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ARTHUR LITTLE

# PRISM

BIG THINKING,  
IMAGINING WHAT  
IS COMING NEXT

TROUBLED  
WATER

BRIDGE  
OVER



THE PRISM BOARD

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Arthur D. Little has been at the forefront of innovation since 1886. We help companies continuously anticipate, innovate and transform to achieve sustained business success in today's disruptive business environment:

- Anticipate future trends and build resilient strategies that embrace complexity.
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- Transform organizations, processes and cultures to continuously adapt.

We are problem-solvers and combine deep industry insight, functional skills and entrepreneurial flair to find and deliver new solutions. With our open consulting approach we bring the best global experts to every assignment, complementing our internal strengths. We are proud to be present in the most important business centers around the world, serving the world's leading corporations and public sector organizations.

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# EDITORIAL

## DEAR READER

Welcome to the first issue of Prism 2023!

Readers of the daily news could be forgiven for getting depressed and anxious. We are constantly bombarded with issues we should be worried about, from inflation and recession to war and climate catastrophe, and the business media are equally prone to pessimism.

Yet, back in the real world, something quite different is happening. Businesses and their leaders are quietly getting on with things and shaping up for the future with a new, cautious confidence. A joint report just issued under the leadership of Nicholas Stern and Mattia Romani talks about “a new growth and development story driven by investment and innovation in green technology, boosted by artificial intelligence.” Technology and business, working together with governments and communities, have huge potential to help the world bridge over today’s troubled waters.

This is the message in our lead article, which highlights that CEOs are overwhelmingly optimistic about the future. Based on unique research with CEOs leading USD1 billion+ companies, the article shows they are focused on growth, innovation, and prioritizing sustainability as a lever to deliver competitive advantage. It looks in-depth at the research, exploring what CEOs are really thinking and feeling as they proactively engage with today’s pressing challenges.

One of the biggest challenges for businesses looking at the green transition in an uncertain future is knowing where to prioritize investment, especially working out what is “urgent,” as well as “important.” Our second article offers a valuable new angle on how to adapt traditional scenario-based strategic planning to help leaders make the right decisions in this difficult space.

Next, we focus on one of the most important levers for transformation to meet the twin goals of sustainability and customer-centricity in a digitalized world: data sharing. Data sharing across ecosystems is increasingly essential for the future, and the energy industry is starting to provide valuable lessons on how to overcome obstacles.



Start-ups are the cradle of innovation, and the recent investment winter has been a concern for many. However, it also provides an opportunity – some would say long overdue – for start-ups and investors to focus better on creating world-class businesses, rather than just chasing topline growth. Our fourth article looks at lessons on how to create a unicorn in the current, more sober, investment climate.

In our final two articles, we go back to our innovation roots. First, we offer new thinking on the latest techniques to improve technology forecasting in today's accelerating world, and second, we show what it really takes to do breakthrough innovation in large companies that manufacture complex, high-value products and systems – and it's not as simple as just setting up a separate breakthrough team...

Finally, we are delighted to bring you another personal CEO interview. In this edition, Andreas Matthä, the CEO of the Austrian Railways (ÖBB), shares his valuable insights on leading the organization and the future of European mobility.

We hope you enjoy the issue. Feel free to let us know what you think!



**Rick Eagar**  
Chief Editor, Prism  
Arthur D. Little





**EMBRACING  
UNCERTAINTY, DRIVING  
GROWTH – WHAT CEOs  
REALLY THINK ABOUT  
CURRENT CHALLENGES**



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Francesco Marsella, Ralf Baron, Petter Kilefors, Barnik Maitra,  
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***A crisis is an opportunity riding a dangerous wind, according to a Chinese proverb – and the world is currently beset with crises. The global pandemic, climate change, and unprecedented geopolitical volatility have provided a wake-up call to all organizations, bringing a long-lasting era of worldwide economic growth to a close.***

In turbulent times, business-as-usual and autopilot strategies are doomed to fail, which means CEOs and executive boards must respond quickly with new strategies and actions to keep their companies afloat and growing. They need to ride the dangerous wind and reap the opportunities.

What are they focusing on, and how do they feel about the current times? To find out, we at Arthur D. Little (ADL) have explored through in-depth research how CEOs in the largest, USD 1 billion+ revenue companies across the globe are coping with this extraordinary combination of challenges.

Many of the findings of the ADL 2023 CEO Insights study were unexpected, surprising, and even counterintuitive, particularly compared to other recent research. Despite current challenges, most CEOs we spoke to are optimistic for the future, with nearly two-thirds expecting a stable or positive global economic outlook in the next three to five years.

This disparity is due to the unique sample of the ADL study – focused solely on the world’s largest, most global organizations employing tens of thousands of staff on average.

Essentially, rather than being beaten down by the range and depth of current challenges, these global CEOs see them as opportunities and are willing to invest and innovate to drive growth, particularly through technology, such as AI, automation, and robotics. With resilience forged during the pandemic, leaders are moving beyond organizational change to address new markets and products. They are focusing on sustainability as a competitive differentiator and building ambidextrous organizations.

Uncertainty is all around us – but fearless CEOs are taking advantage of it to shape a more positive future for their businesses and wider society.

Looking in-depth at the research, what lessons can we draw for all CEOs? And what is motivating them? Who are the winners and losers? Through AI-based analysis of their qualitative answers, this article explores what CEOs of the world’s largest companies are really thinking and feeling as they proactively engage with today’s pressing challenges.

**About ADL’s 2023 CEO Insights study**

- The global survey interviewed 246 CEOs from companies with revenue of more than USD 1 billion.
- Over half (55%) of participating CEOs led organizations with more than 10,000 employees.
- CEOs were equally distributed among organizations in six key industries (telecoms, energy & utilities, manufacturing, travel & transportation, healthcare, and financial services).
- To give a representative, truly global view, CEOs were based in Europe, Asia, the Middle East, Africa, and South and North America.



## THE RISE OF THE TIGER CEO – POSITIVE OUTLOOK, GROWING INVESTMENT

In times of crisis, CEOs can embrace one of two strategies. They can hunker down and focus on being defensive, cutting costs to protect their current position, or go on the offensive and take an aggressive approach, exploiting the opportunities that turmoil brings. Essentially, they can act as tigers or mice.

Our unique research finds that we are living in a world of tiger CEOs, who are leading our largest companies. The vast majority (63 percent) are positive and optimistic despite current challenges, and investing in growth, innovation, and entrepreneurship, driven by technology such as AI. (See Figure 1.) In addition, 41 percent say growth is essential to the long-term health of the organization.

Furthermore, our global consulting projects show that senior executives are becoming personally involved in the paradigmatic shift currently happening in many of our core industries. For example, mobility and energy are driving decarbonization, telecom companies are delivering higher-quality connectivity, and financial and healthcare organizations are fully embracing digitalization. It is encouraging to see that most CEOs of the largest companies are focusing on forward-looking activities rather than remaining in defensive mode.

This optimism is further demonstrated by investment plans, as shown

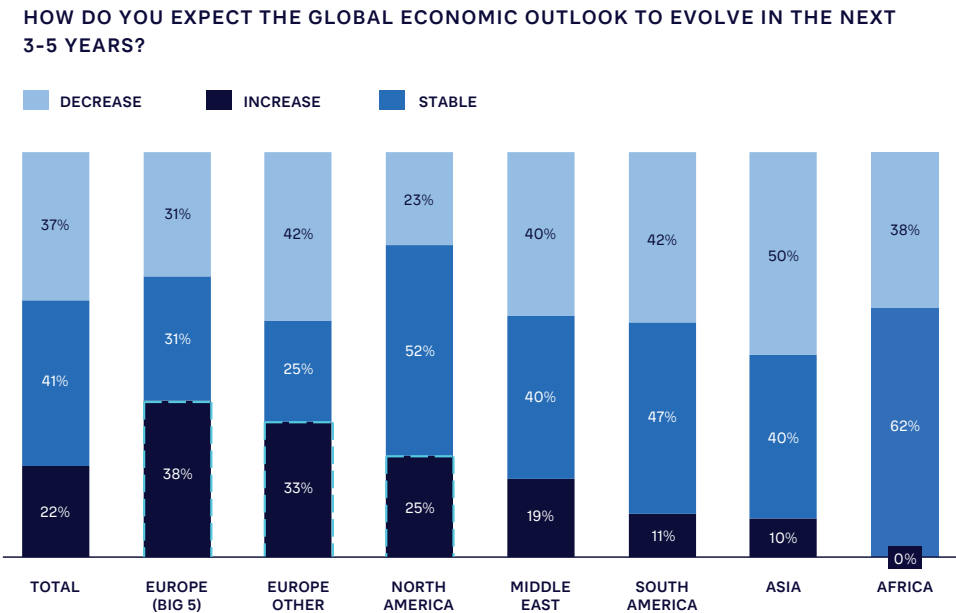


FIGURE 1: CEO VIEWS ON GLOBAL ECONOMIC OUTLOOK

in Figure 2. Nearly 30 percent plan to grow faster than the market, around three-quarters of whom will increase their investment in growth. Showing the widespread commitment to expansion, 40 percent of CEOs who are planning cautious growth are nevertheless increasing their growth investment, with 55 percent keeping it constant. Even the one in five CEOs planning a defensive approach expect to invest more relative to the last three years. Given the rising cost of borrowing, this counter-cyclical investment trend reaffirms the focus on growth.

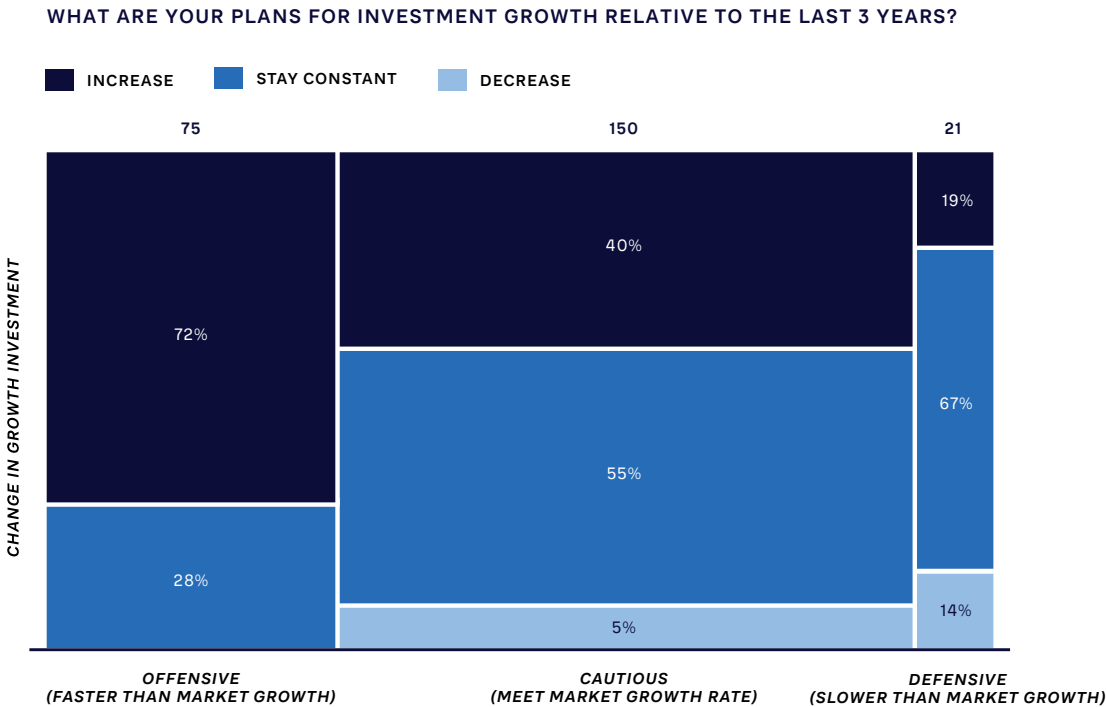


FIGURE 2: GROWTH AMBITIONS AND CHANGE IN INVESTMENT LEVELS

RENEWED FOCUS ON GROWTH AND INNOVATION AS DRIVERS

Half of CEOs are planning to enter fresh geographies over the next three years – an increase of 30 percent over the past period. Nearly one-quarter (23 percent) more are decreasing their focus on their core business to free up time and resources to concentrate on the new. Globally, over one-quarter (26%) list technology innovation as the most critical factor to growth, well ahead of raw material/energy prices (11 percent).

CEOs are moving beyond digitalization and integrating AI, automation and robotics into their strategy, as shown in Figure 3. They are also monitoring new innovations, such as the metaverse and virtual reality, as potential drivers of growth.



ADL experience supports this trend. AI applications have achieved mass-market penetration – for example, they are underpinning new modes and means of transportation, better access to mobility systems, new and bidirectional energy management systems, and automation and autonomy enabled by new telco connectivity systems. All of this will lead to progressive and radical changes to economies and societies, and CEOs are focused on understanding and acting on the implications of technology breakthroughs.

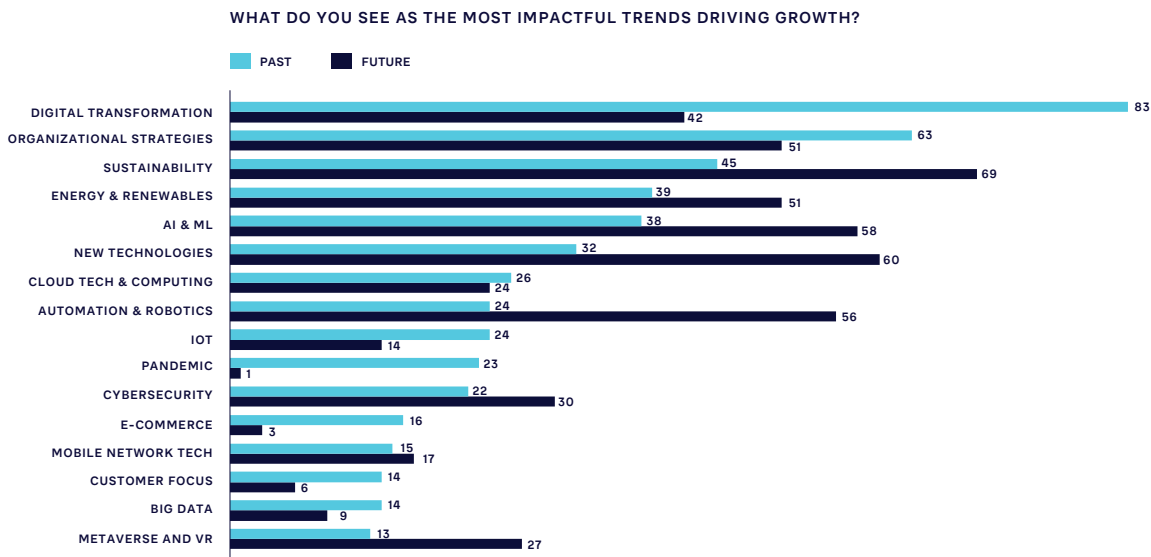


FIGURE 3: MOST IMPACTFUL TRENDS DRIVING GROWTH – PAST VERSUS FUTURE

BECOMING AMBIDEXTROUS,  
COMBINING INNOVATION AND  
EFFICIENCY

This growth focus is not at the expense of operational efficiency. An unchanged number of global CEOs (34 percent) continue to see cost optimization as a priority, creating ambidextrous organizations that combine innovation and efficiency.

Examples from the travel & transportation industry demonstrate this focus on ambidexterity. The COVID-19 crisis pushed airlines and airports into large-scale efficiency programs to achieve major cost reductions, which impacted thousands of jobs. However, at the same time, these companies are forming new partnerships to offer new services to passengers, such as combined intermodal mobility offerings (bringing together aircraft, rail, and mobility-on-demand services).

