:

- Shift to value-centric models for development and platform capabilities by tracking new key performance indicators (KPIs) that drive cultural change.
- Accelerate work toward product-centric delivery by instilling foundational technologies and practices.

- Scale up their organization to meet the changing demands of digital business by mastering product management and digital platform models.

Strategic Planning Assumption

By 2024, more than 50% of large enterprises will manage internal business capabilities as products to drive continuous innovation and competitive advantage.

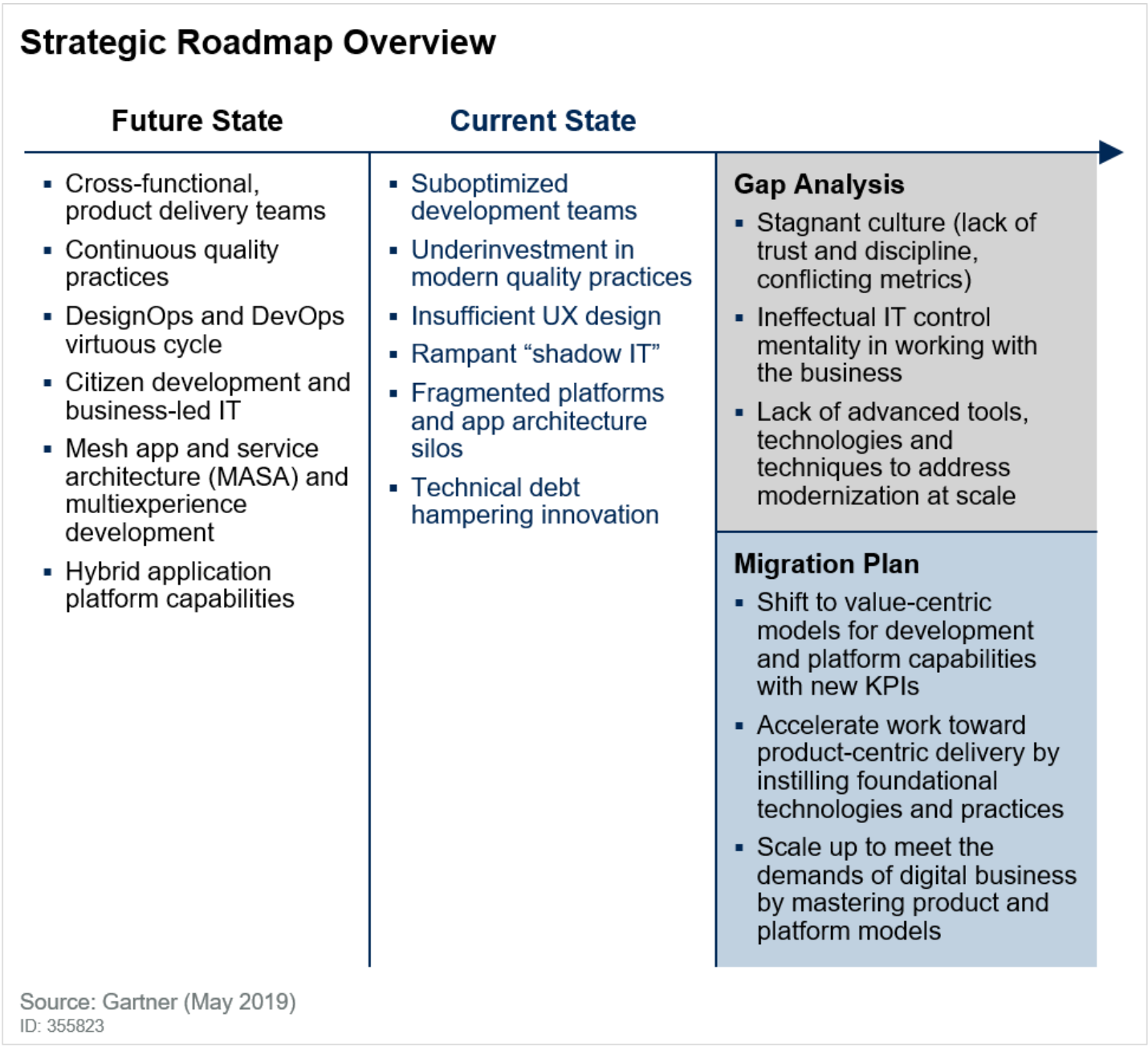
Analysis

Digital business involves new business models, typically driven by new digital products that deliver continuous value to internal and external customers. However, according to Conway's Law, organizations cannot fully achieve this vision because the organizational structure of traditional application development organizations inherently constrains their capabilities to do so. Conway's Law states that:

> **Organizations which design systems are constrained to produce designs which are copies of the communication structures of these organizations.**
>
> — *Melvin Conway, 1967*

Therefore, in order to support the goals of digital business, today's application development organizations must "morph" into digital product delivery organizations. However, this is no simple endeavor. It's very much like remodeling your home as you and your family are still living in it. Careful planning is required. The plan's execution will take years. And you must be able to adapt and adjust dynamically using self-organizing principles. Gartner's strategic roadmap in Figure 1 sets out the path you must take to achieve this future state.

