Report

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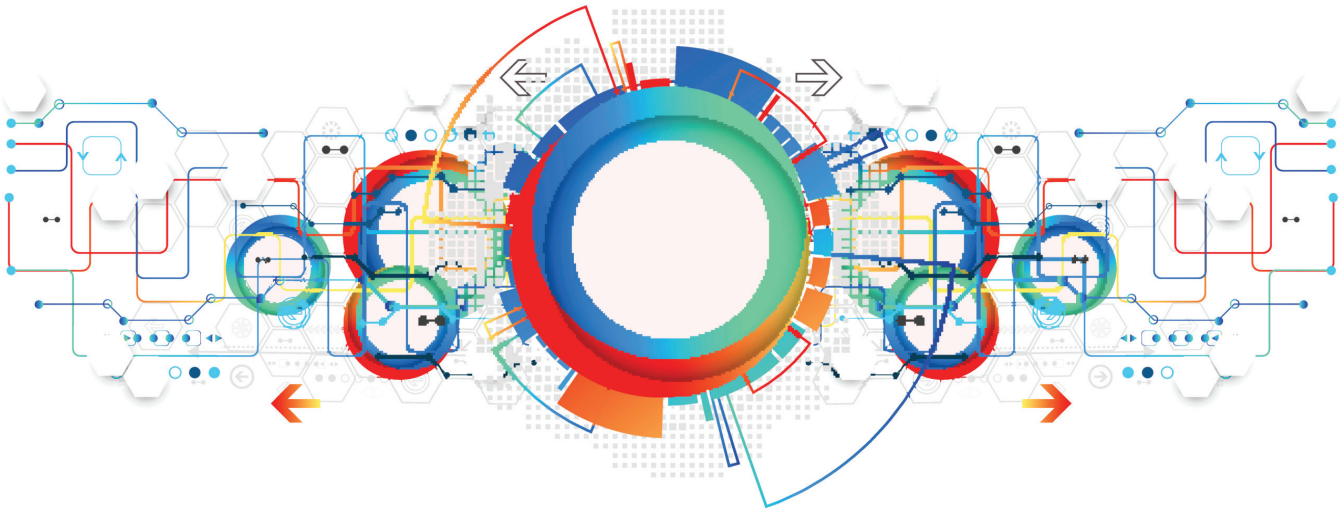
Four years late: Why enterprise tech innovation predictions miss target