## **BUILDING ON POSITIVE CHANGES FROM THE PANDEMIC**

Why do they feel able to pursue growth? A big factor is the transformation already brought about by the pandemic, which has created new organizational structures, skills, and capabilities. Reorganizations are no longer on the agenda, with no less than 91 percent of global CEOs feeling that their current organization is good enough to deliver on their changing business priorities.

## **ESG IS FINALLY BECOMING CORE**

Sustainability is a final area seeing a transformation in its strategic importance. The vast majority of CEOs (80 percent) now view environment, social, and governance (ESG) as a source of competitive advantage, with 41 percent now making it more of a priority than other initiatives. Two-thirds (67 percent) reference consumer pull as a further reason for ESG strategies, the same percentage as those who pick compliance as a driver.

## **WINNERS AND LOSERS**

Clearly the top-line findings obscure some differences between regions and industries. In the Big Five economies of Europe (Germany, France, the UK, Italy, and Spain), 38 percent expect positive global growth, perhaps surprisingly well ahead of North America (25 percent) and Asia (10 percent). In terms of industries, 60 percent of carbon-intensive manufacturing companies see sustainability as a higher priority, compared to just 28 percent of healthcare companies. Financial services is the most pessimistic sector, with 58 percent of CEOs expecting the global economic attitude to evolve negatively over the next three years.

Overall, the quantitative picture shows CEOs of the world's largest companies engaging with today's challenges and looking to seize the opportunities they bring. This is an interesting contrast to CEOs of smaller, more national/regional organizations, who, based on other research, seem to have a less positive outlook. For a more detailed breakdown of the results, visit the ADL website to download the full report.

## **TECHNOLOGY AND STRATEGY ARE STILL AT THE HEART OF CEO RESPONSES TO VOLATILITY**

Uniquely, the research aims to understand what is driving how global CEOs of USD 1 billion+ companies think and feel by directly listening to what they are telling us. Diving deeper into the findings, we used AI to help analyze and categorize the qualitative responses of the 246 CEOs. By using a clustering algorithm to group words referring to the same concept and then applying topic analysis and a network diagram algorithm, we were able to depict relationships between terms and



topics. From this we have created graphical network representations of CEO answers, highlighting the most frequent topics and word associations covered by responses around the topic of how to deal with volatility.

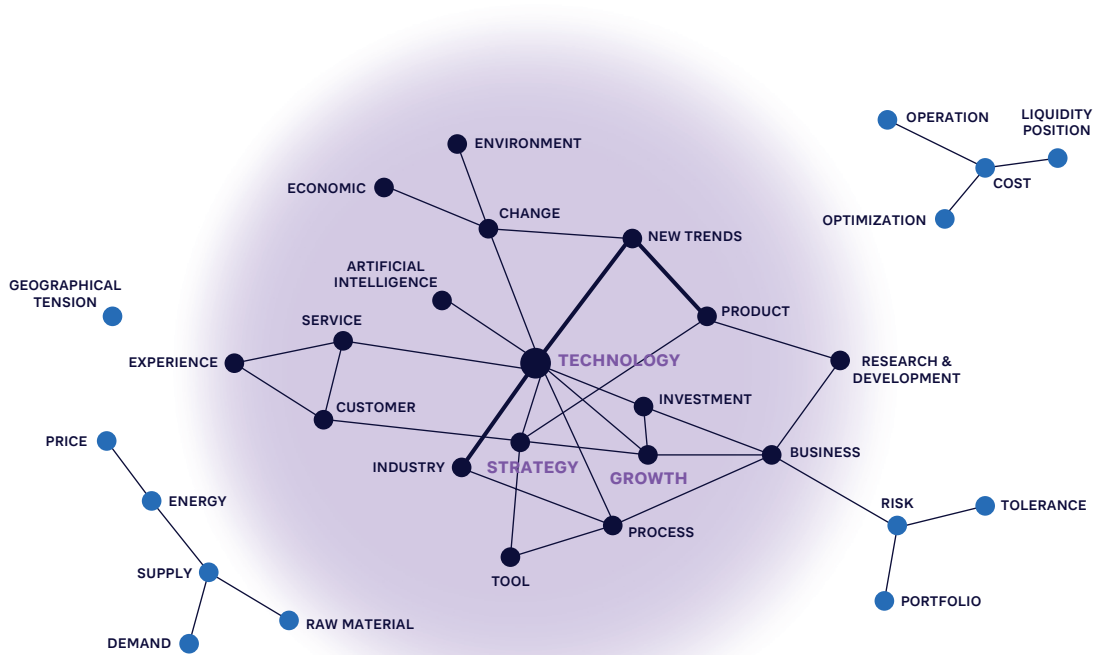


FIGURE 4: HOW WILL YOUR COMPANY DEAL WITH MARKET VOLATILITY?

The responses at the center of the network diagram, with the greatest prevalence, recur most often. The nodes on the edges are less relevant, but still present. Thick lines represent words and concepts that are strongly bonded. Altogether, the results show that technology and strategy are at the heart of how CEOs are responding to volatility and driving growth. This underpins both cost optimization and growth.

OPTIMIZATION

Technology enables organizations to optimize operations and costs, such as through AI, automation, and analytics. For example, better visibility across the supply chain provides early warning of disruption. Global CEOs are therefore putting in place the technology and capabilities to manage volatility, such as through dedicated, skilled teams focused on key areas. They understand that the pace of change is accelerating with technology, which means they need to fill capability gaps through training, recruitment, or acquisition.

*“We found that we were lacking in strategy formation for market volatility; therefore, we established a team of skilled and high-quality people to manage our strategies, as well as incorporating cutting-edge technology into our process to deliver excellent service to our customers for growth.”* **CEO, Telecommunications**

*“We are using advanced technology to resolve issues in advance so that we have real-time supply chain visibility and can run our business more smoothly.”* **CEO, Travel & Transportation**

*“We need to upgrade capabilities faster than previously assumed. There will be an urgent need, for instance, for advanced digital-marketing capabilities, outpatient and at-home solutions, and effective, compliant ways to engage patients directly. We may want to target deals for digital, analytics, and healthcare-technology talent; given economic pressures across all industries just now, it may actually be easier to attract and successfully pursue acquisitions.”* **CEO, Healthcare**

GROWTH

Changes in the economic outlook are dramatically altering the competitive environment and behavior of customers. CEOs recognize that this volatility also provides opportunities for growth – but

**TECHNOLOGY INCLUDING AI UNDERPINS INNOVATION, ENABLING ORGANIZATIONS TO CREATE NEW PRODUCTS AND SERVICES WHILE HELPING THEM TO COPE WITH NEW EVENTS.**

only through transformation and innovation. Technology including AI underpins innovation, enabling organizations to create new products and services while helping them to cope with new events, such as around raw material shortages or rising energy prices. CEOs understand

the importance of agility in seizing opportunities and reacting to events that are difficult to predict.

*“We faced market volatility after the pandemic. Due to that, we made changes in our working process and strategies, leading to much better and advanced usage of tools and technologies. In our business, it is important to use cutting-edge technology to increase industry growth as well as profits.”* **CEO, Healthcare**

*“Typically, market volatility is a complex component that is challenging to control. We are continually preparing, planning, and integrating new technology and trends in order to minimize the effect of market volatility.”* **CEO, Travel & Transportation**

*“Despite challenging business conditions, we were still able to achieve dramatic growth. Our global efforts to reduce costs meant we achieved our goals three years ahead of schedule. Now we are prepared to handle all the uncertainties that may arise.”* **CEO, Healthcare**



SECONDARY FOCUS AREAS

Moving toward the edge of the network diagram, our analysis highlights four secondary focus areas revealed by CEOs:

- 1. **Cost optimization** – through a global approach to managing costs and supply chains, with careful use of M&A to reduce costs
- 2. **Decision-making** – taking a proactive approach without being deflected from long-term goals

*“Letting short-term anxieties trigger your investment decisions may prove costly. Being comfortable with your plans and your portfolio is important.”* **CEO, Manufacturing**

- 3. **Managing liquidity** – cashflow is king at times of increased volatility, requiring greater oversight and caution

*“Looking at the current situation, we have become more cautious in the context of the liquidity position of the organization.”* **CEO, Financial Services**

- 4. **Focusing on the customer** – delivering a superior customer experience is critical to retaining business and minimizing the impact of volatility

*“We started assisting the business where it might bring in more money by offering an unrivaled customer experience and pricing models.”* **CEO, Telecommunications**

STRATEGY AND LEADERSHIP STYLE – EMBRACING DIVERSITY AND FOCUSING ON ACCESS TO TALENT

As we’ve detailed above, CEOs see growth and diversification as central to reaching their business goals. Achieving this starts with people, and, as during the pandemic, CEOs recognize the importance

of communication – sharing their goals across the organization to increase productivity, while at the same time, investing in employee development.

**CEOS SEE GROWTH AND DIVERSIFICATION AS CENTRAL TO REACHING THEIR BUSINESS GOALS.**

This requires changes in leadership styles to embrace diversity, different experiences, and new ways of thinking. It involves greater openness and listening to employees at all levels, while continually enhancing their skills.

*“We consider diversity one of the strategies that are directly linked to business growth, and believe that it is critical to incorporate diverse viewpoints from our employees who have diverse mind-sets and ideas.”* **CEO, Financial Services**

*“We have followed a leadership style where we focused on improving our employees’ productivity and efficiency, whereas we should also be focused on enhancing their learning skills and their ideas for the organization’s growth.”* **CEO, Energy & Utilities**

Given the focus on talent, a concern is access to the right skills. CEOs struggle to organically attract new capabilities, and are focused on acquiring them via headhunters, corporate venture capital, or direct acquisition. Under one-quarter (21 percent) of key employees are developed internally, with headhunters the favored option for 29 percent of companies. CEOs understand that a greater focus on diversity, equity, and inclusion (DEI) will help attract and retain talent over the long term, potentially requiring cultural change across the organization.

*“We are transforming our services through technological innovation, and for competitive advantage, we are increasing the participation of women in our organization.”* **CEO, Financial Services**

**ADVICE FOR THE NEXT GENERATION –  
EXPLORE, ALLOW FAILURE, BALANCE  
WORK AND LIFE**

We asked our CEOs what message they would lesson and legacy they would pass on to future CEOs and senior managers to help them better inform their actions and leadership styles. Responses focus around three key areas – always exploring, not fearing failure, and finding a strong work/life balance.

**BE OPEN TO THE NEW**

Across the board, CEOs urge the younger generation to keep learning, exploring new ways of working and embracing new technologies. Only by continually moving forward and following their passions will they bring about necessary changes. New technologies create new ways of solving problems – simply applying existing methods will not be enough.

*“For the youngster, I would advise them to continuously try to learn and explore new things to identify their interests, and always keep their passion first.”* **CEO, Financial Services**

*“I would encourage them to always read about the latest technologies that will be available, and to always aim to learn new skills that are relevant to their interests.”* **CEO, Energy & Utilities**

## FAILURE AS A POSITIVE

Multiple CEOs stress that failure is crucial to reaching success, teaching important lessons for life and work as people learn from their mistakes.

*"On the path to success, understand that failure is important. Do not get disappointed with any failures, and accept it as a step closer to your goals."* **CEO, Telecommunications**

## BALANCING WORK AND HOME LIFE

Demonstrating a relatively recent cultural change, CEOs underline the importance of achieving work/life balance, for both those in younger generations and current leaders. When asked what they do to relax, over three-quarters (77 percent) of CEOs say spending time with their family, alongside reading (81 percent), meditation (55 percent), and exercise, both running and in the gym.

*"My key message would be to prioritize your health above all. A healthy life will enable you to accomplish much and achieve more."*

**CEO, Healthcare**

*"I would advise not only young people, but everyone, to slow down and cherish the little things in life."* **CEO, Financial Services**



# INSIGHTS FOR THE EXECUTIVE

Our unique research demonstrates that CEOs of the world’s largest companies are focusing on the positives in the current business environment, building their strategies and embracing 10 imperatives to drive competitiveness, which are organized into five key groups:

## BUILD A NEW FUTURE FOR THE COMPANY

- (1) **Pursue a growth-oriented strategy.** Seize today’s unique opportunities for expansion and diversification through a growth-oriented strategy.
- (2) **Engage proactively with government stakeholders.** Governments are restructuring regulations to respond to societal crises. Companies must engage to shape policy and regulation, particularly around decarbonization and sustainability.

## LEAD AN AMBIDEXTROUS AGENDA

- (3) **Balance resource allocation between optimization and growth/renewal priorities.** Ensure adequate budget and, more importantly, leadership bandwidth to strike the right balance between innovation and optimization initiatives.
- (4) **Develop programmatic M&A as a strategic lever.** While continuing to focus heavily on existing customers, CEOs should use the current drop in asset prices to launch programmatic M&A initiatives supported by thoughtful integration capabilities.

## SHAPE THE ORGANIZATION

- (5) **Fill capability gaps.** Proactively seek out and develop the right talents and focus on encouraging greater organizational diversity to match changing business and customer needs.
- (6) **Build organizational agility.** Strive to break down silos, encourage cross-functional teaming and collaboration, and enable more risk-taking and innovation.

## LEVERAGE TECHNOLOGY

- (7) **Build a comprehensive technology transformation agenda.** Move beyond process digitization and embrace newer technologies such as AI, robotics, and the Metaverse.
- (8) **Invest in scaling technology usage.** Fully embed new technology in business models to drive full value realization. Consider measuring return on investment in technology (RoIT) and incorporating this into company and employee dashboards.

## MOVE ESG TO THE CORE

**(9) Move from intent to action on ESG.** Put sustainability at the core of business models and engage with customers, suppliers, and regulators. Create a culture of positive ESG actions in the company.

**(10) Craft and execute bold ESG bets.** ESG could be a source of future business model differentiation. Make bold ESG bets such as divesting carbon-intensive operations, investing in new technologies (such as carbon capture and storage), and creating an end-to-end green business model.





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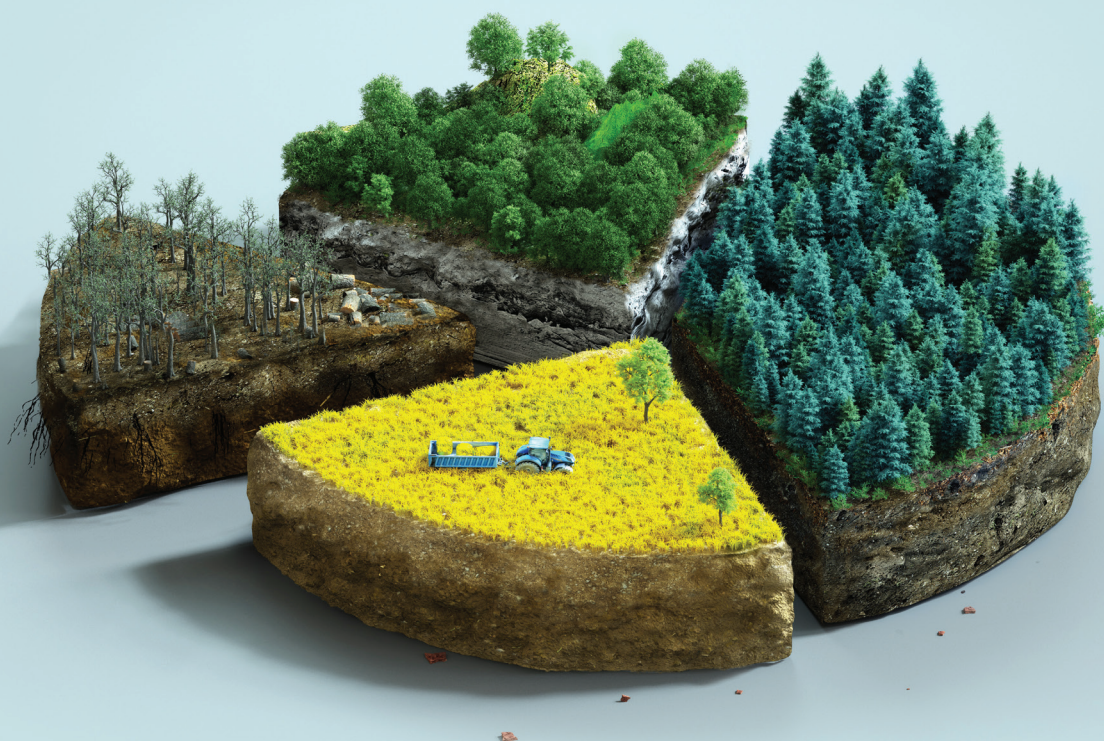
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# **NAVIGATING THE SUSTAINABILITY JOURNEY**



**– A NEW SCENARIO-BASED  
APPROACH TO  
DECISION-MAKING**

## AUTHORS

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Dr. Michael Kolk, Martijn Eikelenboom, Lina Lukoseviciute,  
Johan Treutiger

**Sustainability is one of the few topics that is high on the agenda across all companies, sectors, and countries. Eighty percent of companies in a recent global ADL study<sup>1</sup> had a sustainability strategy in place, and a further 12 percent were developing one.**

Ninety-nine percent of CEOs surveyed by the United Nations said it was important for their business. However, recent economic developments, the COVID-19 pandemic, supply chain disruptions, and the energy crisis have all made it difficult for companies and consumers to prioritize sustainability. In addition, recognizing something as very important does not automatically drive urgent action. In a complex world with multiple players, understanding what to do NOW is not straightforward, particularly as regulations, technology, standards and expectations are still developing or uncertain. For example, just 18 percent of CEOs in the United Nations' study<sup>2</sup> felt that governments and policymakers had given them the clarity needed to meet their sustainability goals.

