Ecosystems and open innovation

Co-create or stagnate

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Key takeaways

In the current ecosystem economy that runs on partnerships, the clear choice for growing one's business is open innovation.

Innovation practices of the past won't work in the future.

Open innovation drives better business outcomes than traditional innovation. For every dollar of investment, the proportion of direct revenue attributed to open innovation is quadruple that of traditional innovation.

Openness drives better innovation outcomes.

Organizations with mature open innovation capabilities innovate at greater speed, scale, and effectiveness. They are 3.3 times more likely to outperform their peers on revenue growth and 2.7 times more likely to outperform on profitability.

Collaboration is critical.

Open innovation is an ecosystem play that requires co-investment and co-creation. On average, organizations engage with around four ecosystem partners per $100 million in innovation spend.

Open innovation demands open technology.

The beating heart of open innovation is partnership through shared data and insights. Open technology—hybrid cloud and artificial intelligence, in particular—is critical. Yet less than three in 10 organizations leverage shared and integrated technology capabilities for innovation with their ecosystem partners.

To stand out, you need to innovate the way you're innovating

Not all innovation is created equal. In a world of increased volatility and continuous change, there's a real risk of "innovation fatigue." When everyone claims to be innovating, it can begin to feel like no one is innovating.

Innovation can become commoditized. And with new ideas and products flooding the marketplace on a daily basis, it's no longer enough to innovate more. To differentiate itself, your organization needs to innovate better.

The impetus for change is especially urgent in the wake of generative AI. Executives expect generative AI to have significant impact across the entire innovation lifecycle, from ideation, discovery, and evaluation to execution and commercialization—not to mention collaboration with partners and measurement of outcomes (see Figure 1).[1] Business leaders don't just view generative AI as another tool in the innovation toolbox; they see it as fundamentally altering the nature of innovation in the modern enterprise.

With generative AI poised to upset the innovation landscape, now is an ideal time for organizations to re-evaluate their approach to innovation.
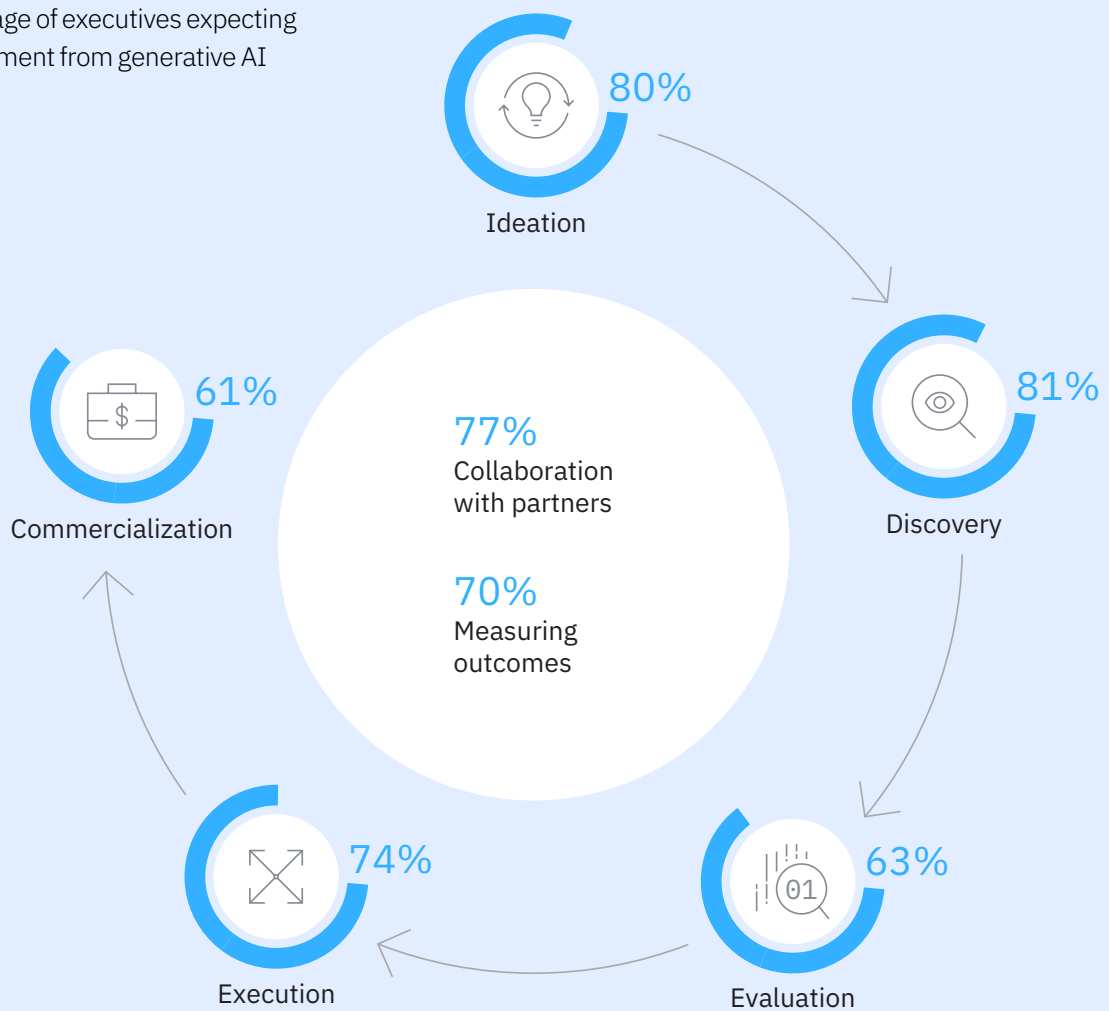
Innovation has traditionally been closed—an internal process that uses organizational resources to maintain secrecy, surprise, and competitive advantage. Whether it's an auto manufacturer developing a new vehicle, a foodservice giant pioneering a new recipe, or a software company building a game-changing mobile app, organizations have generally conceived and executed their best ideas in-house under strict lock and key as a way to protect their intellectual property.

But traditional "closed" innovation is no longer adequate. In the current ecosystem economy that runs on partnerships, the clear choice for growing one's business is open innovation.

FIGURE 1

**Executives expect improved performance from generative
AI at every step of the innovation lifecycle**

Percentage of executives expecting
improvement from generative AI

80% Ideation

81% Discovery

77% Collaboration with partners

70% Measuring outcomes

61% Commercialization

74% Execution

63% Evaluation

Collaboration is key

Based on collaboration and co-creation, open innovation has become a ubiquitous aspiration, with 84% of executives saying open innovation is important for the growth of their business.[2] Their instincts are right: the rate of revenue growth for open innovation leaders is 59% higher than that for other companies, according to research by the IBM Institute for Business Value (IBM IBV).[3]

Our most recent research reinforces this. In a typical large organization, as much as 10% of revenue stems from open innovation (see Perspective, "The revenue generated from open innovation is four times that of traditional innovation," on page 10). If effectively adopted across all Fortune 500 companies in the US, that would translate into $1.8 trillion of revenue per year.[4]

But a large share of this potential value remains untapped. Many companies haven't yet converted the opportunity into reality.