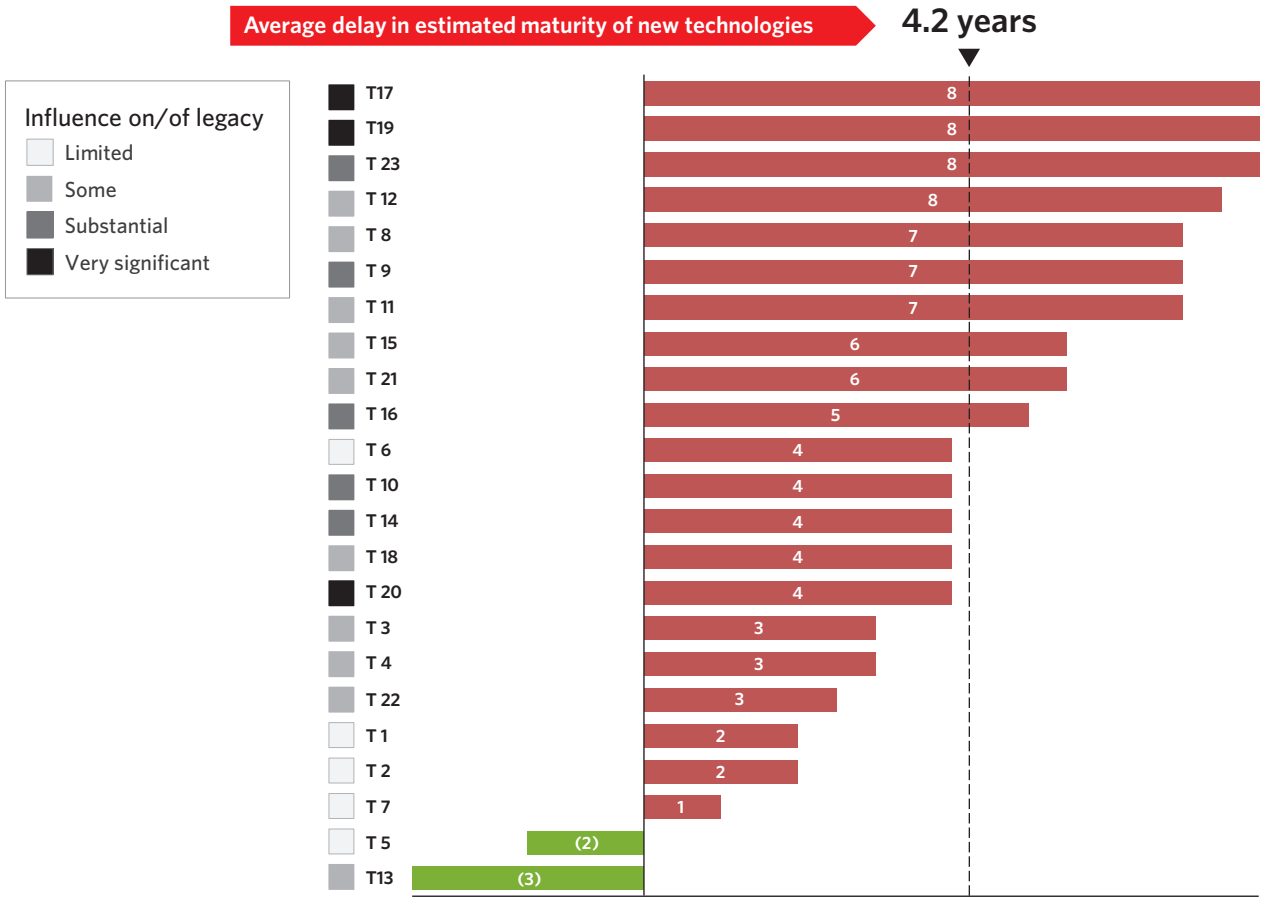
Evidence from our research shows that it is hard to predict accurately when new technology will be productively embedded, at scale, in enterprise operations. A lag of four years is common between initial prediction and actual large-scale adoption, and the path between the two is somewhat erratic. This is especially true for business-to-business (B2B) technologies that transform operations with deeply entrenched ways of doing things (not just systems). The implication of our research isn't that enterprises should wait until technology fully proves

itself, as the best competitors are increasingly harnessing these technologies to secure early advantages. However, what is needed is a deeper understanding of what hinders the embedding of technology into the fabric of enterprise business processes. The results can guide transformation approaches to deliver more tangible results.

"Predictions are hard, especially about the future"

Nobel Prize physicist Niels Bohr's quote applies well to today's enterprise, a complex system built on the interplay between people's rational and emotional choices with business processes and related organizational constructs. Our hypothesis, based on our own observations in hundreds of large enterprises, was that such a system's adoption of new technology is hard to predict. Many enterprise leaders witness this phenomenon and ascribe to it much of their firms' resistance to change, with middle management tending to reject innovative visions as "yet another passing fad."

To test the hypothesis, the Genpact Research Institute recently reviewed analyst reports and other sources over the last eight years. As shown in the next charts based on the analysis of the predictions related to twenty-two technologies, long-term predictions tend to be only directionally precise, and generally underestimate the time needed for adoption at scale by about four years.