All of this means that companies, especially those operating globally, struggle to reach consensus among key stakeholders on what is important and what requires urgent investment to ensure business continuity and capture strategic opportunities. How can CEOs understand what are the most important and urgent actions and "no regret" decisions to take now, irrespective of what will change in the future?

As this article explains and illustrates, one answer is to adopt updated, more data-driven, scenario-based planning methodologies, focusing on complex local and international sustainability factors and their interdependencies (such as technology developments, local and international legislation, or NGO pressure). These give the clarity and confidence business leaders need to take the right short-term decisions, without jeopardizing their mid- to long-term sustainability journey.



# THE DIFFICULTY OF MAKING SUSTAINABILITY-BASED STRATEGIC CHOICES

While the vast majority of larger companies state that they have a sustainability strategy, far fewer position it as part of the core of their strategy that guides actual investment decisions. Often, change only happens when market and regulatory pressure delivers a “burning platform” moment, such as in the automotive sector, which faces bans on the sale of new internal combustion engine (ICE) vehicles in many countries, beginning in Norway in 2025.

This opens incumbents to the risk of challenges from new, sustainability-first competitors, or even of being driven out of business altogether. For example, Volvo Cars’ former CEO, Håkan Samuelsson, stated in October 2014 that fully electric cars were “not something we believe in.” Less than seven years later, in March 2021, Samuelsson announced that Volvo Cars would only sell electric cars by 2030, significantly behind first mover Tesla.

Aside from current economic and geopolitical turmoil, a range of factors act as obstacles to progress on sustainability. (See Figure 1.) These include:

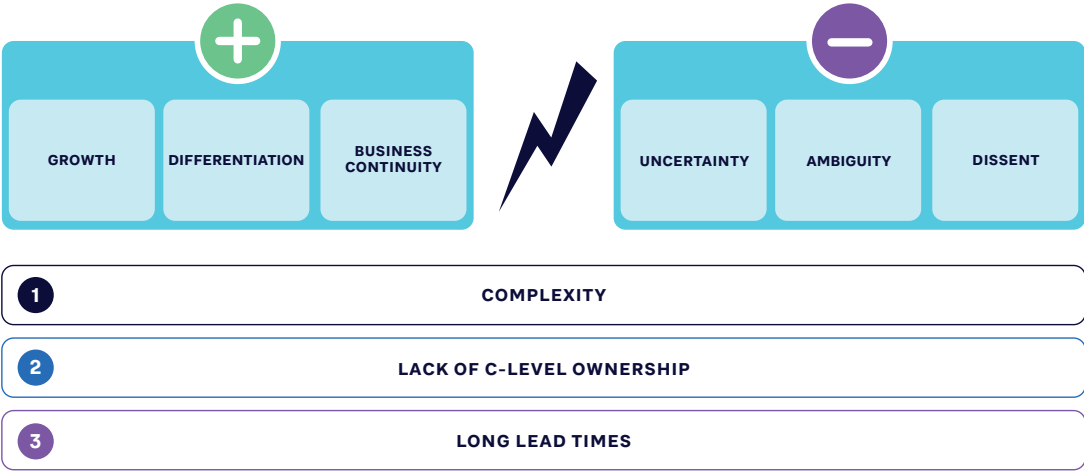


FIGURE 1: WHAT MAKES DECISION-MAKING IN SUSTAINABILITY-DRIVEN TRANSFORMATION DIFFICULT?

1. **Complexity:** There are generally very good reasons to “go green”: it can serve as a new growth engine, help differentiate your products, and even be critical for the longer-term survival of the company. However, individual business cases for green initiatives, such as to start a large R&D program, acquire a greener technology, or build a new plant, can be fraught with uncertainty. (For example, will new technology around carbon capture really take off, and can we access enough green raw material at the right price?) Ambiguity can further confuse the case for change: will customers really be paying a green premium, and are we even clear on what we regard as

“sustainable”? To make matters worse, there is often a great deal of dissent between internal stakeholders. Some may question the projected pace of change in consumer preferences, or of political willingness to move ahead as economic concerns grow. Others may see proposed green investments as a threat to their own business.

2. **Lack of C-level ownership:** As any CEO can attest, it is not easy to drive change that truly “moves the needle” in large companies. Innovative products can be launched, and new technologies and ways of working implemented, but without executive decision-making and follow-up, a company will remain largely the same tomorrow as it was yesterday. This is why company-critical issues are generally owned by C-suite executives: CEO, CFO, COO, and so on. It is therefore surprising that few companies have a chief

sustainability officer or comparable role represented in the boardroom, someone who brings understanding across functional domains and the authority to act across organizational departments. We believe this is a real problem for many companies. It is made clear from the authoritative reports on sustainability

(such as those from the International Energy Agency [IEA] and the Intergovernmental Panel on Climate Change [IPCC]) that the world and the business environment will be turned upside down for most industry sectors, and company transformation will need to accelerate significantly. Making the right far-reaching decisions in a highly complicated and dynamic environment is often fiendishly difficult, but in most companies, the accountability for informed decision-making around sustainability is scattered at best.

3. **Long lead times:** While most business leaders today would agree that sustainability trends are accelerating, they could still take a long time to become truly inescapable. Decarbonizing and circularizing entire supply chains, particularly in globalized industries, is an extremely complex process that will take many years, if not decades. Developing new technologies to the required robustness and economic viability is similarly time consuming, as development of fuel cells, for instance, clearly shows. All this in itself would not be such a problem if not for the fact that most companies are only good at making decisions whose “time to business impact” runs in years, not a decade or more. It takes a high degree of conviction and stakeholder alignment to make far-reaching decisions that will solve issues that have yet to fully materialize and will take many years before fully paying off. As a result, such decisions are all too often postponed or watered down. They are strategically important, but not seen as urgent.

***THERE ARE GENERALLY VERY GOOD REASONS TO “GO GREEN”: IT CAN SERVE AS A NEW GROWTH ENGINE, HELP DIFFERENTIATE YOUR PRODUCTS, AND EVEN BE CRITICAL FOR THE LONGER-TERM SURVIVAL OF THE COMPANY.***

Clearly, companies need to find new ways to address and overcome these challenges if they are to both hit medium- to long-term sustainability targets and ensure competitiveness as they move forward.

## A NEW APPROACH TO SCENARIO-BASED PLANNING FOR SUSTAINABILITY

Scenario-based thinking and planning have been proven approaches for many decades to manage uncertainties and understand trade-offs. Through detailed research, they aim to provide a range of realistic, coherent possible future scenarios based on available information, and then use this to drive more informed decision-making. They enable organizations to monitor, plan and shape their potential futures, providing actionable insights and timelines for the speed and depth of change.

However, traditional scenario planning has its limitations. Often, it remains solely a research exercise that is not then turned into action. If it is used, general business planning typically picks the mid-case for decision-making and budgeting and ignores the other findings.

Working with clients, ADL has successfully trialed a new approach that builds on conventional scenario development approaches, but is tailored to the specific requirements around sustainability decision-making.

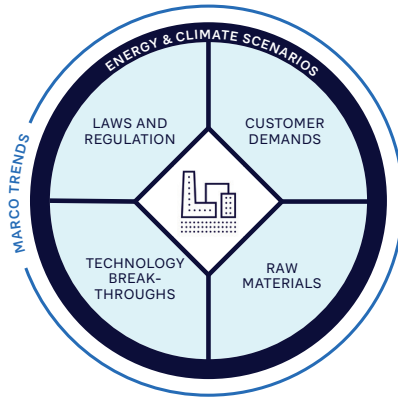
As shown in Figure 2, the sustainability scenario approach differs from others primarily in its focus on **understanding the implications of sustainability drivers for management decision-making at a much more granular business portfolio/regional level, including the question of timing and urgency.**

SCENARIO TIME HORIZONS	GREATER DETAIL DEVELOPED FOR SCENARIOS AT <b>RELEVANT TIME HORIZONS FOR STRATEGIC PLANNING</b> , E.G., 5–10 YEARS RATHER THAN 10–20 YEARS
IMPACTS	ASSESSED AT A MORE GRANULAR <b>BUSINESS PORTFOLIO/ PRODUCT SEGMENT/REGIONAL LEVEL</b> , RATHER THAN ONLY AT AN OVERALL STRATEGIC LEVEL
URGENCY	SPECIFICALLY ADDRESSED FOR EACH STRATEGIC RESPONSE BY CONSIDERING RELATIVELY <b>PREDICTABLE FACTORS</b> (SUCH AS NEW LEGISLATION), AS WELL AS THE CONSEQUENCES OF “ <b>DO NOTHING</b> ”
DECISION-MAKING	DISCRETE DECISIONS RECOMMENDED, INCLUDING SCENARIO-INDEPENDENT “ <b>NO-REGRET</b> ” ACTIONS, AS WELL AS <b>EVENT-DEPENDENT DECISIONS</b> TO BE MADE IN THE FUTURE

FIGURE 2: HOW THE SUSTAINABILITY SCENARIO APPROACH DIFFERS FROM CONVENTIONAL SCENARIO PLANNING

The approach involves four main stages, as shown in Figure 3.

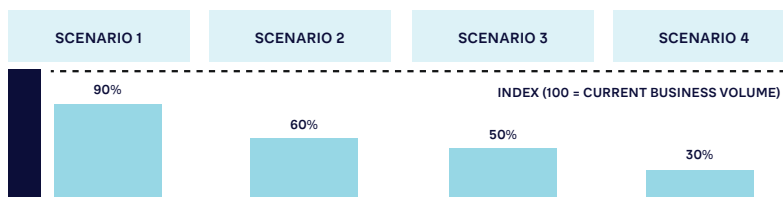
## 1. SUSTAINABILITY SCENARIOS



## 2. COMPETITIVE POSITION

Industry X		Competitive Position			
Business Segment		Technical Performance	Cost	Carbon Footprint	Circularity
1.	Boating				
2.	Recreable				
3.	Interior Tiles				
4.	Exterior Tiles				
Cost		On Par	Significantly Higher		

### 3. SCENARIO IMPACT (2035)



#### 4. NO-REGRET DECISIONS

PURCHASING/SOURCING	BUY	MAKE	PARTNER	
ASSETS/OPERATIONS	EXPAND	CLOSE	REFURBISH	
PORTFOLIO	DIFFERENTIATE	FIX	EXIT	EXPLOIT
R&D	ACQUIRE	PARTNER	DEVELOP	
ORGANIZATION	GOVERNANCE	IT	LEGAL	

**FIGURE 3: THE APPROACH, FROM SCENARIOS TO BUSINESS IMPACT TO DECISION-MAKING (ILLUSTRATIVE EXAMPLES)**



## 1. SUSTAINABILITY SCENARIOS

The most important requirement in scenario development is for scenarios to be individually meaningful and plausible, as well as collectively exhaustive. Meaningfulness and plausibility can be achieved by starting from wider macro trends (such as global demographics) using reputable sources such as the World Bank and the United Nations. Within those “macro-constraints,” we can then position the wider energy and climate scenarios (such as around the use of renewables and stated government goals) as produced by the IEA and IPCC.

We then consider all sustainability factors and trends that impact specific industry scenarios across different end markets and regions, such as regulation, customer demand, technology breakthroughs, and the availability of required sustainable materials, which is

***THE MOST IMPORTANT REQUIREMENT IN SCENARIO DEVELOPMENT IS FOR SCENARIOS TO BE INDIVIDUALLY MEANINGFUL AND PLAUSIBLE, AS WELL AS COLLECTIVELY EXHAUSTIVE.***

increasingly becoming critical. These factors need to be characterized by defining what might be their credible extreme projections within a relevant, realistic timeframe, such as from today to 2035. For example, costs of CO2 emissions could rise well above today’s levels,

but the EIA regards it as unlikely that they will structurally exceed USD 160–170/t by 2035. Similarly, we might expect economically viable breakthrough technologies to emerge, but wide application may still be constrained by economic limitations.

One always-present scenario that deserves specific attention represents continuation of today’s situation (called “Scenario 1” in Figure 3). The point here is that even if sustainability trends stall over the coming years, the world will experience continued and worsening reminders of the importance of fighting climate change. In our view, this means whatever urgency is allocated to sustainability by governments and the market today, the world of tomorrow (for example, by 2035) is bound to be meaningfully different from today from a sustainability perspective, regardless of the scenarios that may unfold. This is an important realization because it underlines that “doing nothing” is also a decision that may have significant consequences.

## 2. COMPETITIVE POSITION

Once sustainability scenarios have been created, they need to be applied across the company and its portfolio of products/markets. A baseline competitiveness assessment evaluates how products and other offerings currently compare to those of competitors in a company’s key business segments. These are evaluated along three axes: cost, technical performance, and sustainability performance, which, in the client example in Figure 3, is broken down into carbon

footprint and circularity performance. This ensures that fact-based and commonly agreed competitive product advantages are considered throughout the analysis and the economic consequences of sustainability actions are transparently considered.

3. SCENARIO IMPACT

Once the sustainability scenarios are defined and described in detail and the company’s current competitive position is known, the impact of each scenario on the relevant product and market segments can be assessed, and even quantitatively estimated. Depending also on the region where a certain product category is sold, the “greenness” of a scenario will change the buying criteria in a market and, hence, determine whether it will win or lose against competing products and potential alternative solutions. For example, a technically superior but fossil-based light-weighting solution in the automotive market may benefit from accelerated penetration of electric vehicles (where weight contribution is especially important), but only in regions where its relatively high carbon footprint is not excessively penalized by either regulators or consumers. Where this is the case, that same product may lose against alternatives made from biomass. Taking the analysis to this level of granularity is key to gauge the real impact of tightening sustainability concerns on margins and market shares.