Treat innovation as a team sport— or lose to those who do

Why are companies not fully capitalizing on the open innovation opportunity? In short, because it's difficult. From cybersecurity concerns to techno-logical barriers to lack of agility, multiple challenges stymie innovation efforts with ecosystem partners. Aligning internal departments and breaking down functional silos for innovation is hard enough. Adding external partners to the mix and channeling their capabilities toward a shared objective can be downright daunting.[5]

Generative AI could help companies overcome some of the challenges they face. In fact, a majority of organizations say they're currently evaluating or piloting generative AI as a tool for open innovation, primarily because of its ability to improve ecosystem collaboration.[6]

But generative AI alone cannot sow the seeds of open innovation. To move from aspiration to realization in an era of exponential technology, organizations must determine what business value they can derive from innovation with ecosystem partners and what's required to facilitate it.

To this end, the IBM IBV and APQC jointly developed a maturity model that we used to analyze whether maturity on key open innovation capabilities results in a more efficient innovation process and improved business outcomes. We call it the Ecosystem Enabled Innovation Maturity Model (EEIMM), and we have tested it with more than 1,000 companies.

Our results are compelling: organizations that are more mature with regard to open innovation signifi-cantly outperform less mature organizations. For example, they are 3.3 times more likely to outperform less mature organizations on revenue growth, and 2.7 times more likely to outperform them on profitability.

Let's dig into our findings further to determine what open innovation maturity looks like, how it can drive business performance, and—most importantly—what it takes to get there.

Perspective

What is open innovation?

Theorist Henry Chesbrough first introduced the concept of open innovation in 2003. His premise was simple: whereas most innovation historically was "closed"—done exclusively inside an organization by its own people with its own ideas and its own resources—most innovation going forward will be "open": done with ecosystem partners in a way that marries external with internal capabilities.[7]

"In a world of abundant knowledge, not all smart people work for you," Chesbrough once wrote. "Companies must become nimble at … accessing and exploiting outside knowledge while liberating their own internal expertise for others' use."[8]

Organizations that are clinging to traditional notions of innovation must transform their operating model from one that supports linear processes and control to one that promotes the open exchange of information, ideas, and abilities across individuals, organizations, and even industries.
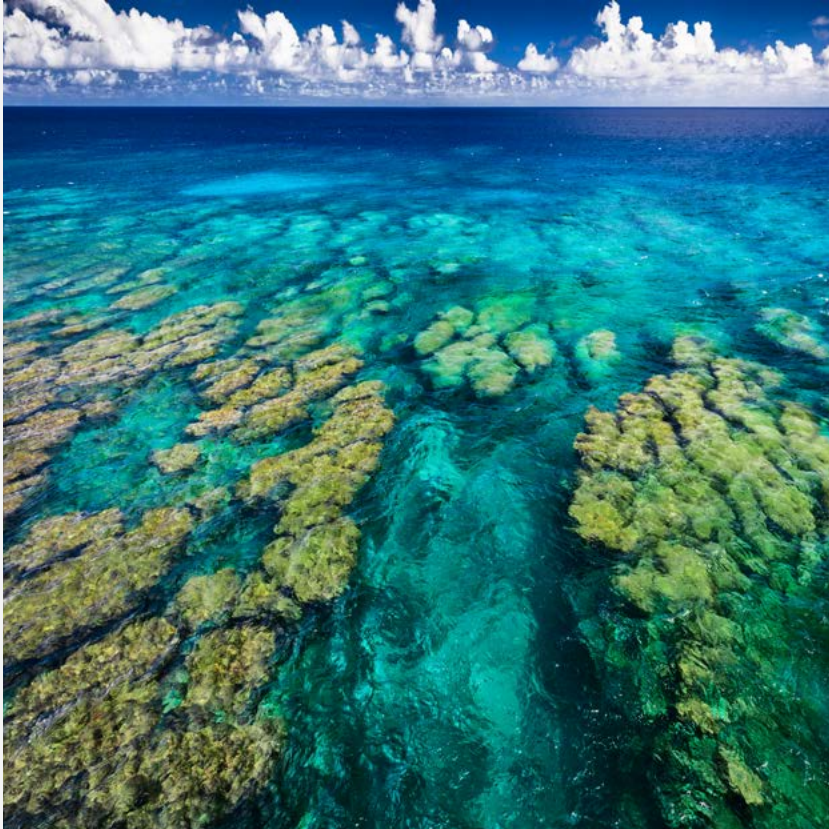
Organizations with mature open innovation capabilities perform better and are more likely to attribute their performance to their capacity for open innovation.

Unlock better business outcomes with an open innovation operating model

Open innovation impacts not only the innovation value chain, but also the wider enterprise.[9] Organizations that embrace it as a business strategy must therefore recognize the broader implications for their operating model.

Step one is understanding what capabilities are most critical for success, including how to build them, how to integrate them for better business performance, how technology can enable them, and what investments might be required to achieve them.

To ascertain what capabilities are needed for open innovation, we built on our extensive existing research and decades of consulting experience to identify four components that constitute a successful open innovation operating model.

To determine how operating model capabilities interact in ways that drive better innovation and business performance, we asked executives about their current open innovation practices and capabilities. We then used a maturity assessment framework with five levels to assess organizations' maturity across each of the four components of open innovation operating model capabilities. Finally, we collected data on key innovation and business performance metrics to relate maturity to outcomes (see "The Ecosystem Enabled Innovation Maturity Model" on page 8).

Organizations that are more mature across the four components significantly outperform those who are less mature. They innovate at greater speed, scale, and effectiveness, and can convert better innovation performance into superior business performance.

The Ecosystem Enabled Innovation Maturity Model:

Achieving increased innovation in an ecosystems-based economy

Open innovation is now an essential driver of growth—and ecosystems are key to success. The Ecosystem Enabled Innovation Maturity Model (EEIMM) is an opportunity to conduct a maturity assessment of your organization and benchmark your results with industry peers. The assessment evaluates the capabilities organizations have in place to enable collaborative value creation from strategic, cultural, operational, and technological perspectives.

Based on extensive research spanning the past decade, the EEIMM includes capabilities in four domains that focus on the keys to successful open innovation: strategy and culture, ecosystem capability, internal capacity, and technology enablement (see Figure 2).

FIGURE 2

The open innovation operating model has four components

	Strategy & culture	Clarity on open innovation strategy, its alignment to business strategy, and the fostering of an open innovation culture
	Ecosystem capability	Active engagement with ecosystems and the extension of innovation and business processes outwards to encompass partners
	Internal capacity	Internal capacity to undertake, participate in, and absorb innovation for business value
	Technology enablement	Open technology capabilities for accelerated discovery, co-creation, and co-execution of innovation activities with partners, including hybrid cloud and AI

**The Ecosystem Enabled Innovation
Maturity Model (con't)**

Each domain includes four to eight questions on specific capabilities and practices across five levels of maturity (see Figure 3). Organizations select the option that most closely matches their practices.