Figure 1. Strategic Roadmap Overview for Becoming a Digital Product Delivery Organization



Application leaders can use this document to:

- Achieve alignment, not only within and across IT teams, but also with business stakeholders and partners.
- Mitigate implementation risks by mapping out the details, in order to be prepared to adjust more easily as the competitive landscape or business environment changes.
- Get digital transformation and optimization efforts moving faster by having a future-state vision that everyone can work toward in unison.

Future State

The future state is not about nirvana. Rather, it's about a continuous journey of enlightenment toward how to become an organization that can be nimble, responsive and adaptive to continuous change (see "Future of Applications: Delivering the Composable Enterprise.")

Your future digital product delivery organization should have:

- **Cross-functional product delivery teams:** The way organizations assemble development teams will shift away from the creation of large project teams that exist for only the duration of a project. Agile organizations employ small teams, usually of six to 10 people. To accomplish large tasks, teams may band together into "teams of teams" or "tribes" that coordinate organically or work according to an enterprise agile framework. As organizations shift to a product model, tribes become long-lived product teams (and feature teams within larger product teams) with broadening skills among their "versatilist" members. Staying aligned with a single product helps teams be effective because the domain knowledge they accumulate and the relationships they develop with subject matter experts combine to give them deep insight into how best to add value to that product.

- **Continuous quality practices:** In future, quality will be everyone's responsibility. In its simplest form, continuous quality is built on the use of continuous integration systems that build and validate software by running through a sequence of validating steps. More broadly, however, organizations must shift their direction from "quality" as an event that is "ensured" by testers to quality as a continuous set of practices utilized by the members of the team to achieve a desired outcome. This also encompasses a shift from the idea that quality is simply about whether an application functions correctly to one that supports nonfunctional aspects (performance and UX) and long-term maintenance and sustainability of the code base (extensibility, reliability and reusability, for example). Continuous quality means using "shift left" practices to test earlier and to design for quality, and "shift right" practices to measure and monitor quality in the production system, thus providing a continuous loop of feedback and control.

- **DesignOps and DevOps virtuous cycle:** Modernizing application development practices have centered on agile and DevOps. However, just as important for the future of product delivery teams is UX design. Digital business means ensuring the UX is at the core, while the focus of agile is the customer. UX design provides critical user-centric research and analysis to discover the right product to be brought to market. DesignOps — the operationalization of ongoing UX design processes — will therefore be essential to continuous value delivery. Together, DesignOps and DevOps ensure iterative and continuous product capabilities and incremental business value. This process is circular and virtuous, as production monitoring and analysis feed back into follow-on design sprints and agile planning.