4. NO-REGRET DECISIONS

Based on this detailed assessment of potential impacts, we can identify decisions that would have positive outcomes regardless of how future events unfolded. Every product group and segment may require highly specific actions, but a handful of decision types

generally emerge if we roll up the scenario impacts across the entire business: such as acquiring more sustainable raw materials and components, making changes to the company’s physical (production) assets, modifying its business portfolio (such as by exiting certain segments), starting new R&D programs, and improving supporting

**BASED ON THIS DETAILED ASSESSMENT OF POTENTIAL IMPACTS, WE CAN IDENTIFY DECISIONS THAT WOULD HAVE POSITIVE OUTCOMES REGARDLESS OF HOW FUTURE EVENTS UNFOLDED.**

competencies and ways of working in the organization. This allows companies to focus on the few “must-win battles” that apply in each scenario, and be clear on which of those require urgent and specific action (how much and what sustainable materials to source by when, for example, or the specific economic context for a new recycling technology to be developed). This clarity is needed to remove the complexity obstacles mentioned above.

Of course, more action is needed besides identifying urgent actions to take today. C-level ownership should be taken, not just for implementation of immediate actions, but certainly also for follow-up over longer periods of time. The higher degree of scenario definition and more precise understanding of which components will be most

important to the company's success help to define these longer-term actions. They make it possible to track just a handful of measurable and meaningful signpost indicators whose values can be used as early warning signals that something is about to happen, requiring urgent specific further action around which executives are already aligned today. Examples could be important regulatory changes on how the EU will deal with recycling and CO2 emissions, or changes in the market prices of green alternatives.

### **SUSTAINABILITY SCENARIO DEVELOPMENT AT A GLOBAL MANUFACTURING COMPANY**

Manufacturing industries are under increasing regulatory and customer pressure to transition from fossil-based manufacturing to safe and low carbon products that are fully circular. However, in complex, interrelated markets characterized by long-term, large-scale investment decisions, planning this transition is difficult. Working closely with a EUR5bn global manufacturing company, ADL used the sustainability scenario approach outlined in this article to identify, assess and optimize strategic choices around future sustainability-related investments and initiatives.

Together with a large, global, cross-functional team, ADL defined four sustainability scenarios whose characteristics and (future) business implications are now well understood by all stakeholders. Furthermore, around 20 “no regret” decisions were defined and budgeted for, which will deliver competitive advantage under any future scenario, covering “external” (such as sourcing and procurement and partnering). Additional “internal” initiatives were proposed, such as launching new R&D programs on recyclability, enhancing the company's digital infrastructure, and introducing new management KPIs and incentives. By using the approach, the company was able to develop a coherent, practical and evidence-based set of strategic decisions to help realize their sustainability transition goals.

## INSIGHTS FOR THE EXECUTIVE – PUTTING SCENARIOS AT THE HEART OF SUSTAINABILITY PLANNING

For executives to have the confidence needed to take the right decisions today that will not jeopardize the longer-term sustainability journey – and gain the consensus of key stakeholders – companies need to adopt a robust, scenario-based approach as outlined in this article. Postponing tough decisions, no matter how important for the company's future, can seem all too attractive in the face of acute economic challenges, especially given the byzantine workings around sustainability trends, opportunities and threats.

The only smart way for companies to move ahead is to boil all this down to urgent and no-regret actions to take at any given moment, starting from today:

- **Start off by defining commonly accepted principles and wisdom**, such as the scenarios developed by the IPCC. Agree on more qualitative assumptions based on experience and common sense.
- **Produce custom scenarios for your business**, using digital tools to analyze dependencies between factors or probabilities and analyzing impacts at the business portfolio and regional levels.
- **Involve all relevant business functions** (commercial, operations, R&D, finance, etc.) to achieve alignment.
- **Make all conclusions actionable**. Monitor, deep dive, and initiate with “if-not-now-then-when” timelines. Define practical signposts linked to key actions.
- **Automate signpost monitoring** wherever and to whatever degree possible, and report through customized management dashboards available by business function.
- **Create ownership at the right level**. Perhaps most importantly, ensure that findings, actions and future follow-up are all “owned” at the right organizational level. Especially in energy- and materials-intensive industry sectors, such ownership should include a (potentially dedicated) C-level executive.





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# HOW TO BUILD A UNICORN IN THE POST-PANDEMIC INFLATIONARY WORLD



## AUTHORS

Barnik Maitra, Andreas Schlosser, Alan Martinovich, Phil Webster, Amar Sinha, Pankaj Mann, Chirag Tibrewal, Abhishek Telang

**The global boom in start-up valuations has abruptly stopped. What felt like never-ending growth in venture capital and private equity investments that created a conveyor belt of new tech disruptors has been replaced by a landscape of failed initial public offerings (IPOs), dramatically lower valuations, and job cuts. Q3 2022 saw 37 new USD1bn+ valued tech unicorns created – a year earlier, the figure had been 165. Venture funding dropped by over 50 percent year-on-year. High-profile companies such as Paytm in India, Palantir in the US, and Klarna in Europe saw their share prices and valuations slide. Large investors such as Softbank and Tiger have lost billions on their portfolios.**

All of this has caused many to write off start-ups as a bubble that has well and truly burst, particularly in the context of the wider “tech winter,” which saw an estimated 150,000 US tech workers lose their jobs in 2022.

What does this mean for today’s start-ups, their investors, and corporates that want to tap into their innovation? At a time when disruptive new ideas are seen as vital to solving global megachallenges, does this spell the end of transformative advances and fresh business models? Are unicorns destined to return to being mythical?

The positive news is that, despite current market valuations, money is still being invested. However, what attracts venture capitalists has changed dramatically – no longer is it about “blitz scaling” to create first-mover advantage, an approach that resulted in significant cash burn and limited or no profits.

Instead, start-ups must focus on the bottom line and profitable unit economics, retain (rather than churn) customers, and look at where they site their operations to maximize efficiency. Based on ADL experience and discussions with venture capitalists and start-up CEOs from across the globe, this article explains the new formula for creating unicorns – and retaining that valuation post-IPO.

## DRIVING TOP-LINE GROWTH – THE FOCUS OF THE PREVIOUS DECADE

### THE MODEL FOR START-UP SUCCESS

The successful emergence of trillion-dollar tech companies such as Amazon, Google, and Meta created a template for start-ups looking to disrupt the status quo. These pioneers attracted enormous private and public capital to bring about transformative shifts in consumer behavior and challenged the industrial incumbents.

Following this model allowed the likes of Uber, Lyft, Grab, and Deliveroo to build completely new business models in traditional markets. Hungry investors provided capital at gravity-defying revenue multiples (20 to 30x), and saw their shares increase in value as new rounds of funding were raised. In this race to back the next big thing, investors started placing huge bets on promising start-ups, focusing on the disruptive potential of technology, online marketplaces, and

platforms. Global venture-capital investments grew from USD78bn in 2010 to USD643bn in 2021.

These investments were made against a backdrop of excess global liquidity and historically low interest rates. Alternative investment classes (such

***THE SUCCESSFUL EMERGENCE OF TRILLION-DOLLAR TECH COMPANIES SUCH AS AMAZON, GOOGLE, AND META CREATED A TEMPLATE FOR START-UPS LOOKING TO DISRUPT THE STATUS QUO.***

as real estate, commodities, gold, and treasury bills) underperformed, which meant cash-rich investors looking for high returns were willing to stomach extra risk in return for potentially outsized rewards when taking equity in start-ups.

### TAPPING INTO THE INVESTOR MIND-SET

In most cases the model for start-up success was seen as focusing solely on the top line or growth. The aim was to build a leadership position through customer acquisition, whatever that cost. As this investor mind-set began to dominate, start-ups focused on building businesses with top-line growth and paid minimal attention to the bottom line, which led to huge cash burn driven by high customer acquisition costs.

Valuations soared between funding rounds, which meant backers saw enormous (paper) gains from their investments.

The increased adoption of digital services due to COVID-19 lockdowns, as well as breakthrough innovations in areas such as healthcare, fintech, and electric vehicles, led to enormous investments, notably through blank-check special purpose acquisition companies (SPACs).

## THE SHIFT IN THE INVESTMENT MARKET

Given the combination of large valuations and perceived market interest, start-up investors across the world saw 2021–22 as the ideal time to get their investments listed and provide an attractive exit option. However, several high-profile failures demonstrated that the valuations they were looking for were not viable for institutional or retail investors. (See Figure 1.)

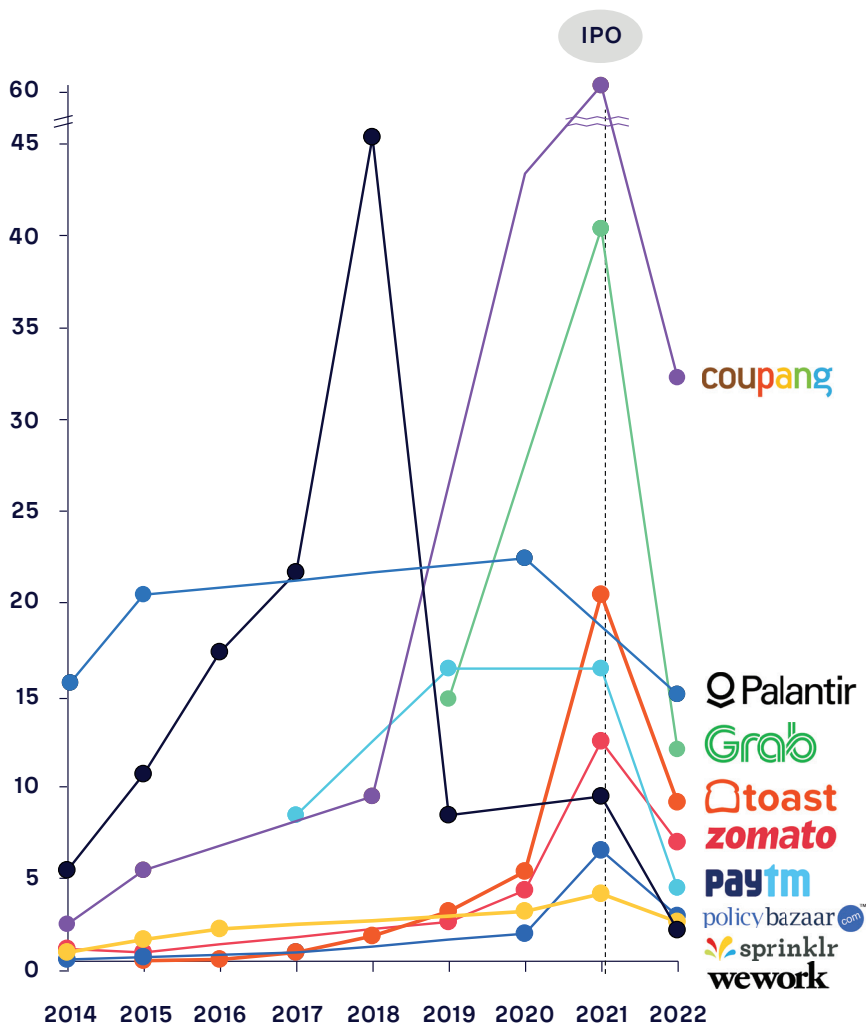


FIGURE 1: VALUATION FOR SELECTED COMPANIES AS PER ROUND OF FUNDING AND POST-IPO (USD BN)



For example, as of December 2022:

- Korean e-commerce company Coupang had a pre-IPO valuation of USD60 billion and traded at approximately USD32 billion.
- Office provider WeWork had a targeted market valuation of USD47 billion in 2019. It had a market capitalization of USD1.9 billion.
- Mobile payments provider Paytm had a USD16 billion pre-IPO valuation and traded at under USD7 billion.

**OVER 80 PERCENT OF THE COMPANIES THAT WENT PUBLIC THROUGH A SPAC BETWEEN 2020 AND 2021 NOW TRADE LOWER THAN THEIR INITIAL IPO PRICE.**

Other start-ups saw falls in value of between 50 and 70 percent in their first year of being listed. Several start-ups (including Indian e-pharmacy PharmEasy, Canadian e-commerce start-up Hubba, and Australian music streaming company Guvera) have put their plans on the backburner

as they could not guarantee high enough valuations. Over 80 percent of the companies that went public through a SPAC between 2020 and 2021 now trade lower than their initial IPO price.

While the IPO market provided early warning signals, the war in Ukraine and subsequent economic disruption deepened the crisis for start-ups and their investors. It has had multiple consequences:

- Rising interest rates, leading to higher borrowing cost
- Lower consumer spending in many categories due to high inflation and economic slowdowns
- A drop in public market valuation that eventually affects private markets. Because of the increased scrutiny of investors, organizations now require stronger financials than before in order to earn the same valuation
- Increased wariness from risk-averse investors about where they put their money, particularly as traditional investments in fixed income and commodities are delivering higher real returns

This funding winter means start-ups that previously could raise large sums are finding it increasingly difficult to maintain or grow their valuations. For example:

- The internal valuation of financial services firm Stripe dropped from USD95 billion in 2021 to USD74 billion in November 2022.
- Supermarket delivery start-up Instacart reduced its internal valuation in March 2022 by 38 percent, from USD39 billion to USD24 billion.

- Swedish “buy now, pay later” payments start-up Klarna Bank was valued at USD45 billion in June 2021, but in a round of financing in 2022, it secured funding that valued it at USD6.7 billion.

All of these factors mean investors are only willing to place bets on category leaders or start-ups with a highly defensible moat. They expect markets to sustain just a few players, forcing others to exit in the wake of competition and inability to keep up with the rapid change in technology and customer demand.

All of this has led to a shift in risk/reward thresholds (see Figure 2) and slowing of larger investments in favor of early-stage start-ups. Venture capital (VC) companies still spent USD81 billion in Q3 2022. However, how they assess start-ups has radically changed. The focus is not just on top-line growth, but also on businesses with a solid bottom line that could pass the IPO test that their peers have spectacularly failed in the recent past.

Start-ups are pivoting to react to these signals. Many have been taking huge steps toward ensuring profitability, such as through mass layoffs, reduction in customer acquisition costs, and shifting to venture debt funding to sustain the business.

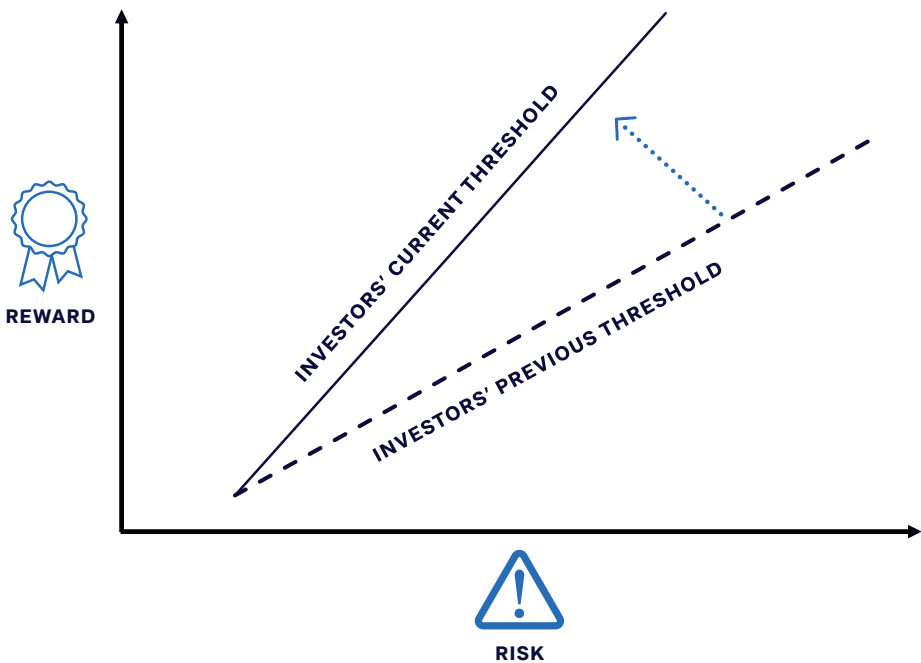


FIGURE 2: SHIFT IN INVESTORS' RISK-REWARD THRESHOLD

# INSIGHTS FOR THE EXECUTIVE – HOW TO BUILD UNICORNS IN THE NEW WORLD

Based on experience working with investors, start-ups, and the wider ecosystem, we see six key dimensions that founders and management teams need to focus on if they are to become unicorns in today’s changed environment. (See Figure 3.)