**Organizations' open innovation capabilities
are measurable on a five-point maturity scale**

Optimized   5
Breaking new ground and advancing open
innovation within industry

Managed   4
Open innovation is tuned and used to further
increase organizational performance

Defined   3
Open innovation is being integrated
across the organization

Repeatable   2
Implementing select open
innovation projects

Foundational   1
Taking the first steps
toward open innovation

The revenue generated from open innovation is four times that of traditional innovation.
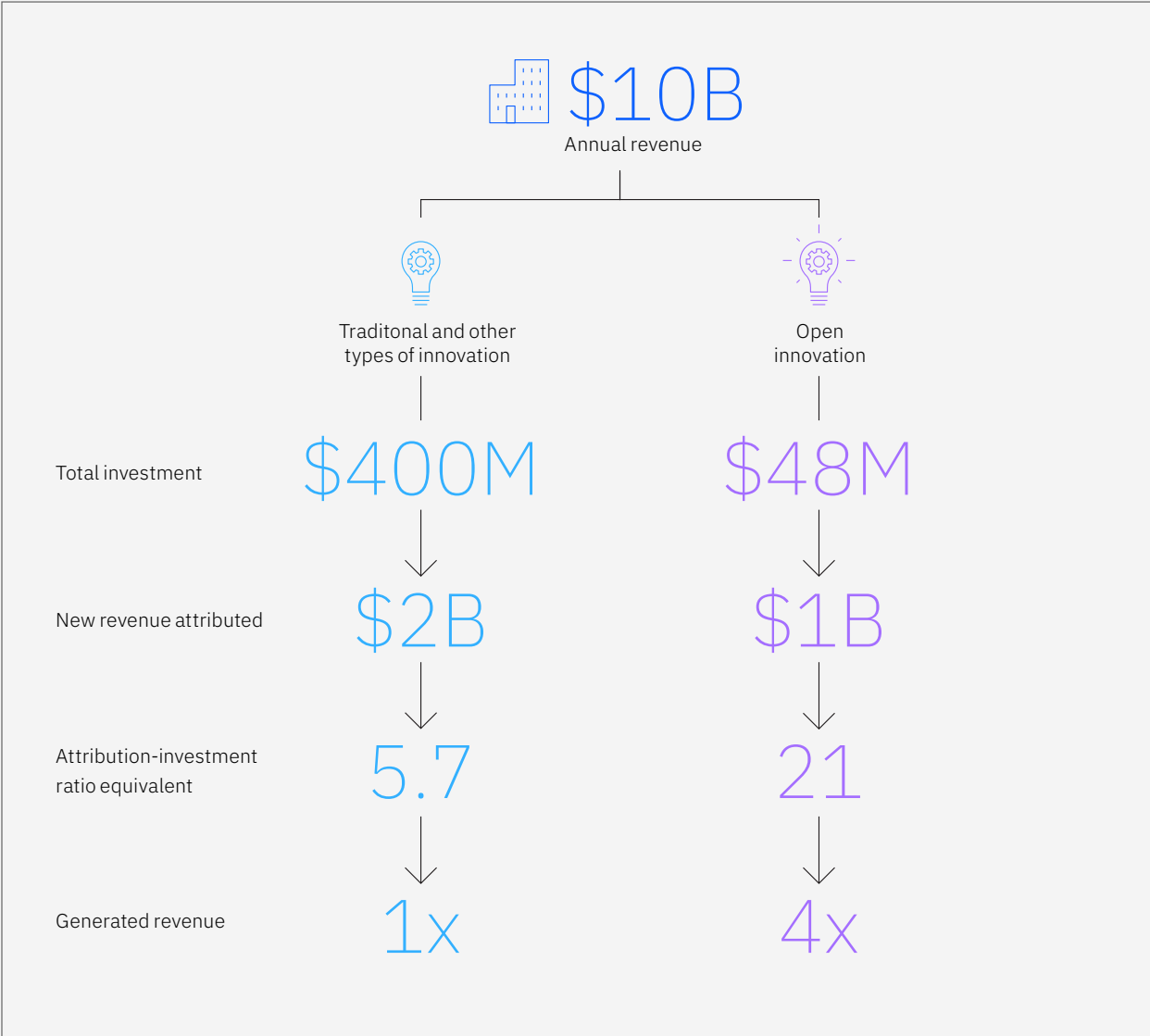
If you're still not convinced of open innovation's merits, consider its impact on revenue generation. On average, surveyed organizations dedicate 4% of their total annual revenue to innovation. Of that, they allocate 12% to open innovation. The same organizations attribute 30% of their revenue to innovation—20% to traditional and other types of innovation and 10% to open innovation.

4%
of total annual revenue
is dedicated to innovation

Only
12%
of which is allocated
to open innovation
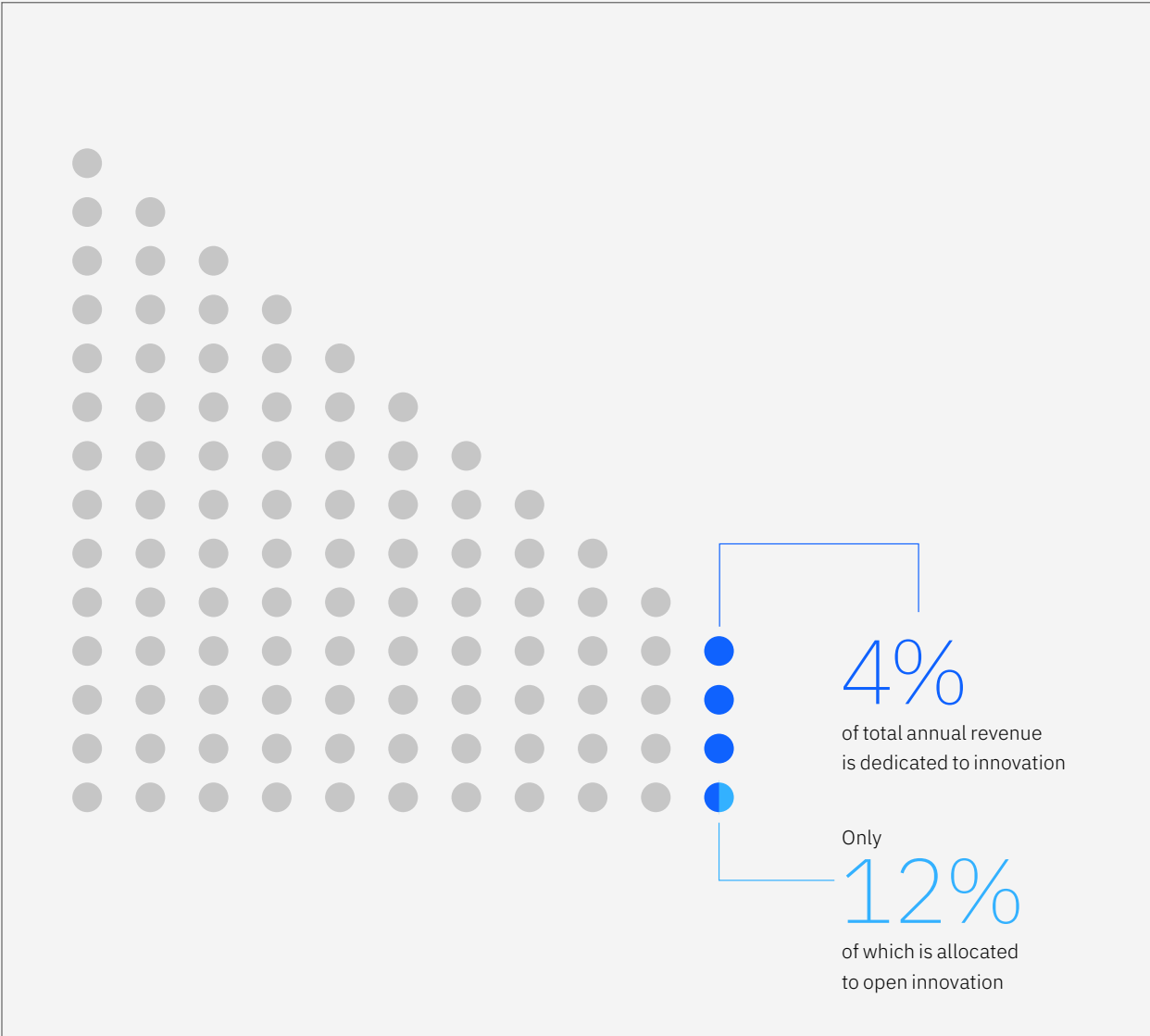
Perspective (con't)