Time to maturity: Divergence between earliest and latest estimates

Figure 1

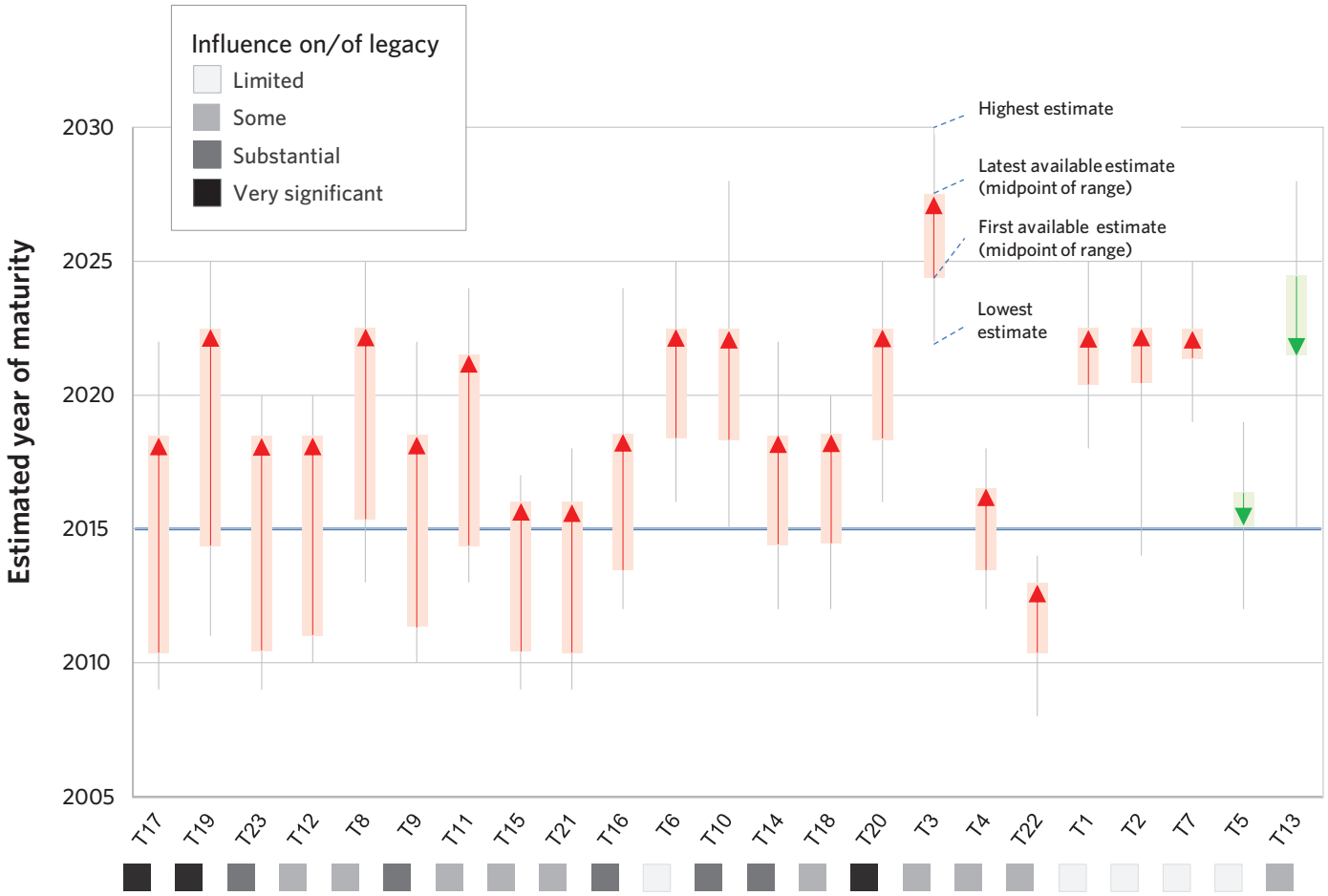


Figure 2

Figure 2 visualizes how such milestone drifts out, and the forecasts fluctuate, as years pass by – especially for technology aimed at environments where pre-existing legacy systems are significant.