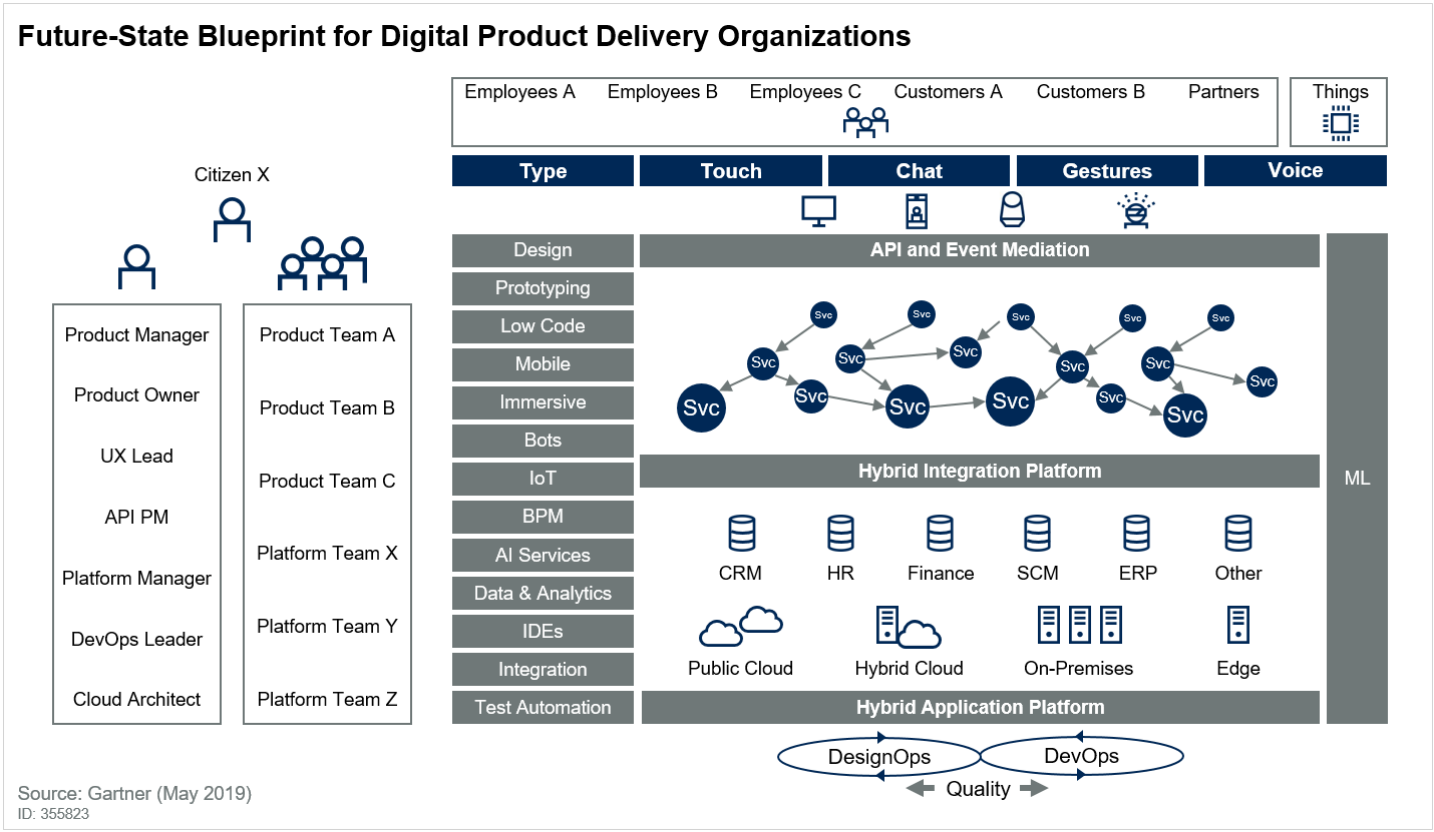
- **Citizen development and business-led IT:** Enterprise IT departments cannot take on digital product delivery alone. Contributions from end users — citizen developers and citizen integrators — are needed to reduce the mundane duties of development teams, so that they can focus on delivering more strategic value. Business-led IT groups, such as marketing technology (martech) teams — will also play a major role in the evolution of distributing delivery capabilities to those who deal more directly with customers.

- **MASA and multiexperience development:** Mesh app and service architecture (MASA) is an evolved multigrained service and event-driven architecture that supports digital products in the form of fit-for-purpose apps. These apps are spread across multiple touchpoints and multiple modalities of interaction. “Multiexperience development” refers to the converged activities and technologies — across web, mobile, wearable, conversational and immersive touchpoints — that support the creation of fit-for-purpose apps within MASA in support of the digital user journey.

- **Hybrid application platform strategy:** Organizations need multiple cloud platform services to support different application requirements, but you also want to maintain some semblance of governance over the platforms. You must have a hybrid application platform (HAP) strategy to ensure you have the platform capabilities needed and can manage application infrastructure investments and expenditure. A HAP strategy recognizes that your organization requires multiple platform technologies (a hybrid model) to support diverse application concerns. Rather than allowing the infrastructure portfolio to grow haphazardly, you should build a platform strategy based on a capability model. This approach will ensure that you have the different types of platform capability needed to support your diverse application portfolio. It will also help you assemble complementary platform technologies and avoid adopting competing ones.

Use Figure 2 as a future-state blueprint for modernizing and renovating your systems, architecture and platforms. Establish this blueprint as an organizational guide to activating your digital business strategy by aligning people and processes, business and IT departments toward delivering business value and customer outcomes. Don’t be afraid to adjust the blueprint as you go.