For an organization that makes $10 billion in annual revenue, this equates to a total investment of $400 million in innovation, and an investment of $48 million in open innovation specifically. Overall, the organization realizes a return of $3 billion on its innovation investment. Of that revenue, $2 billion stems from investments in traditional and other types of innovation and $1 billion from investments in open innovation. This equates to a revenue attribution-investment ratio of 21 for open innovation compared to 5.7 for traditional and other types of innovation.

In other words: For every $1 an organization invests in innovation, the revenue it can attribute to open innovation is four times greater than the revenue it can attribute to traditional and other types of innovation.

$10B
Annual revenue

Traditonal and other types of innovation

Open innovation

Total investment — $400M — $48M

New revenue attributed — $2B — $1B

Attribution-investment ratio equivalent — 5.7 — 21
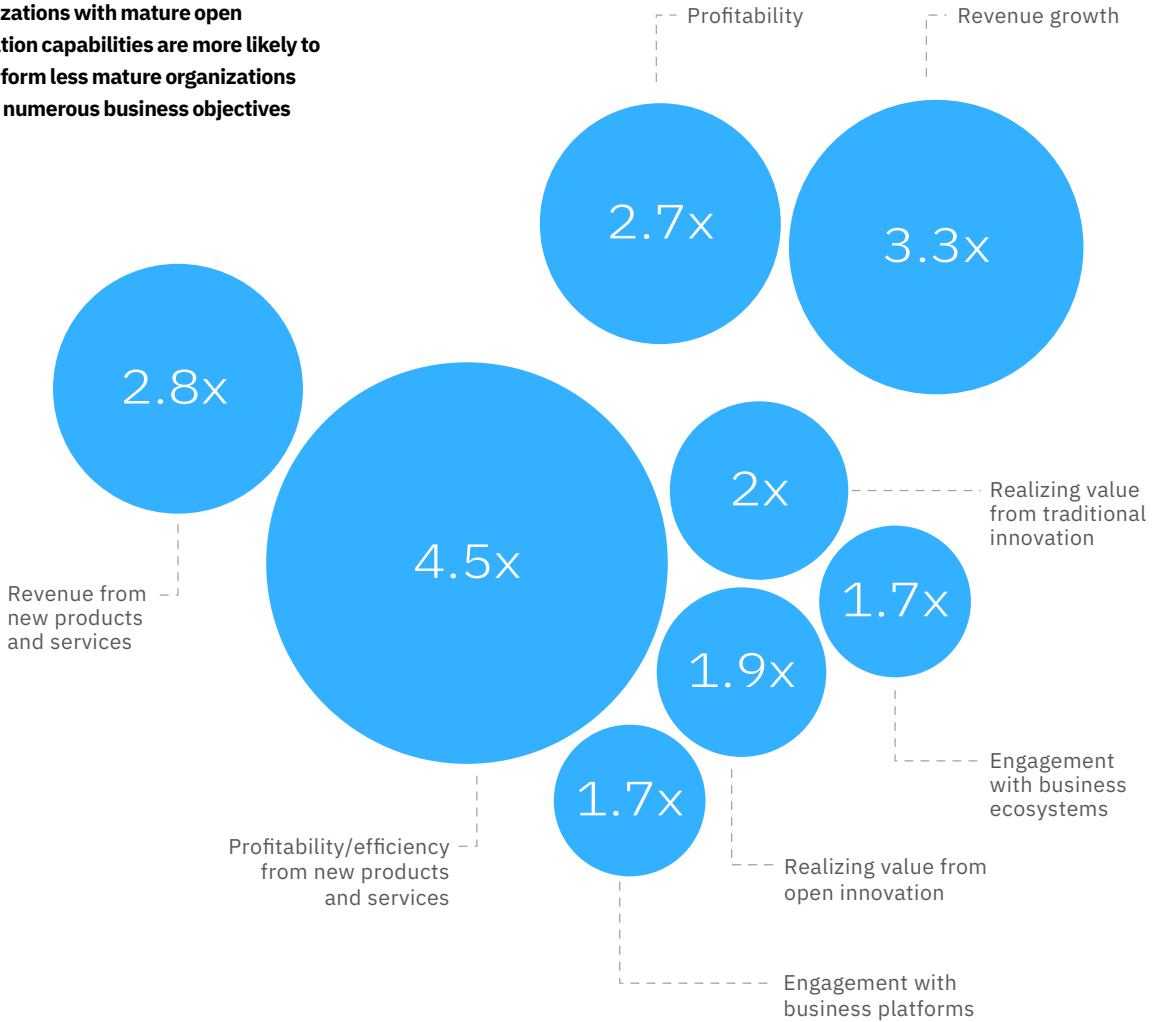
Generated revenue — 1x — 4x