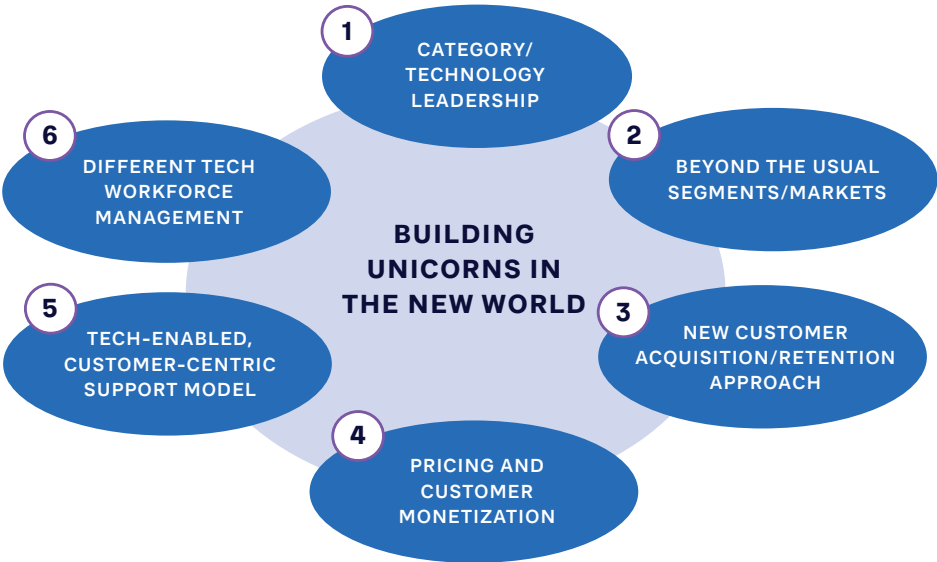


FIGURE 3: BUILDING UNICORNS IN THE NEW WORLD

## 1: AIM FOR CATEGORY OR TECHNOLOGY LEADERSHIP IN YOUR TARGET SEGMENT

Nowadays, product-market fit is not enough. Instead, customers and investors are looking for “insane product-market fit,” namely, 95 percent or more targeted customers should find the product or service offering compelling in comparison to alternatives available in the market. This will drive longer, deeper customer relationships, lower churn rates and net positive customer lifetime values.

On the operations side, businesses should look to build a more asset-light model with a quick path to profitability and capital efficiency. Unit economics are back in fashion and sustained profitable growth is greatly valued. Consequently, start-ups that can use this time to finesse their product and service and build lean, sustainable, and cost-effective business models will not just weather this prolonged winter, but eventually flourish and thrive.

*“We’re looking at disruptors who are using tech to disrupt the ecosystem, and are not just building a tech-based solution.” –*  
**Managing Partner at a global tech-focused VC**

## 2: LOOK BEYOND THE USUAL SEGMENTS AND MARKETS

The majority of start-ups begin their journey with pilots targeting specific, familiar markets – for example, B2C tier 1 cities and affluent consumers or B2B large corporates. This results in increasing hyper-competition between start-ups to grab wallet share of customers in these segments.

Yet multiple industries and customer segments remain underserved. Start-ups should therefore target these new addressable markets, such as tier-2 cities, SMEs, or areas such as ESG<sup>1</sup>.

*“Most of the companies in our portfolio are witnessing massive growth from tier-2 cities, showcasing the need to focus on such underserved market segments.” – Managing Partner, Amicus Capital*

## 3: TAKE A NEW APPROACH TO CUSTOMER ACQUISITION AND RETENTION

Rather than aiming to spend large marketing budgets to attract customers, start-ups need to adopt more targeted tactics. Spend is shifting from above-the-line activities such as advertising and sponsorship to below-the-line tactics with growing focus on referrals and word of mouth. Rather than employing glamorous celebrities as brand ambassadors, start-ups are working with lower-cost, more targeted social media influencers. Not only does this positively impact budgets, but it also is more trackable to ensure effectiveness.

Once customers are onboard, much greater emphasis should be placed on retention and upselling, rather than headline acquisition numbers. The focus for investors has now shifted toward metrics such as monthly active users (MAUs) and time spent per session, rather than, for example, app downloads.

*“The biggest challenge when you are small is the old saying—revenue is vanity, profit is sanity, cash is reality.” – Shauravi Malik, Co-founder, Slurrp Farm.*

## 4: FOCUS ON PRICING AND LONG-TERM MONETIZATION OF CUSTOMERS

Previously, many start-ups based their revenue models on “freemium” or ad-based approaches. Neither of these deliver the revenue certainty that investors are demanding – for example, economic conditions mean start-ups are finding it tougher to convert customers from free to premium packages once trial periods end. As the focus of investors has shifted from customer acquisition to customer retention, subscription-based revenue models have come into fashion once again.

1. Environmental and social governance

However, subscription-based offerings should be flexible to keep pace with changing customer needs, as well as showing close, easily understandable alignment between value and price. For instance, beauty and personal-care companies are increasingly using a razor-and-blade pricing model in which the main product offered is cheap, but additions/refills are relatively expensive.

*“Great companies are capital efficient, and we like to deal with great companies.” – Founder and Managing Director, early-stage US-based VC*

**5: BUILD A TECHNOLOGY-ENABLED, CUSTOMER-CENTRIC SUPPORT MODEL**

While they’ve often claimed to be customer-centric, many start-ups have not carried this promise through from product creation to post-sales customer service. Following a top-line growth model based on acquiring new customers meant retaining existing ones was not a priority.

The new focus on reducing churn and increasing customer lifetime value, combined with higher customer acquisition costs, make retention a key success metric. While a product-market fit approach brings in customers, high-quality service is essential to maintaining

market share. Ideally, service needs to be provided in-house to maintain quality customer service and high retention rates.

**WHILE THEY’VE OFTEN CLAIMED TO BE CUSTOMER-CENTRIC, MANY START-UPS HAVE NOT CARRIED THIS PROMISE THROUGH FROM PRODUCT CREATION TO POST-SALES CUSTOMER SERVICE.**

However, customer service has traditionally been a labor- and cost-intensive function that grows in tandem with market share.

To break this link, start-

ups should look at technology, particularly digital channels, AI, and natural language processing (NLP), to automate customer service through solutions such as chatbots and NLP-powered online FAQs.

*“Start-up founders need to be mindful of the fact that their moat can be disrupted by their competitors, and must therefore strive to remain one step ahead.” – Shivathilak Tallam, Unitus Ventures*

**6: DIFFERENT TECH WORKFORCE MANAGEMENT**

Most start-up founders are based in cities established as start-up hubs, such as the Bay Area in the US, Bengaluru (Bangalore) in India, Paris in France, or London/Cambridge in the UK. As they grow, they naturally expand their operations and teams in the same location. However, the rising popularity of these areas has driven increases



in the cost of living and real-estate prices. For example, the cost of housing in San Francisco is no less than 238 percent higher than the US average. All of this results in higher salaries and operating costs.

Therefore, as start-ups begin their expansion phases, founders should plan on setting up centers in emerging hubs (such as Denver, Colorado and Austin, Texas in the US, or Hyderabad and Pune in India) where the cost of operations is relatively low. Additionally, start-ups located in developed countries should plan to effectively outsource operations to countries such as India, Poland, or Romania, where a highly qualified talent pool is available at a much lower cost.

On the technical side, as they grow, start-ups should look at improving operational efficiency. This could mean shifting from cloud-based solutions such as Amazon Web Services to managed and co-location services for their IT infrastructure.

*“Multiple start-ups have initiated layoffs from their offices situated at high-cost locations because of their inability to justify such high salaries at premium locations.” – **Founder, Indian Unicorn***

Today’s funding winter is far from being simply a bad news story. It has provided a welcome driver for start-ups to focus on profitability and creating world-class businesses, rather than just growing the top line. They need to use the slowdown as a positive, removing extra fat from the organization and making their businesses lean and IPO ready, if they want to genuinely achieve lasting unicorn status with the benefits it delivers. Today corporates have a new opportunity to make strategic acquisitions, investments, and partnerships with start-ups in a less overheated market and with a more balanced risk/reward profile. They should take advantage while it lasts.



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# HOW DATA SHARING IS ESSENTIAL TO DELIVER INDUSTRY-WIDE TRANSFORMATION

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**Industries from energy to healthcare are facing up to transformational change. This is driven by several factors: a need for greater sustainability, reinforced by regulation; changes in consumer needs and behaviors requiring greater flexibility and customer-centricity; and technological development, especially digital and automation. Current geopolitical and economic trends affecting energy prices, supply chains and inflation are acting as a further driver.**

For example, the energy sector, as it moves to Net Zero, is undergoing a revolution in terms of new, sustainable generation sources, along with changing customer needs caused by the electrification of society. For energy network operators, this requires a dramatic shift from a unidirectional command-and-control model to a more complex, bidirectional ecosystem of more and more active players. Operators need to become more customer-centric while increasing energy efficiency to ensure that the lights stay on with minimum expenditure on additional physical grid infrastructure.



Meeting these twin needs around sustainability and customer-centricity requires new levels of collaboration both inside and outside sectors, working with non-traditional partners, regulators, and competitors alike. Central to this collaboration is data. Data sharing is essential to managing climate impact along the entire value chain and achieving the level of flexibility and responsiveness demanded by customers. This is the case for many sectors, not just energy.

However, up to now, data sharing has been easier said than done. A range of challenges must be overcome to achieve it, such as quality, governance, confidentiality, and availability. Adopting a philosophy of system thinking and an open mind-set is essential to help industries break down data barriers and create globally optimized ecosystems. This article explores how the energy sector is starting to tackle the problem, and looks briefly at how other sectors are approaching the issue using similar principles, even if the methods and mechanisms differ.

## THE CHALLENGES TO DATA SHARING AND COLLABORATION

Organizations recognize the importance of data and data sharing to effective collaboration across their ecosystem, but they face key challenges:

### AVAILABILITY

Information is distributed across the ecosystem and locked in silos within businesses that are unwilling or unable to share it. The data landscape is fragmented, with different levels of organizational data maturity. Non-traditional players are frozen out of the market because of lack of data access, while incumbents struggle to create agile ways to use the data they manage.

### QUALITY AND SPEED

Data often cannot be provided fast enough or with sufficient granularity to enable more advanced use cases. Lack of data governance undermines quality and, therefore, trust by users. This results in users and market players launching their own data collection methods, which adds to complexity and leads to lack of interoperability.

### STANDARDS

Data created by different players is not in standard or easily exchangeable formats, and has no common vocabulary to describe data. For example, a “customer” can mean different things to different organizations (or even between departments in the same company). This lack of interoperability holds back sharing on a technical level.

CONSENT

Safeguarding personal customer data is central to operating ethically and legally. At the same time, customer interest in sharing data to improve their experience is growing. However, gaining customer consent to use data beyond basic billing and operations is not embedded in current processes. Fears over breaching regulations results in trapped data value.

MIND-SET

The culture within many industries (such as transport, financial services and energy) is heavily focused on compliance and avoiding unnecessary risks. Clearly, this is important. However, it can lead to a conservative, inward-looking culture that fails to see and embrace the benefits that data sharing brings.

***SAFEGUARDING PERSONAL CUSTOMER DATA IS CENTRAL TO OPERATING ETHICALLY AND LEGALLY.***

In addition to these internal factors, industries are grappling with an accelerated pace of regulatory change, particularly around sustainability. This can create bottlenecks within supply chains that result in missed potential.

For example, grid congestion can hold back renewable energy uptake that has been encouraged by regulators.

Taken together, these factors lead to lack of system thinking and failure to see the big picture. Data is used to drive local, isolated initiatives instead of enabling collaborative, industry-wide optimization.

BREAKING DOWN THE SILOS - A PHASED APPROACH

The complexity and challenges outlined above can be overcome through a combination of collaboration and customer-centricity, often enabled by regulatory push.

In general, a phased approach, which involves gradually widening sharing outside the core participants in an industry, seems more effective than a big bang. This requires three layers of ambition, as shown in Figure 1.

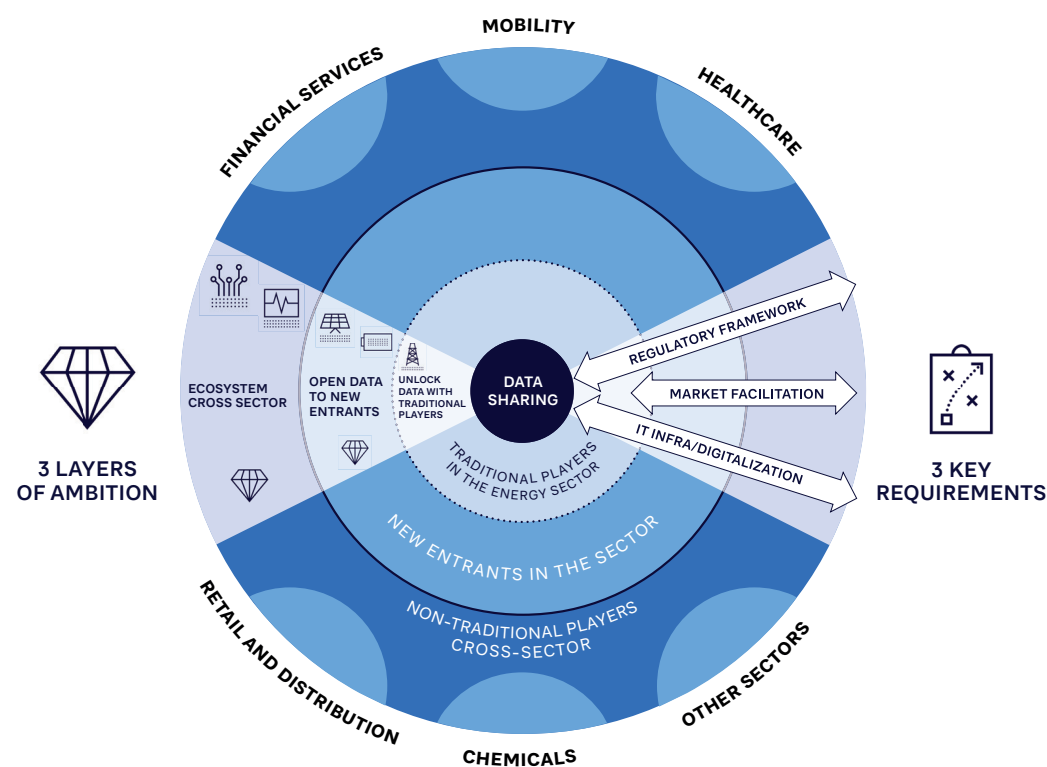


FIGURE 1: A THREE-LAYER APPROACH TO ECOSYSTEM DATA COLLABORATION IN THE ENERGY SECTOR

The first step starts with the customer and involves **unlocking existing data** so it can be reused across traditional players (for example, in the case of energy, grid operators and energy retailers). The second step involves **opening this data to all players in the sector**, including new entrants. The final step is to **create a dynamic digital ecosystem**, with data shared more widely beyond the traditional sector boundaries. Throughout this approach, the needs of the customer should be at the center.

Key requirements need to be in place at a high level to enable this:

- A **regulatory framework** that sets legislative ground rules for collaboration and data sharing, backed by robust customer data consent mechanisms.
- Inclusive and effective **market facilitation** that gives all potential players a voice. This should include a collaboration forum for collective decision-making, as well as operational capabilities to enable cooperation.
- A **cross-industry IT infrastructure** that supports data exchange. Customers should be able to manage access to their data easily, and standardization helps market players access it seamlessly.