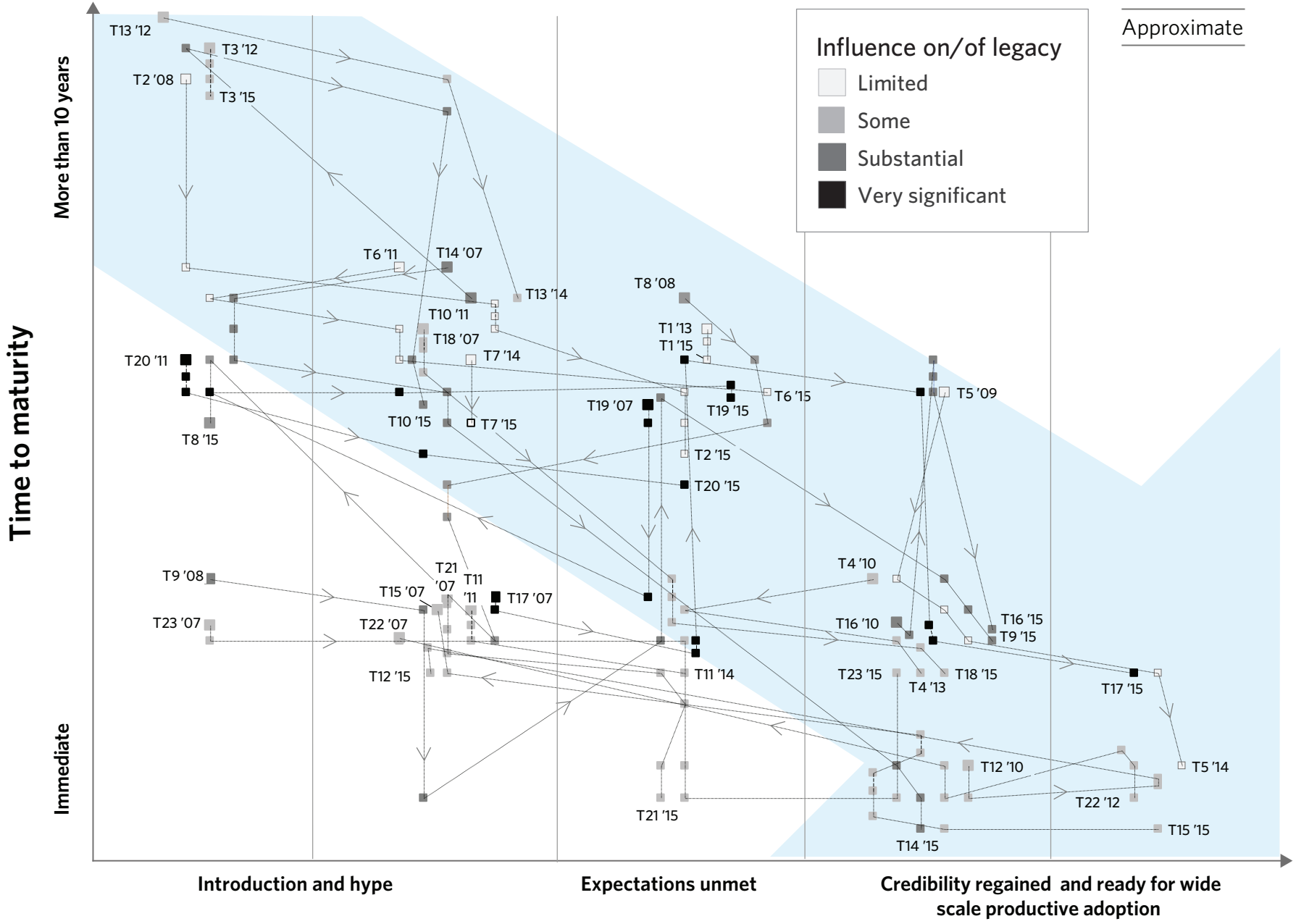
Figure 3 shows how technologies evolve through various maturation stages in a fairly erratic way, instead of following a predictable path.

It is widely assumed that the adoption of groundbreaking new technologies is typically affected by their technical maturation, price point, and the ability of organizations to find substantial productive uses for them. However, our research shows that the reality seems to be a lot more chaotic than this set of assumptions.

What drives the adoption of innovation in enterprise environments?

To dig deeper into the cause of these discrepancies, we classified the technologies into four different classes based on the amount of pre-existing "legacy" operations that these innovations need to integrate with, complement, and/or displace.