More mature organizations are 3.3 times more likely to outperform less mature organizations on revenue growth, and 2.7 times more likely to outperform them on profitability. We also found that more mature organizations achieve a cumulative five-year revenue growth rate that's 37% higher. In addition, more mature organizations achieve average operating margins that are 7% higher compared to those of less mature organizations; are significantly more likely to report gains in revenue and profitability from innovation through new products and services; and are more likely to realize value from both traditional and open innovation efforts (see Figure 4).
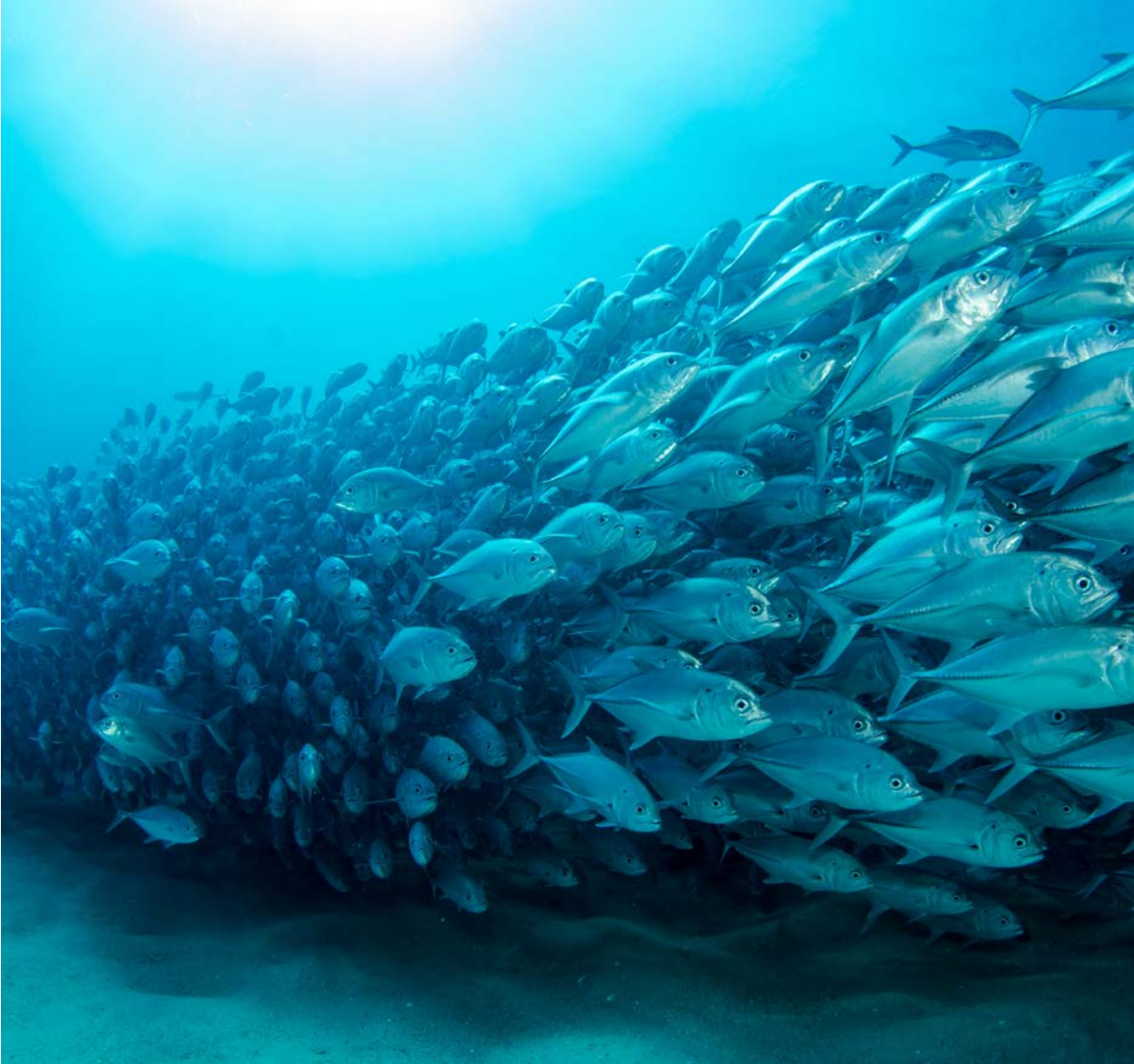
Crucially, the most mature organizations are more likely than the less mature organizations to attribute positive business performance to open innovation in areas such as: revenue (98% more likely), profitability (76% more likely), number of patents filed (41% more likely), R&D productivity (31% more likely), time to market for new products and services (72% more likely), and number of new products and services launched (76% more likely).

Simply put: not only do organizations with mature open innovation capabilities perform better, but they also are more likely to attribute their performance to their capacity for open innovation. They have cracked the code for how to convert open innovation efforts into real impact, thus capitalizing on the opportunity that so far has eluded so many enterprises.

FIGURE 4

Organizations with mature open innovation capabilities are more likely to outperform less mature organizations across numerous business objectives

Profitability

Revenue growth

2.7x

3.3x

2.8x

4.5x

2x — Realizing value from traditional innovation

1.7x

1.9x

Revenue from new products and services

Profitability/efficiency from new products and services

1.7x

Engagement with business ecosystems

Realizing value from open innovation
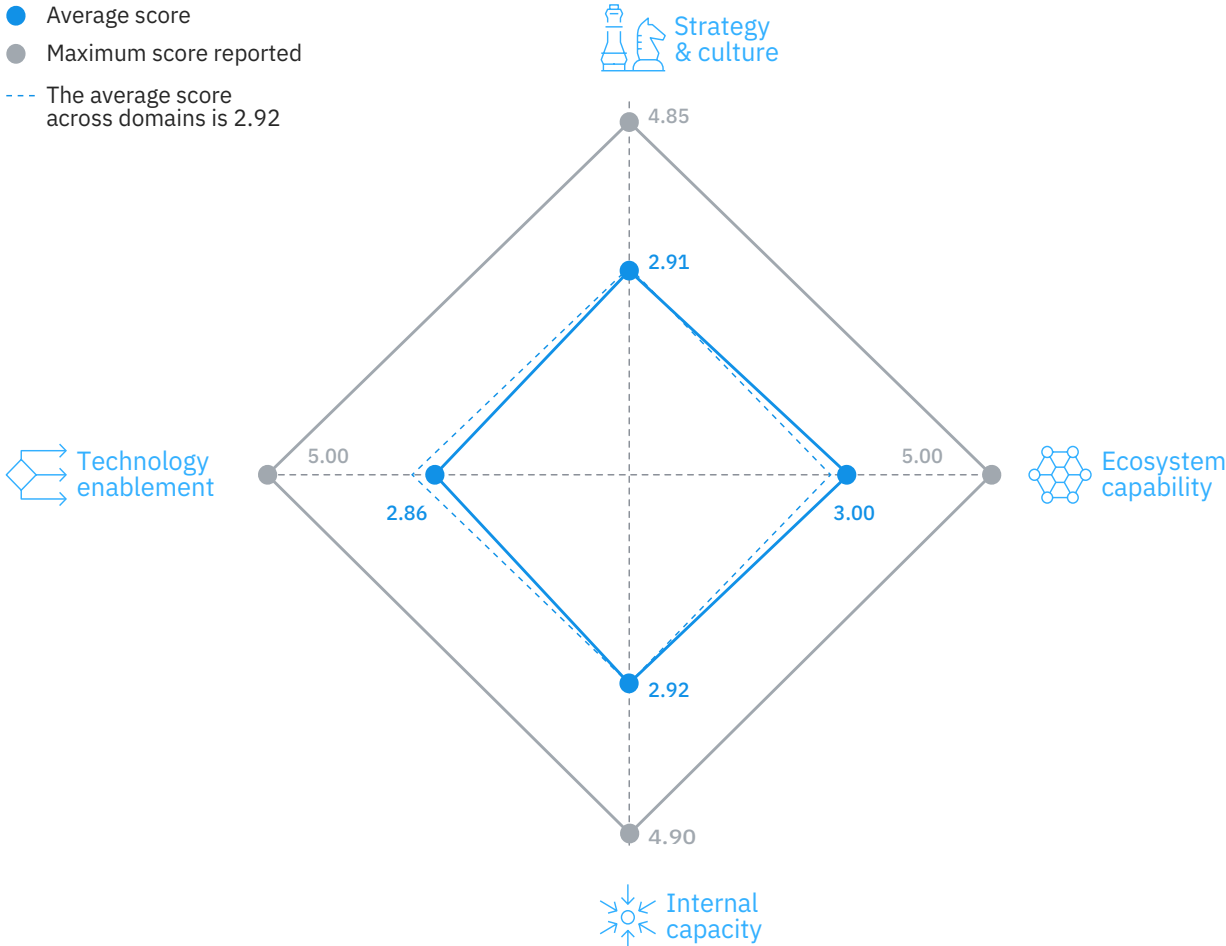
Engagement with business platforms

An objectives-based approach to open innovation

Among the organizations we surveyed, maturity on open innovation capabilities is moderate, with an average score across domains of 2.92 (see Figure 5).