# DATA SHARING IN THE ENERGY INDUSTRY – AN EXAMPLE FOR ASSET-INTENSIVE SECTORS

To illustrate this approach in practice, the Netherlands energy market provides a good example.

The energy industry is typical of many distributed, deregulated, asset-intensive sectors, which are now being disrupted by changing customer requirements and the decarbonization imperative. However, it is set apart in that it has been faster to collect and share data at a customer level, through ongoing roll-outs of smart meters. When combined with grid asset data, this potentially gives players access to a comprehensive range of data sets to enable collaboration. In the Netherlands, three obstacles have been preventing the energy sector from moving towards a fully integrated, interconnected, digitalized market, including lack of:

- **A transparent regulatory framework**, with no incentives for players to become more open
- **Facilitation across the energy market**, covering customer data, access for new players, and slow decision-making processes at market level
- **Transparency and openness within current market governance**, which prevents effective decision-making

The above points mean data was solely used for closed and isolated system processes (such as supply, switching, and balancing), and only shared with a small group of market participants. To enable sector-wide data sharing, the energy grid operators, working with ADL, initiated a new Energy Market Facilitation Framework. (See Figure 2.)

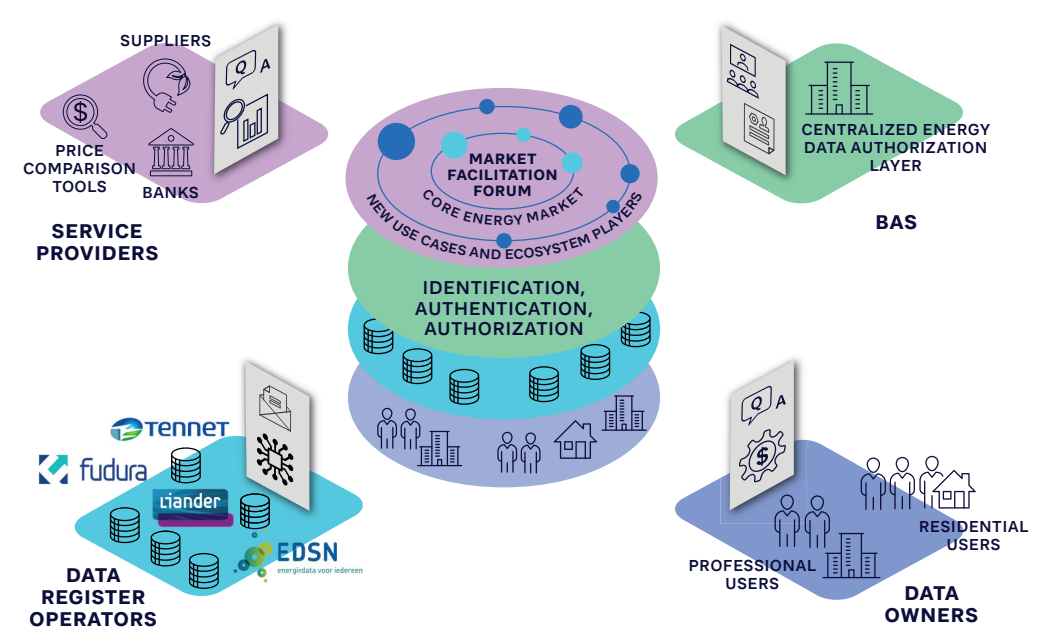


FIGURE 2: ENERGY MARKET FACILITATION FRAMEWORK

The first step was to support the necessary regulatory and legal changes needed to open the market to new technologies, players and use cases. All players were then aligned through setting up a market facilitation forum (MFF<sup>1</sup>), a new consultation and decision-making forum open to all energy sector stakeholders. A second entity, BAS, was created to execute the decisions made by the MFF. BAS<sup>2</sup> is responsible for the technical and operational side of data sharing, and currently creating a centralized energy data authorization layer.

The new framework covers the identification, authentication, and authorization of any requests for data sharing enabling multiple new use cases. These could include, for example:

- Customers who can share accurate household energy usage data when applying for bank loans for green renovations or solar and battery storage
- Insurers that can monitor household energy efficiency to automatically adjust their premiums and deliver greener products
- Construction companies that can use energy usage data to audit how a property can be made more sustainable. Aggregated efficiency data can also be used at district, city or country levels to enable targeted interventions and funding
- New services to manage EV batteries, such as providing predictive maintenance and optimal charging, based on insights into the charging profile and real-time voltage level of the connection. This also enables more granular grid balancing with tariff flexibility for consumers

These use cases vary in their complexity, and different players have different levels of digital maturity. Data therefore must be made available in multiple formats and ways (such as through a self-service portal or APIs). The examples listed here are not exhaustive – essentially, opening up data lowers barriers to entry for new players, and therefore encourages innovation and new, customer-centric use cases.

Klaas Hommes, Director of BAS NV

*Rethinking how data is unlocked and distributed within and across sectors is a top priority. In the energy sector, for instance, having data in a uniform and transparent way with a centralized consent layer for customers facilitates market growth and sector-wide collaboration.*

1. Marktfaciliteringsforum  
2. Beheerder Afsprakenstelsel

## HOW OTHER INDUSTRIES ARE APPROACHING DATA SHARING

The approach successfully applied in the Netherlands energy market is not the only model for data sharing. For example, sharing can also be underpinned through blockchain or federated learning. Different approaches have different strengths and weaknesses. Below we provide an overview of how other sectors are approaching data sharing.

### FINANCIAL SERVICES

In financial services, data sharing across banks has become standard practice, at least in the EU, thanks to the Payment Services Directive 2 (PSD2) regulation. Data can be shared with other banks, fintech players, and even those outside the industry, such as retail companies for their loyalty programs. This aims to drive greater customer

centricity through additional services and more choice, while lowering barriers for new entrants.

***THE FINANCIAL SERVICES APPROACH HAS BEEN MORE DECENTRALIZED THAN THAT OF ENERGY PLAYERS, WITH EACH BANK MANAGING ITS OWN DATA-SHARING CAPABILITIES.***

The financial services approach has been more decentralized than that of energy players, with each bank managing its own data-sharing capabilities. The lack of a market facilitation element

means there is no centralized data authorization layer for payment and account data, and customers have no central place to manage consent or determine with whom their financial data can be shared. This may explain why PSD2 has not yet had the consumer traction that was expected at the time of its inception.

### MOBILITY

Lacking a proper level of data exchange, modern cities currently struggle to build more sustainable and customer-oriented urban mobility systems. In line with the phased approach suggested above, mobility data might be unlocked in stages:

- First, authorities could open their infrastructure data related to mass transit networks, stations, mobility hubs, road networks, traffic and parking data.
- Second, mobility service providers could give access to data regarding routes, schedules, real-time and historical status of vehicles, fleet capacity, and deployment.
- Third, going beyond mobility, urban planning and events data can be exchanged, including information on public spaces and points of interest.



This data collaboration should be led by local authorities through data and service exchange hubs that cover all ecosystem players. The approaches mentioned above for the energy sector are also broadly applicable for urban mobility.

HEALTHCARE

Digital transformation of healthcare is key to achieving objectives around quality, access, efficiency, and enablement of personalized healthcare. Already the rise of wearable medical devices and remote patient monitoring is increasing the volume and availability of data. This is allied to the growth of electronic health records

**HOW DATA IS GATHERED AND STAKEHOLDERS' INTERESTS ARE MANAGED CAN ENABLE OR HINDER THIS TRANSFORMATION, PARTICULARLY WITH PATIENTS SHARING THEIR DATA.**

(EHRs), which make information more widely available and underpin a more decentralized patient journey. Data volumes in healthcare are also compounding, with increasing large-scale biologic information being gathered from genes

and other pools of molecules. The aim is to develop much more personalized treatments and identify personal risks at a very early stage. Sharing this data securely will require a clear ecosystem approach with a digital hub that allows for safe and compliant collection, processing, analysis, and data sharing across key ecosystem stakeholders (such as doctors, patients, payers, hospitals, research institutes, and drug developers), as well as adoption of new technologies.

How data is gathered and stakeholders' interests are managed can enable or hinder this transformation, particularly with patients sharing their data – especially if they feel it is not being used to directly benefit them or it is being shared with third parties who will exploit it for commercial gain. To overcome this, multiple stakeholders need to work together. Government must promote implementation of integrated systems and knowledge sharing, potentially backing it with legislation to deepen the protection of personal data. Private institutions can supply specific analytics skills that many healthcare providers lack.

RETAIL AND DISTRIBUTION

Sourcing good-quality, exhaustive product information from suppliers is paramount for distributors and retailers. Most often, “not enough detail or information” is the primary reason given for online cart abandonment. Additionally, retailers are legally responsible for displaying key technical specifications, such as energy efficiency and flammability of certain product categories.

Brands also rely heavily on product content to engage with customers and convey their values. Product syndication is an important part of this, differentiated depending on the retailers and their audiences.

Product data has historically been exchanged bilaterally between brands and retailers, using diverse solutions and proprietary data formats. In order to improve efficiency, multiple retail sectors have organized themselves to facilitate data exchange:

- The construction supplies industry has collaboratively developed common data models for exchange of product data, through standards such as Fab-Dis, ETIM, and BMEcat.
- In consumer goods, players have built shared data platforms for product data synchronization, for example, leveraging the GDSN standards established by GS1, the leading not-for-profit standardization organization.

These approaches have driven efficiency and productivity gains through greater collaboration, systemic thinking, and strong governance.

## CHEMICALS

Arguably the single most important strategic challenge to the chemical industry is meeting its sustainability objectives and targets, particularly around decarbonization and circularity.

The chemical industry increasingly understands that data sharing is a critical enabler to meet rising environmental concerns and regulatory changes around this green transition. Two specific key examples are:

- Tracking, tracing and reporting sustainability performance. Governments, as well as customers using chemical products, are expected to demand ever more extensive, robust and traceable data on areas such as (indirect) carbon emissions and use of recycled and biobased materials. This requires data to be shared between, for instance, every player along the value chain of a polymer, in order to assess the sustainability performance of its end product, such as a component in a car dashboard.
- Optimization of logistics and distribution. Efficient sharing of accurate data helps reduce operational costs, increase resource efficiency, and facilitate a seamless modal shift (i.e., between transport modes over land and sea). It also helps optimize business processes through greater real-time planning and steering, increased sustainability, and more end-to-end transparency. Finally, real-time data sharing may bring early/proactive detection of risks and enable rapid intervention.

## INSIGHTS FOR THE EXECUTIVE

Across all industries, data is the fuel for increased collaboration and innovation to meet the twin needs of sustainability and customer-centricity. Even historically less-regulated sectors will be impacted by increased legislation. Data needs to be shared beyond traditional players, widening ecosystems to bring in new entrants for the greater good, while enabling existing companies to embrace new opportunities and reap the benefits of innovation. However, to be shared effectively, data needs to be freed from silos and made interoperable and available to all, while strong governance and consent mechanisms are ensured. The key transferable lessons from how the energy sector has approached this are:

- **Put the customer at the center of the program.** Customer-centricity is essential to deliver the right framework to meet their changing needs.
- **Ensure you create a clear storyline** related to the need for change, explaining the specific benefits and resolved pain points for each of the different market parties. Focus on showing “what’s in it for me” for each persona.
- **Take a phased, iterative approach.** Ecosystems contain a wide range of players and market participants with different agendas, and players need to get their buy-in and build a governance model. The Dutch energy example started with grid operators to fund and facilitate the framework, and then moved on to retailers, before widening to new market players. This will allow the value proposition for each stakeholder involved to be gradually built.
- **Create a forum for stakeholders** once the seed is planted. A steering committee or taskforce of key stakeholders helps to jointly shape and implement suitable governance, with facilitators needed to drive wider adoption. The forum should be representative and participative. The value increases exponentially with the number of active players involved.
- **Involve regulators/government.** This may lengthen time frames, but it provides a legal mandate and ensures compliance with supranational laws, such as EU regulations, as well as protecting customer data. If applicable, embed the governance as part of the regulation.
- **Understand that data sharing is not a tech-led solution.** While a flexible, scalable data platform is important, ensuring adoption requires cultural change and buy-in, particularly from traditional players. Technology alone is not enough.

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# **TAKE OFF OR TROUGH?**

**– BETTER TECHNOLOGY  
FORECASTING  
USING EXPERT  
CROWDSOURCING AND  
DESIGN FICTION**



## AUTHORS

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Albert Meige, Rick Eagar

*"Prediction is very difficult, especially if it's about the future."*  
– Niels Bohr

**Back in 2016, amid a wave of optimism, Ford, General Motors and Volkswagen all predicted that driverless cars would be available by 2020 or sooner. In 1970, Marvin Minsky, one of the pioneers of artificial intelligence, predicted that a machine with the general intelligence of a human being would be available within three to eight years. In 2007, when the iPhone was launched, PC Magazine concluded that it was deeply flawed, and that Apple would sell many at first and then sales would plummet. However, since then, 2.2 billion have been sold, and the iPhone accounts for close to half of Apple's revenues.**

Technology development is littered with examples of poor and often wildly inaccurate forecasting. Gartner's famous Hype Curve recognizes that, in many technology development cycles, an initial period of high expectation is often followed by a trough of disillusionment. Conversely, many technologies develop slowly for extended periods and then suddenly take off – such as the internet. What is undoubtedly true is that the development trajectory is more often bumpy than smooth.

For businesses, this is a problem. Ignoring a potentially disruptive technology can leave a company trailing its competitors if there is a sudden unexpected acceleration. However, investing too much, too soon, can be equally challenging, as Meta is experiencing in its huge gamble on the metaverse. Plenty of technology data and intelligence are around, much of it free, with no shortage of established approaches and frameworks, so why is forecasting still a problem? What can businesses do to get better at technology forecasting?

## COMMON APPROACHES TO TECHNOLOGY FORECASTING

Fundamentally, forecasting the future means you have to understand relevant trends that are visible today. Methods, tools and approaches for technology trend intelligence have been around for many years, and can be split into three categories:

- **Scanning:** Systematic monitoring and gathering of the latest data, information and intelligence on relevant trends and developments
- **Analytics:** Analysis of data on relevant existing science and technology developments, for example, scientific publication (bibliometrics) and patent data
- **Expert based:** A range of approaches that access knowledge, insights and opinions from a variety of internal and external experts on technology trends and futures

Scanning is a central aspect of technology forecasting, and probably the approach that first comes to mind. It should include relevant global and business trends, as well as technology, competitor and market intelligence. If done well, it helps ensure that businesses stay up to date about the latest relevant activities, so they are in a better position to spot important signals that could point to imminent change or disruption. It also helps businesses understand and engage with the evolving ecosystem of players, which is key for developing their own role within it. The obvious limitation is that it largely relies on available published data, which is often of varying quality. Defining the scope boundaries is often difficult, and for many technology fields, there is literally too much to cover.

Analytics of patent data has become increasingly sophisticated with the introduction of digital tools such as AI, machine learning, and visualization tools to enable better trend analysis and interpretation. Challenges such as time lags of often several years between technology development activity and patent filing, skews in the statistics (for example, large volumes of Chinese patents), and differing IP protection policies mean datasets may not be representative. Bibliometrics can reveal impact trends, especially in early-stage research, but its value is mainly in pointing the way for further intelligence gathering, which then still needs to be done.