It is widely assumed that the adoption of groundbreaking new technologies is typically affected by their technical maturation, price point, and the ability of organizations to find substantial productive uses for them. In accordance with this assumption, when new disruptive technologies are introduced and reach an attractive price point, the strongest teams of IT and business experts will



Source: Genpact analysis

Figure 3

find the right use cases and start deploying them. That is when leading enterprises start separating out from the rest. Over time, laggards will also begin transforming their processes by applying best practices proven by others.

However, our research shows that the reality seems to be a lot more chaotic than this set of assumptions.

Legacy operations are the missing clue. Technology maturity and the existence of meaningful use cases are certainly important factors in driving adoption, but in our experience they are not the only ones—especially in sizeable operational environments such as the middle and back offices of large enterprises where pre-existing processes and legacy technologies constitute an operational backbone. Many companies, particularly big and successful ones, have invested for many decades in technologies (from ERP to mainframe applications) that are now architecturally obsolete and—often because of extremely customized implementations—literally "cement" these companies in what may now be the wrong place. Examples include the processing of financial products applications (for example, credit cards), the approval of insurance claims, the reconciliation of invoices in the order to cash cycle of consumer product firms, the management of regulatory affairs and compliance filings in life sciences firms, and the synchronization of supply chain and financial forecasts in industrial equipment services.

Importantly, the issue is not just about legacy systems. Legacy operations as a whole may also include obsolete and often poorly documented processes and organizational models (for example, fragmented delivery instead of shared services) that contribute heavily to the complexity of transformation and delay the productive adoption of new technology.

When we examined the data through the lens of the size of legacy operations that these technologies must interact with, at least four insights emerged. **First, in some cases it is precisely the maturation of the technology that takes time. Second, some technologies benefit from comparatively clean integration points with existing operations and systems. Third, the "last mile" of industrialization is the hardest one. Finally, but certainly not the least important, complex legacy issues make the adoption of new technology even harder**. Let us review these in turn.

Influence on/of legacy

Limited	Some	Substantial	Very significant
▪ Virtual reality ▪ Augmented reality ▪ Speech recognition ▪ Natural language question answering ▪ Smart advisors	▪ Volumetric and holographic displays ▪ Virtual assistants ▪ Biometric authentication methods ▪ Big data ▪ Predictive analytics (big data) ▪ Internet of things (big data) ▪ Salesforce automation SaaS ▪ HR management SaaS ▪ Marketing resource management SaaS ▪ SaaS procurement applications	▪ Cloud computing ▪ Internet of things ▪ Enterprise 3D printing ▪ Supply chain (execution) SaaS ▪ E-Commerce SaaS	▪ Financial management SaaS ▪ Supply chain (planning) SaaS ▪ Cloud ERP for large enterprises

Figure 4

In some cases, it is precisely the maturation of the technology that takes time

Consider, for example, holographic **augmented reality, virtual assistant** and **natural language** question-answering technologies. These substitute for hardware and related software—often mobile—which is replaced often. However, such technologies are leading edge and often experimental, and hence their evolution can be unpredictable, as well as relying on complex infrastructural networks whose limitations (themselves constrained by technology evolution) could be a limiting factor.

Marketing technologies are another good example. Despite comparatively limited legacy technology and processes, marketing technology continues to fall short of large-scale stability because of this continuous and rapid obsolescence—the thousands of marketing technology startups constitute a disorienting environment for many marketers.

Some technologies benefit from comparatively clean integration points with existing operations and systems

While business-to-consumer (B2C) technologies often operate from a blank canvas, B2B technologies are also in some cases not too far from these conditions. For example, the evolution of biometric authentication has been steady as the technology has been able to integrate into pre-existing and increasingly modern (due to ongoing security and compliance threats) authentication systems.

Speech recognition, which substitutes for traditional keyboard based input, is a similar example. Moreover, **eCommerce** technology, despite the complexity of its integration into adjacent areas (for example, the supply chain and customer relationship management) benefits from almost twenty years of experience, as well as the emergence of Application Programming Interfaces (APIs). APIs are a boon for integration and have begun to help disruptors move up the maturity curve much faster, as exemplified by the extraction of personal payment data from incumbent banks' records that Fintech companies like Mint are able to perform.