This indicates that the average organization already has the business case and strategy for open innovation in place, and is beginning to bolster it with additional management support. Furthermore, it's exploring internal and external dependencies, and establishing relationships with ecosystem partners. However, open innovation pilots and projects are more likely to be compartmentalized than integrated across functional units, and there is limited use of data and digital technologies to accelerate innovation. Progress is being made, but much work remains.

FIGURE 5

Average maturity on open innovation capabilities is moderate—just 2.92 out of 5

- Average score
- Maximum score reported
- - - The average score across domains is 2.92

Strategy & culture

4.85
2.91

Technology enablement   5.00   2.86 · 3.00   5.00   Ecosystem capability

2.92

4.90

Internal capacity

Organizations that want to increase their maturity must understand that not all capabilities are equal. Some capabilities are more relevant to innovation and business performance than others.

More importantly, the role of different capabilities varies according to desired outcomes. In order to understand how best to allocate their resources, organizations must clearly define what objectives they want to achieve (see Figure 6).

Organizations must set clear objectives for open innovation

If you want to ...

Then you should focus on ...

If you want to ...	Then you should focus on ...
Improve time to market from open innovation	1 Governance for secure collaboration 2 Open innovation strategy and execution planning 3 Participation in ecosystem platforms
Increase speed to ROI from open innovation	1 Business processes supporting ecosystem engagement 2 Broad and deep ecosystem engagement 3 Skills of employees engaged in open innovation
Increase ROI on open innnovation	1 Training employees to deliver on open innovation 2 Legal and IP processes to enable open innovation 3 Empowering employees to take initiative
Improve market share from open innovation	1 Participation in innovation ecosystem platforms 2 Legal and IP processes to enable open innovation 3 Integration of open innovation into business strategy
Realize value from open innovation	1 Governence and systems for collaboration 2 Open innovation strategy and execution planning 3 Legal and IP processes to enable open innovation

Organizations that are more mature across the four components innovate at greater speed, scale, and effectiveness, and are able to convert better innovation performance into superior business performance.

Let's explore this further.

If your goal is to improve innovation efficiency—for example, reducing the time it takes to realize ROI from open innovation investments—then you must set up your organization for engagement and collaboration with ecosystem partners. Among other things, that requires an emphasis on skills development and cybersecurity, both of which are critical enablers of collaboration.

If your goal is innovation effectiveness—for example, increasing the impact of innovation on market share—key success factors include participation in platforms, intellectual property approach, strategic clarity, and strong alignment with business strategy.

Our findings reinforce the notion that open innovation is a strategic business decision that requires clarity with regard to business objectives. In other words, why is your organization engaging in open innovation in the first place? Is it to accelerate the speed of innovation, for example? Or perhaps it's to create new commercialization and monetization opportunities?

Different levers will come into play depending on what you're trying to achieve—which could explain why a clear strategy and execution plan is universally important across all objectives.

FAW-Volkswagen builds open innovation delivery skills[10]

As part of a broader effort to lead China's EV and digital automotive industry, FAW-Volkswagen embarked on end-to-end transformation. This included creating and training a digital innovation team of more than 150 individuals in design thinking and agile operations. To achieve this, it used a garage methodology—a set of best practices guiding companies through transformation processes.

FAW-Volkswagen also implemented cloud-based technology capabilities to enable integration with other digital services such as streaming media, parking, and EV charging services. This technology shift fostered seamless integrations between software and the wider ecosystem of external services.

The initiative resulted in more than 3 million new users registering for FAW-Volkswagen's VW and Jetta brand mobile apps, underscoring the impact of open innovation and digital transformation on customer engagement and business operations.

For transforming the very nature of its development team from a factory-focused software department to an agile group of innovators, the Chengdu R&D team became the first team within FAW-Volkswagen to gain independent R&D capabilities. It also won an IDC award for "Best in Future of Digital Innovation" for an intelligent network digital capacity-building project, which included establishing an intelligent ecosystem middleware platform.

Virtusa embraces participation in open innovation platforms[11]

Most banking and financial services (BFS) firms cannot afford the distraction and expense of overhauling decades-old legacy systems and processes. Instead, "build, buy, and compose" is becoming the innovation mantra for firms that are vying to compete and operate effectively in the digital BFS environment.

Although service providers play an emerging role as BFS ecosystem orchestrators—curating and managing fintechs—there is a real need for more visible and transparent testing and validation processes before fintechs are invited into ecosystems. Virtusa uses its experience with product development to help validate and test fintechs before baking them into services.

The company initially built the Open Innovation Platform (OIP) as an internal accelerator to help manage its own ideation and product development cycles. It then converted it into an accelerator for its financial services clients to help drive co-innovation with clients and external partners such as fintechs. Virtusa also developed several banking-specific AI models (for example, default prediction and fraud detection), workflows (for example, customer onboarding), and a smart bank data model, and added relevant APIs and synthetic data to the OIP so it could serve as a sandbox environment.

Virtusa productized the OIP in 2021 after using it with several BFS clients. A related subcomponent called the Digital Product Workbench allows innovations to move from interesting ideas using design thinking to actual product development, with a focus on reuse—helping to accelerate cycle time.

Open innovation is vital yet varied across industries

If defining one's objectives is so critical to open innovation maturity, the question begs: what are companies trying to achieve by engaging in it? Interestingly, their number one priority is reducing and optimizing costs, followed by improving products/services and creating new business models and value propositions.