Figure 2. Future-State Blueprint for Digital Product Delivery Organizations



Current State

Application development organizations are in various states of modernization and transformation. Based on the thousands of conversations that Gartner has had, we see the current state of mainstream enterprise application development organizations as one that has:

- **Suboptimized development teams:** Though many organizations have at least some small, agile teams in place, many continue to rely on large project teams bound to shorter durations. Even among organizations that have shifted primarily to agile teams, some poor practices often persist. One such practice is the alignment of teams toward technical components. Several such component teams must usually work together to deliver a single increment of functionality. Such cross-team interactions and dependencies impair agility and slow down delivery. Technical alignment also means that teams become shorter-lived, because they often dissolve when the technology changes, and they are not measured on long-term business outcomes.

- **Underinvestment in modern quality practices:** We still find that organizations have underinvested in testing and in particular test automation. Many have turned to outsourcing as a solution and thus lack the internal skill set and communities of practice (COPs) for quality practices, which leads to functional silos that are often geographically dispersed. This creates barriers to successful agile adoption, which requires a high degree of collaboration and which also tends to shift from function silos to distributed responsibility. Many organizations are also dependent on older generations of test automation technology that inhibit success due to the high cost of maintenance and a lack of support for the full ecosystem (test environment, test data, code quality/security, functional validation and performance/customer experience).

- **A lack of UX design:** According to a Gartner Research Circle survey on the state of UX design in enterprises, only a small proportion of organizations have a strategy in place for UX design that is "defined" or being "optimized." [1] The majority are still developing or are fragmented, with no formal process or strategy to operationalize UX design. UX designers and UX professionals tend to be spread throughout their organizations' business units, and developers outnumber UX designers by 21 to one, on average. At a fundamental level, organizations blindly build functions without understanding a "fit-for-purpose app" design approach utilizing customer segments, personas, user flows, prototyping and periodic user testing.

- **Rampant shadow IT:** Technology budgets and buying power have shifted and continue to shift to lines of business. In a Gartner survey on business-led IT and shadow IT trends, just 51% of respondents indicated that such activities are "well managed." [2] This can become a significant issue because application leaders tend to lump shadow IT and business-led IT together. Their typical reaction is to restrict business-led IT initiatives and resist the opportunity to convert shadow IT into productive citizen development, integration and data science initiatives.

- **Fragmented platforms and app architecture silos:** One of the biggest inhibitors of innovation is the inertia created by existing large systems. This inertia is created because developer knowledge requires investment in training for new languages, frameworks and architectures. Even with this knowledge, solutions need to be not just migrated to new platforms, but also modernized and rearchitected to

take advantage of cloud-native capabilities. This creates much of the initial modernization impetus toward using cloud infrastructure.

- **Technical debt hampering innovation:** Few organizations understand their level of technical debt or the cost of sustaining it (see "Reduce Technical Debt for Modernization"). The additional operation and maintenance effort required due to technical debt consumes resources that could otherwise be used for innovation. Applications whose technical debt lies in the area of extensibility or ease of modification directly impact innovation by making it more difficult to change or build on the software. Even where technical debt is directly addressed through replacement or refactoring, the cost of doing so can delay investment in innovation.

Gap Analysis and Interdependencies

There are probably many gaps between your current state and your desired future state. We identify three of the most common and challenging gaps in application development organizations today:

- **Stagnant culture (lack of trust and discipline, conflicting metrics):** While the technological gaps are significant, we find that what organizations struggle with most is the required shifts in culture. We have noted this in our surveys of agile and DevOps adoption and in our interactions with clients. Agile was "acceptable" because it was "trending," promised quicker delivery, mechanisms were developed to support "keeping an eye on things" (burn-down charts, for example) and because it is something "the developers do." But ultimately agile (lean, DevOps) isn't just a developer or an IT thing — it is a fundamental rethinking of the role of software, how procurement operates, how work is funded, and how an organization is structured. We have cataloged this in numerous pieces of research, including noting the shift from a project- to a product-based structure (see "How to Use Product Roadmaps for Funding and Governance of Agile Product Delivery Teams"). Additionally, there are organizational models that overemphasize centers of excellence that support functional specialization and operation. This "siloing" of functionality, along with the metrics applied to the organizations, has created core conflicts (for example, between constant updates and stability) that must be overcome. You must develop new metrics that recognize the codependency of teams and have an objective of using business value metrics.