The "last mile" of industrialization is the hardest one

In the case of many Software as a Service (SaaS) solutions where the footprint of pre-existing systems (for example, sales force, marketing, HR, and procurement systems) has been limited, progress has been faster. However, it generally takes a long time for technically mature solutions to reach wide-scale productive use. Why is this so? The answer seems to be found the respective legacy environments.

Complex legacy operations surrounding the new technology makes it even harder

When operated in a standalone manner with minimal integration with adjacent processes, or in small enterprises that didn't have pre-existing tools, new technologies may be simple to deploy and use. However, when deep integration becomes necessary (for instance, because of the need for better master data management, two-way synchronization with financial systems, or more granular and faster access to data for analytical purposes), architectural issues grow exponentially.

Unsurprisingly, **HR SaaS** started developing – and has been most successful - in mid-size companies served by the likes of Intuit and Workday (which have since begun to disrupt the larger enterprise sector), as well as in relatively standalone processes such as talent management systems.

3D printing may follow the same path, given the slow rate of change in traditional manufacturing environments, while disruptive use cases such as the printing of prototypes or the development of smaller replacement parts for the servicing of large industrial equipment in the field, will emerge faster.

This may also be the case for **predictive analytics**, the deployment of which will not only face talent shortage issues in the analytics organizations but, importantly, will also need to become an accountable process embedded in the fabric of the overall operations of companies. Similarly, **supply chain planning** and **financial management**

SaaS in large enterprises will need to replace or complement older ERP technologies with heavily controlled process steps and complex ramifications for the supply chain and HR systems. In industries such as professional services, where value chains (for example, the upstream and downstream supply chains) are simpler, the adoption may be faster, but large manufacturers will struggle for longer with older but thoroughly integrated systems. The same may also happen in the case of cloud ERP for large enterprises.

The future of the internet of things (**IoT**) will likely hinge on similar considerations, as its value proposition is largely predicated on network effects. Moreover, while new equipment is largely enabled with modern APIs, older machines constituting most of the installed base are often hard to retrofit.

Lastly, legacy operations also fulfill a compliance role. They are often the manifestation of years of increasing controls through checks and balances. Regulatory compliance is often partly responsible for the convoluted deployment of old systems. Reimagining the respective processes requires significant business domain expertise, which is often in short supply among technology focused staff.

The road ahead for large enterprises

Technology adoption and maturation behave vastly differently in B2C processes (and front-end processes more generally) than in B2B and mid-to-back-office processes. Their paths, as depicted in Figure 5, may diverge and need to be planned for differently. B2C adoption is more dependent on the maturation of the technology