Objectives differ by industry (see Figure 7). This suggests that organizations' strategic objectives with open innovation depend largely on industry context.
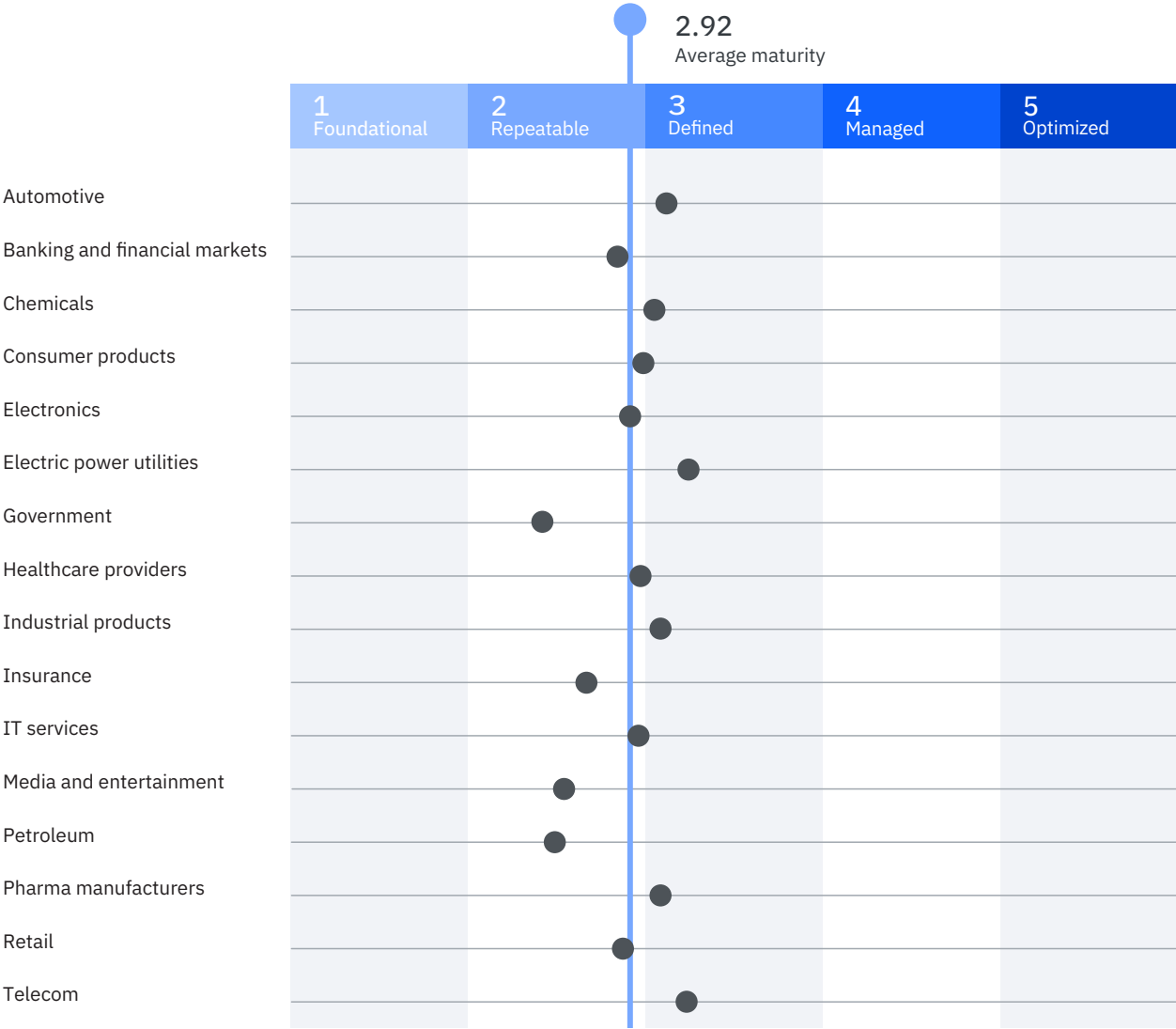
FIGURE 7

Organizations' top open innovation priorities differ widely by industry

Industry	Market access	Market share	Competitiveness	New business models	Tech or infrastructure	Reduced costs	Access to capital	Product/service improvement	Stronger core operations	Time to market	Customer value
Automotive						●					
Banking and financial markets	●										
Chemicals			●								
Consumer products						●					
Electronics						●					
Electric power utilities								●			
Government					●						
Healthcare providers			●			●		●			
Industrial products									●		
Insurance				●							
IT services						●			●		
Media and entertainment							●				
Petroleum		●									
Pharma manufacturers											●
Retail											●
Telecom			●								
Transportation				●							
Travel						●					

Indeed, the particulars of industry ecosystems and market conditions—and the role of one's organization within these—will dictate how open innovation can bring value to the enterprise. It is therefore no surprise that organizations in networked industries such as electric power utilities and telecommunications on average display the most mature capabilities. In contrast, organizations in government are the least mature (see Figure 8).

FIGURE 8

There is room for improvement across all industries—including those with the most mature open innovation capabilities

2.92
Average maturity

	1 Foundational	2 Repeatable	3 Defined	4 Managed	5 Optimized
Automotive			●		
Banking and financial markets		●			
Chemicals			●		
Consumer products			●		
Electronics			●		
Electric power utilities			●		
Government		●			
Healthcare providers			●		
Industrial products			●		
Insurance		●			
IT services			●		
Media and entertainment		●			
Petroleum		●			
Pharma manufacturers			●		
Retail			●		
Telecom			●		

Bankart creates a new value proposition with open banking[12]

Bankart is a payment instruments processor that handles more than 45 million transactions a month. It enabled a radical change in the Slovenian banking sector through open banking, capitalizing on the changing regulatory environment—particularly open banking-friendly regulations such as the updated Payment Service Providers Directive (PSD2).

Open banking allows customers to manage accounts across multiple banks and provides alternative payment systems through a platform with integration and regulatory compliance capabilities.

This innovation empowered 11 out of 15 Slovenian banks to thrive in the open banking environment, reducing their costs and deployment timelines when compared to the time needed to create their own platforms in-house. Because it integrated the remaining four banks across platforms, it allowed customers to access any account in the country through a single access point.

Bankart's successful use of open innovation enabled it to transform the banking landscape in Slovenia, fostering efficiency and cooperation among banks.

"The scale for this solution was bonkers," said Sinisa Jancic, business development and innovation director at Bankart, Procesiranje plačilnih instrumentov d.o.o. "We're providing for 11 different banks—each with their own security requirements and so on. But we were all a lot more comfortable doing this together than we would have been doing it by ourselves. Between the IBM infrastructure, our knowledge of microservices, and Bankart's experience with the banks, we could all work really fast and cover all of the bases to create an open, compliant solution."

Win the day with co-creation— not stagnation

Your enterprise is at an urgent crossroads: either the organization opens its doors to open innovation now, or it could be closing the door to future value creation opportunities.

The choice should be easy, but the work required will be difficult.

It starts with technology. Led by hybrid cloud and artificial intelligence, advances in digital technologies are opening new opportunities in innovation, as well as new challenges related to privacy, ethics, security, and intellectual property rights.

These radical changes are closely tied to the emerging ecosystem economy, which is enabled in large part by open technologies and standards that facilitate collaboration and co-creation. It is thanks to interoperable technologies and a shared language of standards that open innovation and ecosystem engagement are possible.

The technological backbone for open innovation in the ecosystem economy is hybrid cloud, which allows the sharing of data and workloads across systems, clouds, functional silos, and organizations. By integrating public cloud, private cloud, and on-premises infrastructure, hybrid cloud enables orchestration, management, and application portability across all three.

Because it makes data more accessible and easier to analyze, this unified environment is a boon for organizations seeking increased value from open innovation. Open standards and interoperability are critical technology features that enable ecosystem engagement by allowing organizations to connect, integrate, and work across system and enterprise boundaries.

If you want to leverage generative AI, you need open innovation

Organizations with access to vast data stores face new challenges as they struggle to distill insights quickly and efficiently. That's why organizations have turned to AI—including generative AI—to convert abstract data into actionable intelligence that accelerates and scales their innovation efforts.

When asked to identify the most important potential benefits from adopting generative AI for open innovation, executives cite expanding their innovation ecosystem as the top benefit, ahead of increased revenue from and reduced cost of innovation.

Executives have reservations with applying generative AI to open innovation. Significant barriers include concerns about data privacy and accuracy, lack of generative AI skills, and the upfront investment required. Interestingly, executives are less concerned with the availability of technology (see Figure 9).

Executives say using generative AI for open innovation purposes comes with both opportunities and risks

Benefits

1. Expand innovation ecosystem
2. Increase revenue from innovation
3. Reduce the cost of innovation
4. Improve share of innovation projects with optimal return on capital costs
5. Improve conversion rates of ideas to outcomes
6. Increase ROI of innovation
7. Access broader range of insights faster
8. Shorten break even time to profit for innovation
9. Deepen insights from more sources
10. Increase number of products/ services developed

Concerns

1. Privacy and confidentiality of data
2. Data accuracy
3. Open innovation requires too much investment
4. Inadequate skilled generative AI expertise
5. Cybersecurity
6. Regulation and compliance
7. Bias
8. Unclear use cases
9. Insufficient proprietar y data available to customize
10. Inadequate business case

Source: Generative AI and open innovation pulse survey. IBM Institute for Business Value. 2023.