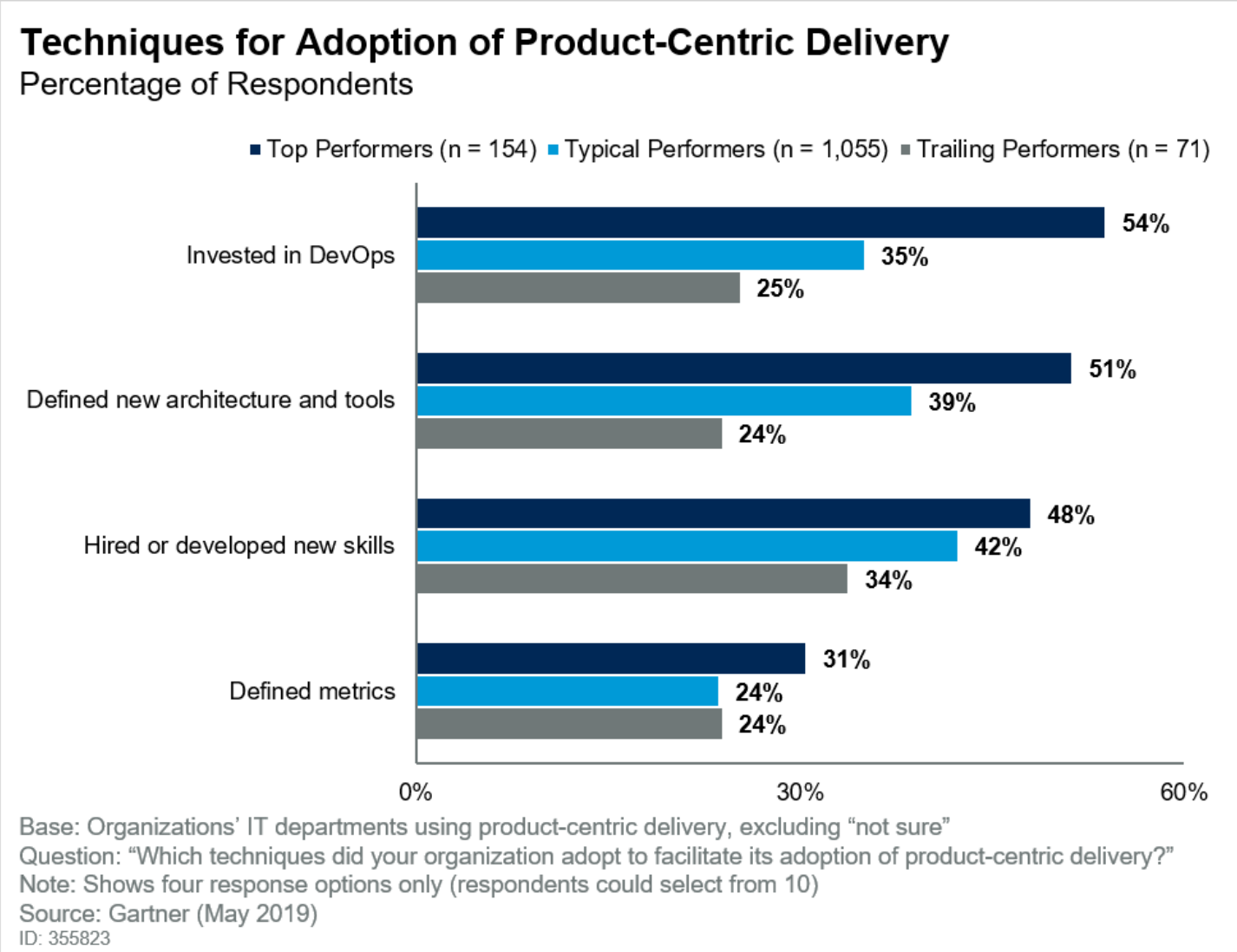
- **Ineffectual IT control mentality in working with the business:** The long-standing separation of organizations into "IT" on the one hand and "the business" on the other persists. IT leaders are still responsible for the safe, secure, reliable and efficient operation of most of their organization's information and technology. This responsibility leads to a risk-averse and high-control mentality, which in turn leads to slower delivery and a reluctance to empower citizen developers. The business, however, faced with unprecedented change and new forms of competition, feels the need for immediate solutions. This leads it to demand (and sometimes seize) control of applications and their development. The result is an unproductive conflict between IT and business-led IT, one that prompts employees to use shadow IT.

- **Lack of advanced tools, technologies and techniques to address modernization at scale:** The multitude of app types continues to grow — from web-based to mobile to conversational to immersive

to wearable. Modernization of legacy systems and shifting of applications and platforms to forms of the cloud (public, private and hybrid) and cloud-scale architecture are a priority. Yet the tools and technologies utilized by the average enterprise development team are usually insufficient for, and ineffective in, delivering the required capabilities. Digital product developers require higher-productivity tools, greater automation, pervasive integration with APIs, and service- and event-driven architectures.