Expert-based approaches have become increasingly prevalent. The most basic approach is to engage with a limited number of internal and/or external experts to understand their views on technology trends, challenges, uncertainties and likely futures. The long-established Delphi method adds a structured process to the approach, involving two or more rounds of questioning with intermediate analysis and feedback to establish areas of consensus and disagreement. The main advantages of using experts are that they can provide a direct perspective on the future, and often

***THE LONG-ESTABLISHED DELPHI METHOD ADDS A STRUCTURED PROCESS TO THE APPROACH, INVOLVING TWO OR MORE ROUNDS OF QUESTIONING WITH INTERMEDIATE ANALYSIS AND FEEDBACK TO ESTABLISH AREAS OF CONSENSUS AND DISAGREEMENT.***

have access to non-published intelligence and interpretation. On the downside, the expert-based approach is difficult to scale. Identifying and recruiting the right experts for a limited interview program is challenging, and the selection process may lead to bias and

incompleteness. The traditional expert profile, whereby individuals have deep, narrow expertise, may constrain realistic forecasting perspectives rather than enrich them.

This is also true for registration schemes in which experts register with a broker that sells fee-based interviews on to clients. The experts who wish to be part of such schemes may not always be the best to consult – sometimes they are driven primarily by the need to generate fee income, rather than pursue respective fields of expertise. Moreover, the process can become expensive and impractical for the client if large numbers of interviews are needed regularly to cover a broad field.

## WHY TECHNOLOGY FORECASTING IS ESPECIALLY CHALLENGING TODAY

Conventional technology forecasting approaches are increasingly failing to meet the needs of today's businesses for many reasons<sup>1</sup>:

- **Complexity and convergence:** Traditional boundaries between technologies and industries are blurring as a result of convergence; hence, understanding where to look for technology trends and intelligence is increasingly tricky. Technological innovation often occurs precisely at these fuzzy boundaries, with involvement from multiple diverse ecosystem partners. Technology intelligence is further complicated by the plethora of data and opinion that can be found online. Much of this piggybacks on itself, and the original provenance of the source data is no longer clear.

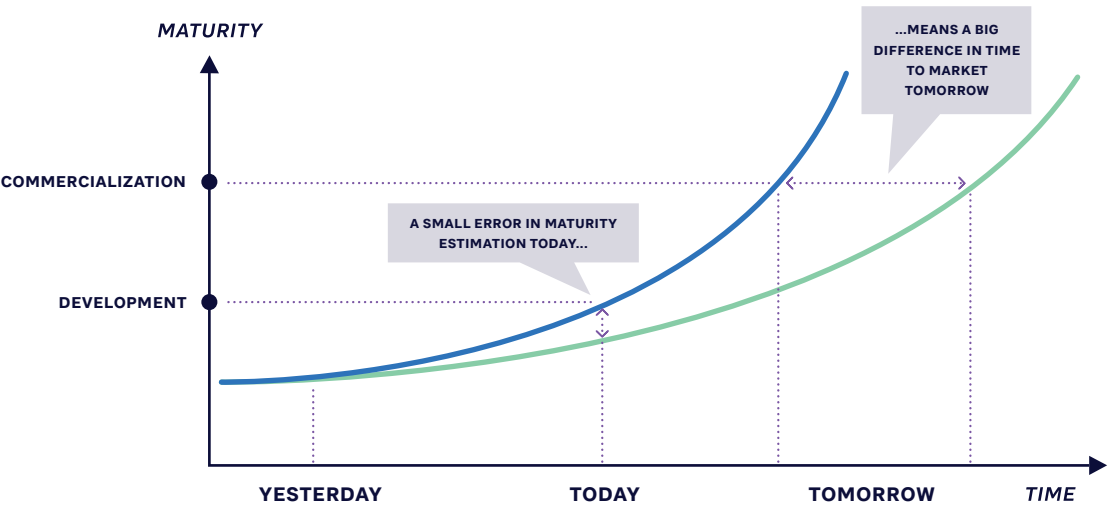


FIGURE 1: TECHNOLOGY DEVELOPMENT

- **Acceleration:** New technology development curves are rarely linear. Technologies that ultimately have a disruptive impact tend, instead, to follow an exponential development curve in which pace suddenly increases rapidly with maturity. The acceleration is steep because a breakthrough can lead to a virtuous circle in which success attracts investment and talent, leading to more success. This means a small error in the predicted development “curve fit” could cause a big discrepancy later. (See Figure 1.)
- **Cognition:** Executives, like all humans, tend to think linearly, based on mental models of their businesses informed by what has always worked in the past. Experts in narrow fields may be similarly constrained. For technology forecasting, this means key disruptive trends and influences that often arrive laterally from unexpected sources can be missed. Often broader factors, such as social, political and behavioral issues that can greatly affect technological impact, are underestimated due to focus on only technology and economics. If technology scanning and expert interviews are guided by the wrong questions, they will give the wrong answers.

## HOW EXPERT CROWDSOURCING AND DESIGN FICTION CAN HELP

Some companies have significantly improved the quality of their technology forecasting by applying newer methods that aim to overcome these limitations, supplementing the core approaches of scanning, analytics and expert interviewing. The two most significant of these are expert crowdsourcing and design fiction.

## EXPERT CROWDSOURCING

Crowdsourcing has become an established approach for a variety of tasks, such as raising investment funds, charity fund raising, data gathering, public policy testing, idea generation and problem-solving. Platforms are offered by open innovation service providers such as InnoCentive, NineSigma, and Presans.

Expert crowdsourcing for technology forecasting is a more recent development. It has been estimated that there are 15 million experts around the world across the fields of science, technology and business<sup>2</sup>. Most leave tracks on the web through scientific literature, patents, research center websites, blogs, forums and the like. New software tools supported by data analytics and machine learning are now available<sup>3</sup>, which can build structured expertise maps from unstructured data, based on specific input requests. They can then generate automatic personalized emails to solicit expert participation from the most relevant experts. The process has three steps, as shown in Figure 2.



FIGURE 2: EXPERT CROWDSOURCING

The key features of the process that are important for its success include:

- **Asking the right questions:** The forecast intelligence you wish to gather has to be formulated in a small number (for example, five to 10) of key questions for the experts to answer. These need to be formulated in a way that is clear and unambiguous but does not impose presumptions and implied limits on the scope of the answer. A mix of open and closed questions helps to ensure a good mix of directly comparable data and content-rich opinion.
- **Diversity:** The population of experts invited to respond needs to include not just “deep/narrow” experts, but also “diverse/broad” experts whose expertise lies in understanding and uncovering the connections between different fields and finding new perspectives across them. A mix of both technical and geographical backgrounds is also important.

2. A Guide to Open Innovation and Crowdsourcing (2011)

3. A good example of this is the Expert Search Engine developed by Presans, an Arthur D. Little company

- **Background:** It is important to gather key information about each expert's background, as this helps to spot trends and potential biases in their opinions.

This expert crowdsourcing approach, which involves much larger numbers of experts than conventional expert-based approaches, can help to overcome today's technology forecasting challenges. For example, it is much easier to gain **perspectives that stretch across the fuzzy boundaries** of converging technology fields, because experts can be invited across diverse areas of expertise. The "wisdom of the crowd" can be used to help **increase the reliability of predictions**, especially the key question of when new technologies are likely to mature and impact business. The results of expert predictions can also be sliced and diced in different ways to show differences of opinion between experts with different profiles and backgrounds. There is also **less likelihood of bias** being introduced than is the case with a limited expert panel. Finally, the approach is **low cost, repeatable and essentially automatable**, especially versus methods that access registered experts on a fee basis.

## DESIGN FICTION

The basic idea of design fiction is to use fiction to help explore and understand possible futures, as a way of informing the design of strategies, plans or policies. In the corporate world of hard data, fiction does not normally feature very prominently. In fact, for most companies, fiction would only be employed in long-term strategy development – imagining what the business could look like in 10 years' time as a way of helping to formulate a strategic vision and ambition.

**THE BASIC IDEA OF DESIGN FICTION IS TO USE FICTION TO HELP EXPLORE AND UNDERSTAND POSSIBLE FUTURES, AS A WAY OF INFORMING THE DESIGN OF STRATEGIES, PLANS OR POLICIES.**

However, design fiction approaches can also be usefully applied in technology forecasting to help overcome the cognition challenge and better consider the broader factors that may influence the pace of development and impact

of new technologies. For example, imagining a future in which brain-computer interface technology is widespread and embedded in everyday life can help to identify a series of issues relating to how the technology would interact with human behavior and impact society. On the plus side, you might be able to put together the main parts of a presentation just by thinking about it, and get your AI bot to complete it. On the downside, your boss could also access what you are thinking. The implications are almost endless.



In practice, effective design fiction approaches for corporate technology forecasting typically proceed as follows:

- Based on the emerging technology or technology field of interest, consider the implications of a future in which the technology has reached full maturity and is deployed as part of everyday life.
- Construct one or more fictional accounts of situations involving interaction with the technology. It can help if these fictions are expressed in the present tense, and involve interactions between humans and the technology in plausible, everyday contexts.
- Use the fictional accounts as a source of discussion and debate, preferably engaging individuals with different types of background, not just technologists. For example, sociologists, psychologists, artists and authors can greatly enrich the content of the exchanges.
- Consciously consider dystopian implications. These are especially valuable for identifying ethical, social, behavioral or regulatory issues that may be key for determining how and when the technology will impact business and society.

It is important to recognize the differences between design fiction and scenario development as forecasting tools. While design fiction consciously selects a possible future and creates a “realistic” story based on it, scenario development considers the full range of possible factors that could affect the future, and constructs a simplified model of alternative futures involving different outcomes for those factors. The two approaches are complementary.

### **Case examples in expert crowdsourcing and design fiction**

#### **Quantum computing technology forecasting using expert crowdsourcing**

ADL’s Blue Shift institute recently completed a technology review of the prospects for quantum computing, focusing on understanding if, how and when the technology would start to impact business. In addition to extensive intelligence gathering on technology status, maturity, pace of development and impact, underpinned by a patent analytics exercise, expert crowdsourcing was employed to enhance the reliability of the forecast.

Approximately 500 leading technology and science experts from academia and industry were identified and invited to participate using a proprietary software tool, based on their published work and credentials in the quantum computing domain. Ultimately, 59 experts participated in a questionnaire, with 51 of these being personally involved in quantum computing technology development.

The results of the expert crowdsourcing exercise, combined with the other intelligence-gathering activities, enabled much more reliable and nuanced conclusions to be drawn about the pace and impact of quantum computing development from a business perspective.

### **French Defence Innovation Agency – Red Team approach involving design fiction**

The French government's Red Team defence program aims to develop a forward-looking vision to anticipate technological, economic, societal and environmental risks likely to generate potential conflicts by 2030–2060. It connects 10 to 12 science fiction authors and writers with scientific and military experts. With a budget of approximately EUR 2 million, the program involves setting up two teams: Team Creation, which focuses on imagining future threat scenarios; and Team Design, which fleshes these out in the form of various artifacts, such as drawings, writings and objects. Since its initiation in 2019, it has published several scenarios, some of which have been made public. These include, for example, biological engineering leading to uncontrollable ecological consequences, and a climate catastrophe scenario whereby energy supply becomes critical for survival.

### **Michelin – Foresighting in the face of the environmental challenge**

The tire manufacturing group Michelin adopts a foresighting approach that aims to go beyond prediction of what will happen toward what could happen. Gael Queinnec, prospective Director at Michelin, explains that Michelin leverages several approaches for specific objectives. Michelin was one of the first quoted groups in France to use prospective scenarios of ecological transition/adaptation and so-called morphologic analysis to frame the corporate strategy and its cascade to all the functions of the company, including the innovation function. To do this, it seeks to develop a “360° vision on political, economic, social and legislative issues,” thinking broadly and exploring unlikely but possible scenarios – utopias and dystopias – involving extensive “what-if” thinking. This breadth of vision is seen as essential for securing the group's role in a world-facing current and future environmental challenges, including diversifying away from tires – which could reduce turnover by 70–90% by 2030.

Another approach used by Michelin is design fiction, which is employed along the innovation path with both potential users and internal resources. Involving users in design fiction allows them to project themselves better into future usage situations and better evaluate the value of the innovation. Involving internal resources from various business functions, such as marketing and R&D, allows the company to anticipate and address potential hurdles across silos.

# INSIGHTS FOR THE EXECUTIVE – HOW TO IMPROVE TECHNOLOGY FORECASTING

In today's business environment of increasing complexity, convergence, acceleration and uncertainty, companies have to evolve their technology forecasting approaches beyond conventional scanning, analytics and expert interviews. This is especially important in light of the multiple interconnected challenges of green transition. The most successful approaches today recognize key success factors:

- Conventional technology scanning and analytics need to be complemented with expert-based methods to improve the depth and breadth of perspectives.
- Experts need to be used the right way. Great care needs to be taken in how they are selected. This means, for example, ensuring that there are enough "diverse/broad" experts, as well as "deep/narrow" experts.
- Suitable experts need to be engaged in sufficient numbers to avoid bias, using methods that are scalable, repeatable and low cost. The "expert crowdsourcing" approach can be very effective in achieving these aims.
- Forecasting needs to focus on what "could" happen, rather than seeking to predict what "will" happen. This means a broad-based perspective is essential. Techniques such as design fiction can be useful in achieving this breadth. The future of a new technology is not only affected by technical progress, but also by a range of ethical, social, geopolitical, behavioral and regulatory factors.
- To enrich the forecasting process, individuals from a range of backgrounds should be considered. Sociologists, psychologists, artists and authors may all have valuable contributions, in addition to technologists and scientists.

Predicting the future will never be easy. However, taking a broader forecasting perspective helps companies recognize better when technologies are likely to take off exponentially – or, conversely, fall into a trough of disillusionment. Companies that do this better than their competitors are likely to enjoy a considerable advantage.