Many of the barriers that executives foresee with regard to using generative AI for open innovation can be addressed through collaboration. Engaging with ecosystem partners gives organizations access to supplementary skills and additional investment capital.

In fact, embracing ecosystem partnerships is an ideal way to unlock the full potential of generative AI for innovation. It is through shared investment, capabilities, and value creation that the ROI from foundation models and generative AI can be achieved. It is questionable whether individual organizations have the resources and scale to singlehandedly make the required investments.

What's more, relying solely on generic models created by a handful of tech companies is likely insufficient for enterprise-level innovation that requires tailoring and contextualization for true differentiation. Working together with business and technology partners through ecosystems, companies can gain the scale required for commercially viable investment in generative AI for innovation that can be a differentiating source of competitive advantage.

Open innovation demands good governance and open standards

Ecosystems open the opportunity to harness data, insights, and technology capabilities from a variety of partners and stakeholders while providing control over the AI capabilities that are most central to the organization's value proposition. But realizing this new potential requires effective governance that convenes partners and stakeholders to create the right conditions for shared capabilities and intelligence.

Gaining a common understanding of the guardrails for secure and ethical use of data and generative AI is a fundamental starting point. Although such efforts do not substitute for wider societal guidance, legislation, or regulation, they constitute ecosystem-specific principles for effective collaboration. These foundational principles must be accompanied by shared data governance and technology interoperability as conditions for mutual value creation and capture. Without common standards, there is little scope for the collaboration and co-creation—let alone trust—that are required for developing shared generative AI capabilities.

Success is synonymous with security

Increased openness often creates increased risk—risk of business deals going bad, risk of unscrupulous or nefarious agents, and perhaps most significantly, risk of cyber incursions.

For too long, organizations have pursued open innovation with security considerations as an afterthought. As a result, as ecosystems become increasingly central to business strategy, organizations are paying insufficient attention to the impact of cyber threats and risk.

Security must become an enabler of successful open innovation and growth. If businesses do not fundamentally rethink their security equation in light of emerging security threats, ecosystems that might have taken years and billions of investment dollars to build could be squandered in an instant.

Organizations with robust security capabilities that extend to their ecosystems benefit from a range of business and operational outcomes, including deeper and more valuable engagement and innovation with partners, recent IBM IBV research finds.[13] Going forward, successful organizations will use more advanced capabilities to manage cyber risk while coordinating partners for efficiency, speed, specialization, and scale. These are all attributes of a more open—and more resilient—organization.

Achieving open standards

Open standards are a mechanism through which organizations can resolve the governance challenges they face with regard to open innovation. Enabling co-creation requires ecosystem partners to have a common language defined by shared definitions and standards. Instead of being unique and proprietary to an individual enterprise, these must be open to cut across organizational boundaries.

Recommended practices include adopting common communities of interest, knowledge, or practice and standardizing procedures and policies across partner operations.

NASA and IBM address climate change with next-generation AI, open innovation, and open science[14]

Increased heat and drought from climate change is fueling an increase in wildfires—and in inquiries from curious scientists who want to know how wildfire smoke will impact air quality, and how searing heatwaves will impact agricultural yields. To answer these and other urgent questions, researchers must comb through millions of Earth science papers and mine mountains of satellite imagery.

In a new collaboration, NASA and IBM are creating AI foundation models to analyze petabytes of text and remote-sensing data to make it easier to build AI applications tailored to specific questions and tasks.

Foundation models are types of AI models trained on a broad set of unlabeled data. They can be used for different tasks and can apply information about one situation to another. The goal of the work is to provide an easier way for researchers to analyze and draw insights from large NASA datasets related to Earth processes.

"It won't just be NASA that benefits; other agencies and organizations will, too," said Rahul Ramachandran, a senior research scientist at NASA's Marshall Space Flight Center. "We hope that these models will make information and knowledge more accessible to everyone and encourage people to build applications that make it easier to use our datasets to make discoveries and decisions based on the latest science."

Action guide

How to activate open innovation

Complacency is the enemy of creativity. To out-innovate the competition in a world that's saturated with innovative posturing, your organization must, where possible, supplement traditional innovation with open innovation. Doing so requires building the capabilities you need today as well as the resilience and adaptability that you'll need tomorrow. The keys are strategic thinking and collaborative action, which you can nurture by taking the following steps:

01
Clearly define your strategic objectives.

Don't embark on open innovation for the sake of it. Decide what you want to achieve, taking into consideration industry-specific regulations, challenges, and opportunities.

02
Understand your current open innovation capabilities.

Assess your current approach to and performance against key open innovation capabilities, such as those defined in the Ecosystem Enabled Innovation Maturity Model. Use the model as a framework to benchmark your organization's practices with those of peers, highlighting opportunities to improve.

03
Align capabilities to objectives.

Understand what capabilities are most important for the objectives you are trying to achieve. Focus on building those first. Once you know your starting point, you can develop a prioritized implementation roadmap. Provide longer-term projects with sufficient resources and budgets.

04
Integrate capabilities throughout the enterprise and across ecosystems.

While some may be more important than others, it's important to recognize that capabilities complement each other and must be integrated holistically across internal and external silos. The entirety of your competencies is greater than the sum of its parts.

Action guide

How to activate open innovation

05

Prioritize good governance.

While it may seem intangible and difficult to define, governance is instrumental for converting open innovation into meaningful business value. Coordination alone is not enough. At its best, governance also encompasses open standards and principles around ethics, privacy, and security.

06

Align technology investments with open innovation strategy.

Your technology choices will impact your ability to engage in open innovation. Ensure that you have the required open technology foundation in place for collaboration and co-creation with ecosystem partners. Look to hybrid cloud and AI as the technology pillars for open innovation.

07

Look ahead.

The conditions for open innovation are continuously changing. Today, generative AI is blowing up business models. Tomorrow, something else will emerge. Anticipating and preparing for the next wave of disruption unleashed by new technology is crucial for long-term success. The levers that unlock value from open innovation now may not be the same that will generate impact later. Keeping track of new developments and considering how they might impact your approach to open innovation is a superpower you can't afford to ignore.

08

Build resilience and adaptability through ecosystems.

A strategic approach to ecosystem partnerships can provide the optionality and resilience that are necessary for navigating and adapting to dynamic circumstances. Your strategic partnerships will not only be a source of greater visibility, but also will provide more pathways for rapid adaptation and crucial access to a broader range of capabilities and technologies.

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Study approach and methodology

Together with Oxford Economics, the IBM IBV conducted a global, cross-industry survey of 1,100 organizations using the Ecosystem Enabled Innovation Maturity Model (EEIMM). The respondents are responsible for open innovation at their organizations, all of which are considering or actively applying an open approach. Roles include CEOs, CIOs, CTOs, COOs, CSCOs, CFOs, and CMOs—or their equivalents—as well as heads of innovation, corporate development, and strategy. Respondents told us how they performed on key metrics that indicate the efficiency and effectiveness of their open innovation functions and answered questions to enable assessment of the maturity of their practices across the four EEIMM capabilities.

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