Data from Gartner's CIO survey [3] shows that top-performing organizations recognize and address these gaps as inhibitors of product-centric delivery (see Figure 3). Identifying your gaps and working collectively across IT and the business to close them will be crucial for the execution of a migration plan.

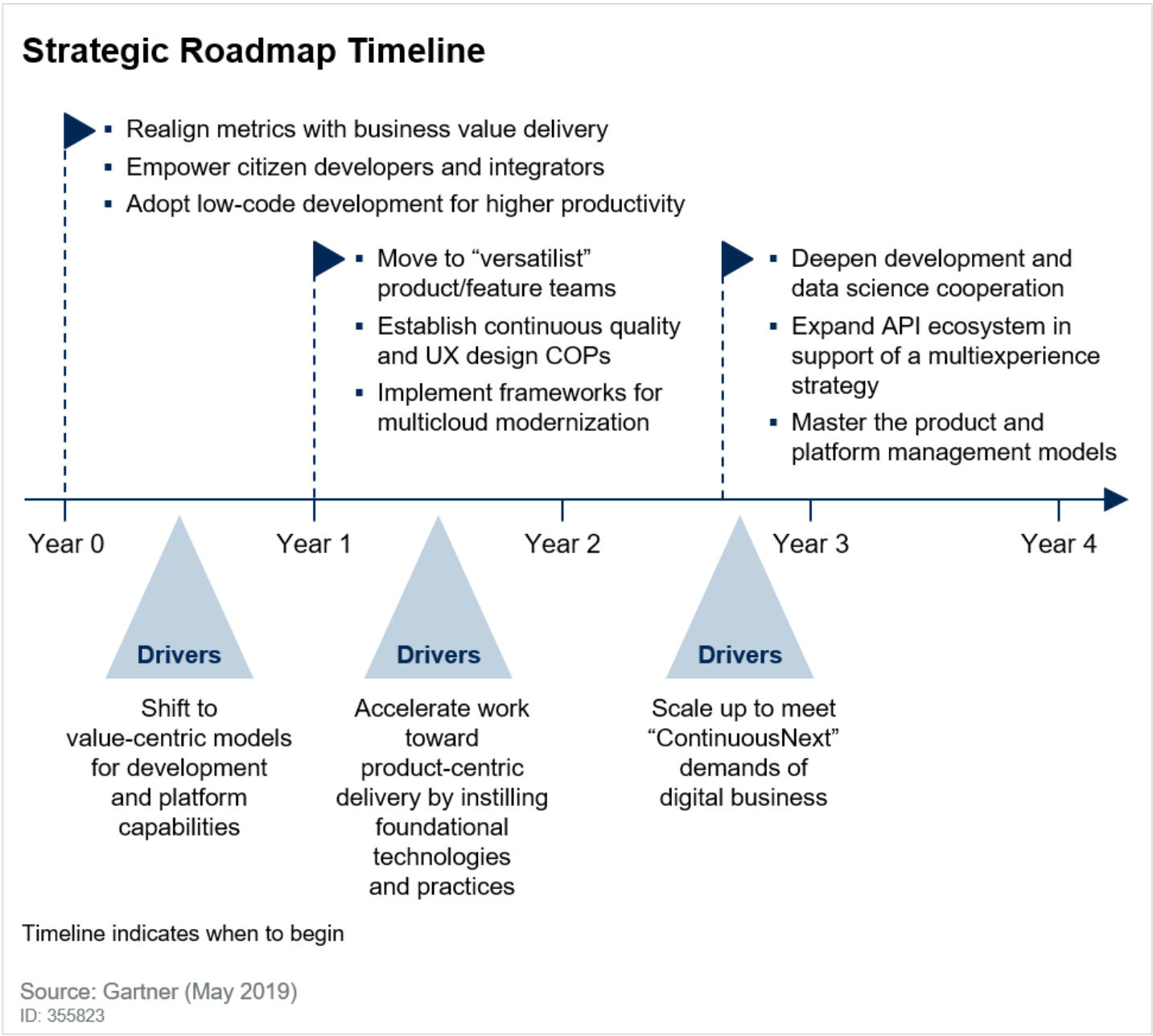
Figure 3. Techniques for Adoption of Product-Centric Delivery (Percentage of Respondents)



Migration Plan

The path to becoming a digital product delivery organization can be marked by three drivers of evolution, each with specific goals (see Figure 4). Each stage of evolution may take a year or more to implement, depending on your organization's current state of maturity and execution prowess.