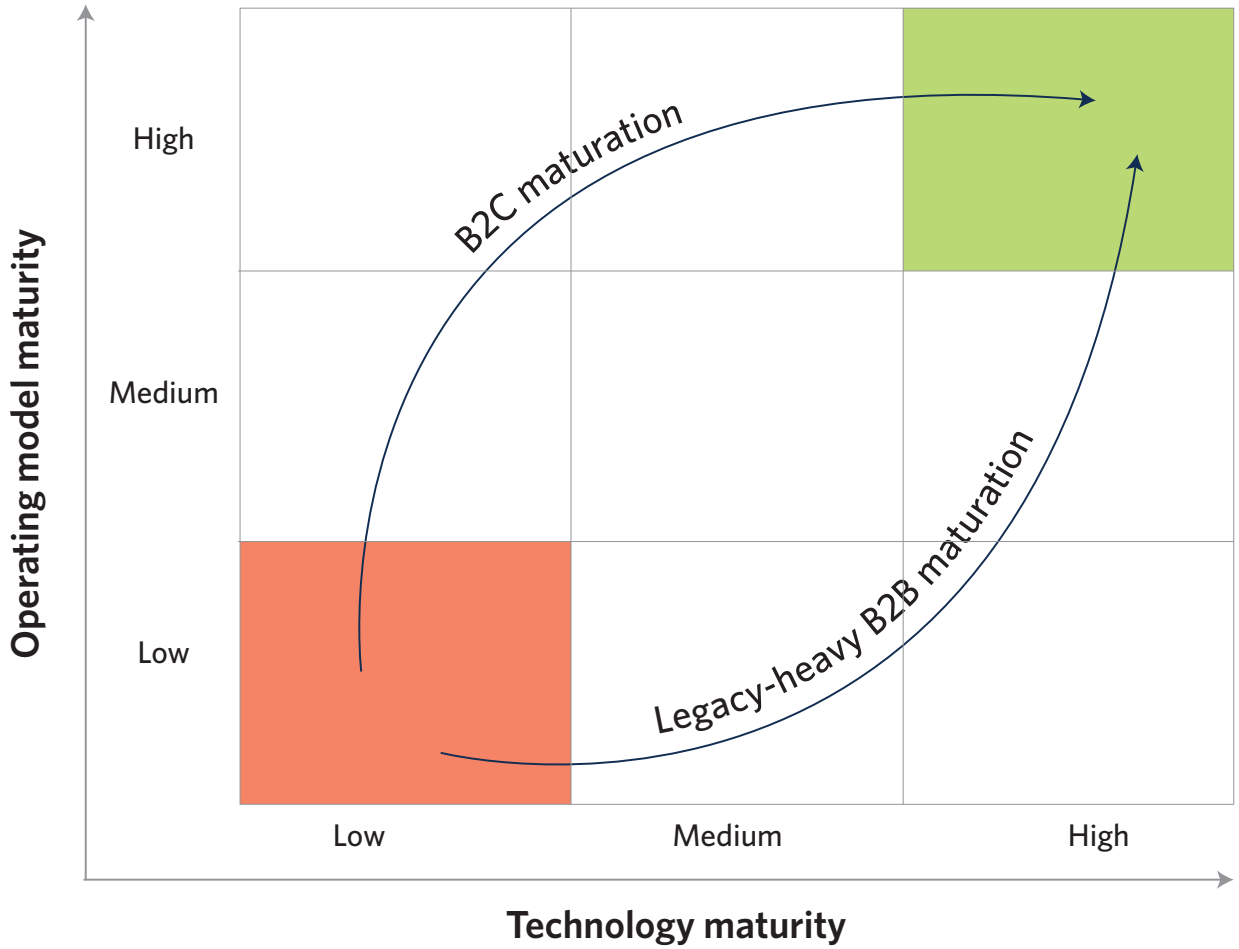


Figure 5

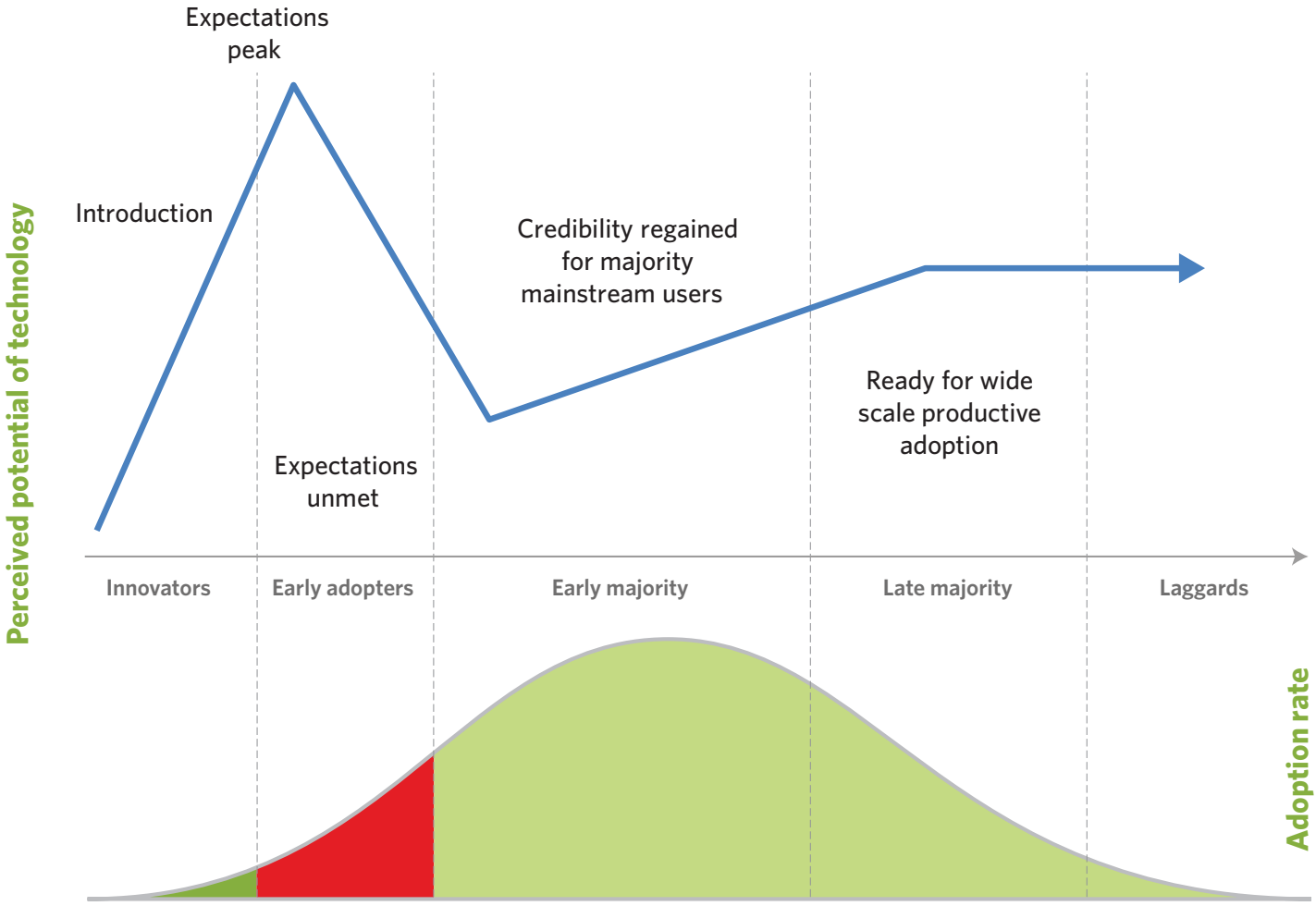


Figure 6

and its affordability. In a B2B environment where legacy operations are significant and "rip-and-replace" of old systems is often not feasible, operating model maturity is a stronger driver of the adoption and success of the new technology. Paying sufficient attention to this aspect is key to success, and, as our current research discovered, neglect of this facet is a common cause of transformation failure.

While innovation will always be a relatively unpredictable affair, there are ways for leaders to improve the odds of success. They are increasingly essential in today's environment. Now early adopters harness technology to upend the competitive dynamics of their industry, unlike in the past when some could deliberately choose to embrace change as part of the "late majority".

The results can guide transformation approaches. More specifically, realizing that the presence of large legacy operations is a hard constraint will help transformation teams apply the right change management approaches. For instance, a bimodal approach that accounts for the need to treat new and traditional technologies differently is becoming prevalent in IT departments. Beyond IT, a holistic approach that has grown out of the need to harness new technology nimbly in large enterprise operations is Lean Digital[SM].

Irrespective of the method used, it is sobering to remember that innovation is not just about inventions, and "shiny objects." It is about the creativity, grind, and sweat involved in reimagining how complex existing business processes can harness the power of new technologies.

About Genpact

Genpact (NYSE: G) stands for "**generating business impact**." We are a global leader in digitally-powered business process management and services. We architect the **Lean Digital**[SM] enterprise through our patented Smart Enterprise Processes (SEP[SM]) framework that reimagines our clients' operating model end-to-end, including the middle and back offices. This creates Intelligent Operations[SM] that we help design, transform, and run. The impact on our clients is a high return on transformation investments through growth, efficiency, and business agility. For two decades, first as a General Electric division and later as an independent company, we have been passionately serving a few hundred strategic clients including one-fourth of the Fortune Global 500, and have grown to over 70,000 people in 25 countries, with key offices in New York City. The resulting business process and industry domain expertise and experience running complex operations are a unique heritage and focus that help us drive the best choices across technology, analytics, and organizational design..

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