Figure 4. Strategic Roadmap Timeline for Becoming a Digital Product Delivery Organization



Higher Priority

The main driver of the first stage is to shift to value-centric models for development and platform capabilities. This shift is essential and must be the top priority in order to change poor habits and ineffective reward systems. Three goals of this stage are to:

- **Realign metrics with business value delivery:** Traditional software project management is scope-driven. It prescribes a series of tasks for application developers to execute, and measures them on the efficiency of their execution. In an agile environment, however, scope is fluid and tasks cannot be determined in advance. The mindset for accountability changes significantly with this structure. Instead of just charging time to a project and doing tasks on time, the team (if it is healthy) sees itself as directly accountable for the "success" of "its" product and for delighting its customers. The

measure of success is delivering agreed business outcomes and satisfying the customer base. (See further "Flattening the Application Organization — Everyone Must Be Part of the Agile Value Stream.")

- **Empower citizen developers and integrators:** Shadow IT should not be ignored and allowed to fester. Rather, you must embrace (even seek out) individuals with the willingness and aptitude to build apps and integration points. They need to be properly empowered and recognized as important contributors to delivering value and innovation. (See further "The Future of Apps Must Include Citizen Development.")

- **Adopt low-code development for higher productivity:** Low-code development is important not only for enabling citizen developers, but also for helping professional developers be more productive and effective at modern application development. Low-code tools enable you to maximize the potential value of junior developers and those with older programming skill sets. Many of these tools also introduce development teams to cloud-based technologies, agile development approaches and modern UX design practices. (See further "Magic Quadrant for Enterprise Low-Code Application Platforms.")

Medium Priority

After shifting to value-centric delivery, the next stage is to accelerate work toward product-centric delivery. The goals of this stage are to instill foundational technologies and practices, including:

- **A move to versatilist product/feature teams:** Agile teams tend to be long-lived, staying together across multiple projects, often for years. Their effectiveness comes from both their small size and their longevity. The members of a small team can, over time, develop a high level of trust, openly and honestly reflect on how to improve, and discover how best to work together. Collectively, they have the skills they need to deliver a complete unit of functionality to the end user. (See further "Becoming Product-Centric Should Be an Evolution, Not a Top-Down Transformation.")

- **Establishment of continuous-quality practices and UX design COPs:** Software cannot be delivered at a high pace without keeping an eye continually on quality and the UX. This means incorporating design sprints and using automated tests that span the "test pyramid," along with practices designed to maintain a focus on writing secure, high-quality code. Traditional development has minimal design input and views testing as an activity handled by a specialized team. For organizations not already making use of practices such as design thinking, Lean UX, test driven development (TDD), pair programming and continuous integration, there can be a great deal to learn and a lot of change in roles and responsibilities. This can also mean considerable change to the organization's culture. While it is easy to say "you should practice design thinking and TDD," organizations have to figure out how these will work for them. There should not be a top-down command, but a bottom-up shift. Organizations should seek to establish a vision and set metrics and support the formation of COPs where lessons can be shared and improved. (See further "DesignOps: Organize, Collaborate and Innovate Product UX at Speed.")

- **Implementation of hybrid integration platform (HIP) and HAP frameworks for multicloud modernization:** As cloud adoption proliferates, some organizations are proactively pursuing a

multicloud strategy. Many others find themselves “accidentally” with applications and data sources in multiple clouds, while maintaining a substantial portfolio of on-premises systems. No matter their approach to multicloud, for a growing number of organizations the issue of cloud service integration is becoming more and more complex. Gartner’s HIP and HAP frameworks help to sort out these complexities. (See further “How to Deliver a Truly Hybrid Integration Platform in Steps.”)

Lower Priority

This third stage is lower in priority because it is the furthest out in the timeline, not because its goals are unimportant. The main driver is to scale to meet the ever-changing demands of digital product management (see “How to Execute Successful Internal Digital Product Management”), which requires you to:

- **Deepen development and data science cooperation:** Data will play two core roles that will rely on development and data science coming together:
  - The first role will concern how an organization will harness data to improve the way software is created. As organizations build toolchains, we see that they still commonly lack a vision of the flow through the system. Tools have been emerging that enable a view of the software value stream to identify bottlenecks, so that improvements can be made in mean time to value. In addition, data science and machine learning are leading to augmented development capabilities, such as selection of which tests need to run based on what code has changed.
  - The second role relates to the likelihood that developers will need effective ways to build machine learning models and capabilities into the applications they deliver. Currently, dedicated data scientists are required to build the models required. However, we are seeing the emergence of tools that enable developers to apply machine learning into their applications without requiring advanced degrees in mathematics. Although these tools are still relatively new, we expect the first use of artificial intelligence and machine learning will be for the consumption of prebuilt services such as image recognition engines and language translation. These types of capabilities will be critical to delivering the multiexperience apps of the future. (See further “Essential Skills for Modern Application Development.”)
- **Expand API ecosystem in support of a multiexperience strategy:** Multiexperience development enables fit-for-purpose apps across multiple touchpoints, built on loosely coupled back-end services exposed through APIs. Application leaders must adopt an API mediation layer to enable this architecture, including API management, as well as integration platform as a service and/or enterprise service buses. Once these APIs are in place, apps and services can come together in a MASA. (See further “Mediated APIs: An Essential Application Architecture for Digital Business.”)
- **Master the product and platform management model:** Products in the digital era reflect a deep understanding of both external and internal customer segments and their personas, goals and user journeys — as well as the business opportunities in serving them through digital experiences. Digital platforms play a key role in easing product delivery and operation, and many enterprises manage

platforms as products in their own right. Knowing how to manage products and platforms together is now a critical capability for organizations aiming to succeed at digital business. Manage the digital business technology platform as a set of products, too, so that you can manage the continuous backlog of platform work in a way that maximizes value across the product lines and ecosystems that rely on that platform. (See further "Platform Business Models That Adapt and Disrupt.")

Evidence

[1] **Survey on the State of UX Design in Enterprises**

This survey was conducted online from 27 April through 10 May 2018 with Gartner Research Circle Members — a Gartner-managed panel of IT or IT-business professionals. In total, 141 members participated. Qualified participants included business end users with an IT or IT-business focus to their primary role.

The survey was developed collaboratively by a team of Gartner analysts. It was reviewed, tested and administered by Gartner's Research Data and Analytics team.

Respondents identified with the survey's classifications of organizations' approaches to UX design as follows:

- **Optimizing (13% of respondents):** Our enterprise's UX design strategy is primarily focused on creating a design culture through applied design-thinking methodologies.
- **Defined (15%):** A UX design strategy has been defined and is being executed.
- **Developing (26%):** A strategy is in place to formalize UX design processes and skills, but our approach is largely reactive and fragmented.
- **Fragmented focus (44%):** UX design is not a formal process across our enterprise and currently there is no strategy to formalize UX design.

[2] **Business Unit IT Survey**

This Gartner survey focused on business unit IT (in all its forms), with a view to understanding how the balance of capability and work is changing between what is done centrally, through business unit IT or through "shadow IT" (IT projects managed outside, and without the knowledge, of the IT department). It was conducted online during November and December 2018 with 321 respondents in Australia, Canada, Ireland, Netherlands, New Zealand, Singapore, the U.K. and the U.S.

Companies were screened for multiple business units or multiple countries of operation. Respondents were required to be CIOs or business executives with control over IT spending and resources.

The study was developed collaboratively by Gartner's Primary Research Team and Gartner Analysts who research IT operating models, shadow IT, business-led IT and bimodal IT.

The survey's results do not represent "global" findings or the market as a whole, but rather reflect the opinions of the respondents and companies surveyed.

[3] **The 2019 Gartner CIO Survey**

This survey was conducted online from 17 April through 22 June 2018 with members of Gartner Executive Programs and other CIOs. Qualified respondents were the most senior IT leader (usually the CIO) in an overall organization or part of an organization (for example, a business unit or region). The total sample was 3,102, with representation from all major geographic areas and industry sectors (public and private). The survey was developed collaboratively by a team of Gartner analysts. It was reviewed, tested and administered by Gartner's Research Data and Analytics team.

The 2019 CIO Survey segments were based on respondents' self-reported IT and enterprise performance. This segmentation enabled a group of digital leaders to be identified as a best-practices group to contrast with the performance of others. The three categories were:

- **Top performers:** A self-reported score of 6 or 7 (out of 7) in response to the question "How effective is your company at making digital an integral part of business strategy and planning?" Respondents in this group also chose "scale" or "refine" (the top two categories) in response to the question "Which of these best describes the stage of your organization's digital initiative?"
- **Typical performers:** The group that performed too well to be included among the trailing performers, but not well enough to be included in the top performers.
- **Trailing performers:** A self-reported score of 1 or 2 (out of 7) in response to the question "How effective is your company at making digital an integral part of business strategy and planning?" Respondents in this group also chose "no digital" or "ambition" (the bottom two categories) in response to the question "Which of these best describes the stage of your organization's digital initiative?"

Recommended by the Authors

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3 Future of Applications Impacts on Customer Experience

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