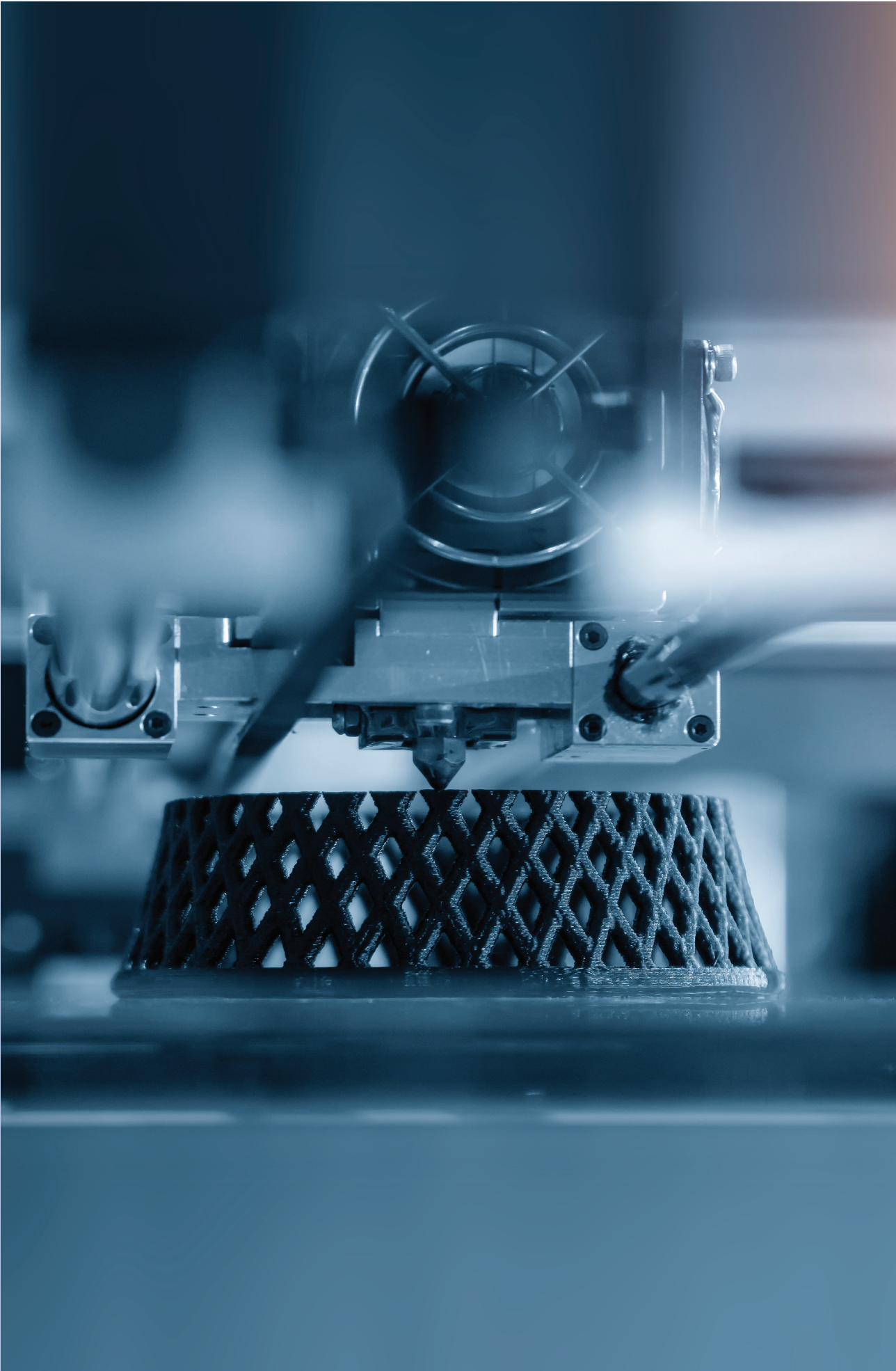
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# COMBINING STRENGTH AND AGILITY – UNLEASHING BREAKTHROUGH INNOVATION IN COMPLEX PRODUCT AND SYSTEM MANUFACTURE

## AUTHORS

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**The need for companies to be able to deliver breakthrough and incremental innovation is well established by now. Much has been written about how to do this effectively, including ADL's contributions<sup>1</sup>. However, one less-often-discussed aspect is how to tackle breakthrough innovation in the complex product and system manufacturing industry, such as aerospace & defense (A&D) or energy.**

These sectors pose particular challenges: they are highly specialized and capital intensive, often rely on unique corporate assets to manufacture the product, and are subject to heavy regulation, with safety-critical products and systems required to meet strict assurance requirements. This means the commonly adopted solution of simply creating a separate breakthrough innovation team and allowing it to work outside normal corporate processes and constraints is much harder to implement. In this article we look at some key success factors to make the breakthrough innovation model work effectively in this type of business.

1. For example, "The Breakthrough Incubator – How to create and rapidly launch new step-out businesses," Prism S2 2018, and "Organizing for breakthrough Innovation," Prism S1 2015



# THE CHALLENGES TO OVERCOME

A breakthrough innovation project (BIP) delivers a step-change<sup>2</sup> in product/service performance, and/or creates new business models or new market space. We can summarize the main challenges that companies in the complex product and system manufacturing industry face in running successful BIPs into five main areas:

- **Methodologies:** Complex engineered systems are developed using highly structured methods, such as the traditional V-cycle, to manage risks and assure quality. BIPs require application of agile methodologies that are fundamentally different in nature and do not lend themselves easily to these structured methods.
- **Uncertainties:** Corporate processes and organization in sectors such as A&D are usually based around well-established and understood markets and business models, whereas BIPs involve higher degrees of uncertainty – for example, the market space may not already exist and user requirements may not yet be clear.
- **Resources:** BIPs need different capabilities along each phase of the program. Using only external resources may fail to leverage unique corporate strengths and can be costly, while relying only on part-time internal corporate resources can be inefficient and ineffective.
- **Steering:** BIPs need to have the right type of steering. They need enough flexibility to “stretch” and “fail fast”, but with enough corporate backing to avoid “kill fast” for the wrong reasons, such as short-term budget constraints or early setbacks.
- **Interfaces:** There are tricky interfaces between the BIP, its customers, and the rest of the organization, for example, in terms of resourcing and use of existing corporate assets. These challenges are especially acute for complex product and system manufacture.

# COMBINING AGILITY WITH STRENGTH – A FRAMEWORK

To address these challenges, BIPs in complex product and system manufacturing need to be set up with a strong focus on how the agility of the BIP teams can be best combined with the asset strengths of the corporation. In practice, this means giving attention to four key topics that are all concerned with how the interface between the BIP and the “legacy” company is organized and managed, as shown in Figure 1.

## 1. OFFER, PRODUCT ARCHITECTURE, AND ASSOCIATED ASSETS

The starting point for any BIP is to articulate clearly the target offer characteristics in a way that is outcome focused, stretching and not over-constraining in terms of product details – such as target performance, key functionalities, cost, and time to market. For

2. A common rule-of-thumb is that breakthrough means at least 30 percent improvement in product performance and/or cost

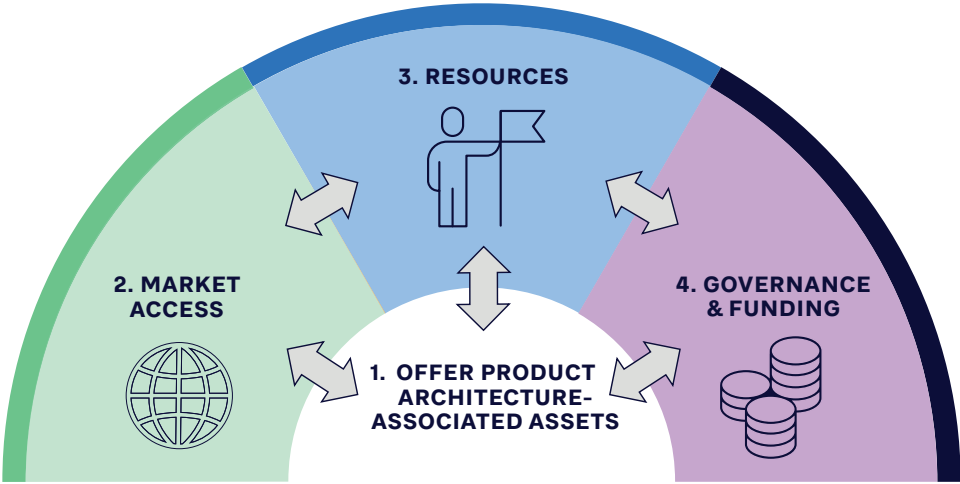


FIGURE 1: THE BREAKTHROUGH INNOVATION DESIGN FRAMEWORK

example, one of our A&D clients determined through preliminary market research and customer interviews that its new BIP needed to achieve a big step-change in performance, reducing cost by 30 percent and time to market by 40 percent. Normal development approaches would have incurred costs that would be too high to be competitive; hence, the offer would need to be developed in a completely different way. This set the stage for how the project was ultimately taken forward.

Product architecture is a central consideration at this stage. Reduction of interface complexity is a key criterion, especially when agile approaches need to be introduced. (See Box 1.)

**Box 1: How to define product architecture using an agile approach**

For a complex, system-based product, project organization should be structured into teams corresponding with discrete physical/functional modules. They should be aimed at:

- Bringing together a multidisciplinary team for each module
- Minimizing technical and organizational interfaces between modules
- Defining modules so they can deliver a tangible, concrete product output at each iteration (this could be a piece of software as well as a prototype)
- Facilitating customization according to the specific needs and constraints of customers (for example, using components from a specified national origin)
- Enabling the evolution of the product according to market demands

Even for complex systems, the first level of the architecture should not be more than six modules. Adopting this approach promotes efficiency, alignment with customer needs, and competitiveness. The structure may also be reusable on other projects.

Once the various technological building blocks of the BIP product are becoming established, early attention also needs to be given to how they will be acquired, designed, and/or manufactured, and their likely ranges of capital and operating costs. This helps to prevent the BIP from failing at the scale-up stage due to unexpected cost constraints.

In general terms, normal “Make or Buy” principles apply: elements that are unique and strategically important (for example, in terms of sovereignty, cost impact, performance, and time-to-market influence),

***EVEN FOR COMPLEX SYSTEMS, THE FIRST LEVEL OF THE ARCHITECTURE SHOULD NOT BE MORE THAN SIX MODULES. ADOPTING THIS APPROACH PROMOTES EFFICIENCY, ALIGNMENT WITH CUSTOMER NEEDS, AND COMPETITIVENESS.***

and for which BIP capabilities are competitive in the marketplace, lend themselves to “Make”. For other elements, especially if there are potential economies of scale, “Build to Print<sup>3</sup>” and “Build to Spec” can be considered – bearing in mind the need to build a future value chain of suppliers. In addition to the two alternatives “Make” or “Buy”, another option is

“Use”, in which the BIP uses internal assets of the legacy corporation without managing it directly or with full autonomy. In this case, managing the planning of the unique asset is a key process to keep the flexibility the BIP needs, especially during the development and the industrialization of the target offer.

An example of such a strategy is shown in Box 2.

**Box 2: Make/Use/Buy strategy to accelerate the development of reusable launchers**

Maiaspace was created in 2021 to accelerate the development of reusable space launch vehicles in Europe. Multiple projects have been conducted over the last few years to develop some of the “critical bricks” of a reusable launcher. Therefore, defining the right Make/Use/Buy strategy was a crucial first step for Maiaspace to optimize the tradeoff between funding needs, time to market, and system performance, starting from this foundation. Here are a few examples of the major choices that were made:

3. “Build to Print” means manufacture by a supplier according to a fully detailed customer design. “Build to Spec” means manufacture according to a customer specification, allowing for supplier design inputs

- **Using the Prometheus engine:** The first-stage engine developed for Ariane 6 was selected to be an almost-ready, next-generation liquid propulsion engine. This choice allowed a major reduction in time to market, risk, and non-recurring cost in the program compared to developing a dedicated new engine.
- **Selecting a two-pronged approach for the launch base:** The first test and demonstration flights were from the Kiruna launch base in Sweden, leveraging the facilities developed as part of the Themis program, and later commercial flights were from the Kourou launch base in French Guyana: here, dedicated facilities were provided for the Maiaspace “Diamant” launch pad, while sharing the world-class installations of the existing Guyana Space Center.
- **“Make” approach for strategic capabilities:** Stage and launcher assembly and integration are being performed by the Maiaspace team with its own workforce and assets, while maximizing possible synergies with the parent organization, such as vacant buildings and test facilities. Moreover, the maintenance, repair and overhaul activities for the launch vehicle will also be conducted in-house by the Maiaspace team in order to master this activity for the economics of a reusable launcher.

## 2. MARKET ACCESS

Developing a strategy for how the BIP’s products will ultimately go to market is a fundamental consideration that must be dealt with at an early stage.

One option is for the new BIP business to use the existing legacy brand and go-to-market channels. While taking this approach has the obvious benefit of leveraging the position and scale of the existing business, it can risk brand damage if the product fails.

Other companies, such as the tech giants, tend to use their brand for BIPs anyway because they see it as strong enough to withstand some failures without damage (for example, Google with Google Glass). Meta is another interesting example, in which the founder is betting the company’s entire brand on a huge BIP in the form of the Metaverse – with considerable short-term downsides so far, although breakthrough innovations are often long games requiring steady nerves and deep pockets.

For many companies with less market clout than Meta, Google or Microsoft, it can be prudent to create a separate, dedicated brand and market channel for the BIP, at least initially, until the BIP has established a viable product/market fit at scale.

This allows modification of the new channel(s) rapidly according to the initial market feedback, and also mitigates the risk of unproductive conflicts with the existing brand organization.

3. RESOURCES

One of the main challenges of running BIPs in a complex product and systems manufacturing company is how to provide them with the best human resources, given constraints around providing the necessary specialist expertise, ensuring sufficient dedicated resources, and avoiding costly duplication of staff. (See Figure 2.)

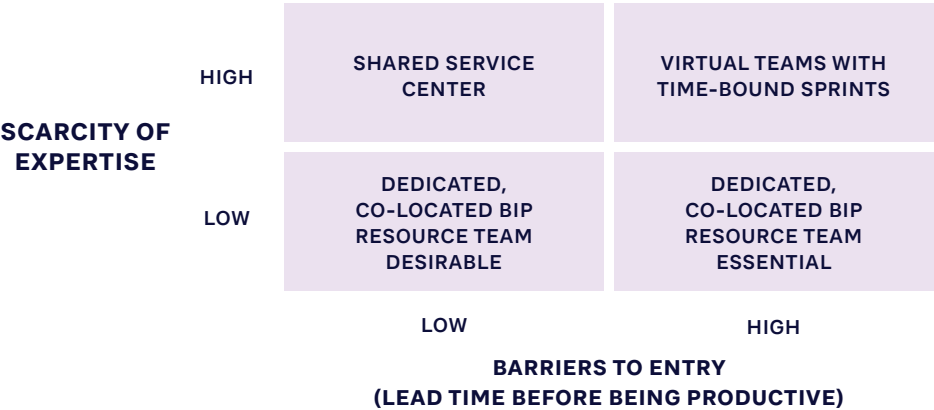


FIGURE 2: RESOURCING TACTICS FOR BIPS

Best practice is generally to allocate at least some staff full time to the BIP core team, as long as sufficient suitable expertise is available. (See the bottom row of the matrix in Figure 2.) This is the best way to maximize productivity and reduce time to market. It also best reflects how independent start-ups work.

However, if resources are scarce and barriers to entry are low, shared service models may be the best option for tasks such as development of engineering tools for the team. If barriers to entry are also high (top-right quadrant), which is a common challenge for complex product and system manufacture, the best solution is to develop virtual teams of part-time key resources. The main success factor here is to deploy key expert resources fully for predefined “time box periods,” rather than having them continuously work part time. (See also Box 3.) Agile methodologies, with their sprints, lend themselves well to this type of approach.

System architects are a good example of these resources, as they have key specialist expertise and are few in number, so cannot be allocated full time to the BIP. It helps to define the needs for their input at each sprint and aim to involve the same individuals for as many of the tasks as possible.

#### 4. GOVERNANCE AND FUNDING

The governance model adopted for the BIP is critical, as it affects decision-making processes and strategy across the interface between the BIP and legacy organization. Unless there are compelling reasons to do otherwise, such as tight synergies with core business and/or regulatory constraints, best practice here is to set up a dedicated organizational structure with empowered leadership. This helps to create a sense of ownership and drive motivation, as well as protect it from de-prioritization due to its low maturity and bottom-line impact. It also helps to free up the BIP from corporate shackles such as procurement bureaucracy and hiring constraints, and facilitates agility and new ways of working.

What happens to the organizational unit when the BIP moves into the commercialization phase is an important aspect to consider when setting up the right legal structure:

- **If new shareholders are envisaged at some future point, creating a separate legal entity is often appropriate.** This could be the case if the BIP opens up an adjacent, but not strategic, market, in which case it could be sold off once it has generated sufficient value. Examples of this include SecLab, a cybersecurity spin-off from EDF R&D, and H2Gen, a hydrogen-focused spin-off from Areva, which sold it to GTT (part of Engie) in 2020. Another example would be external private equity or venture capital funding envisaged to be needed until profitability; in this case normal measures need to be taken to protect the legacy company (such as intellectual property rights protection, seats on the board, and restricting sale of the BIP to competitors).
- **If the legacy company can fund BIP development until profitability, an internal entity is preferable.** If the BIP creates a strategic business and can be fully funded until profitability, it is usually preferable to retain the entity within the existing legacy legal structure. (See also Box 3.) The upside of this is the ability to maximize strategic alignment and synergy with the rest of the business. However, the governance approach needs to ensure that its independence is properly safeguarded, including providing dedicated resourcing and freedom from normal corporate constraints. For this model to work in practice, the BIP needs to report to the highest level of sponsorship, preferably the CEO, who is in a position to resolve conflicts and ensure continued independence.



**Box 3: “Free zone” approach to governance of internal  
breakthrough innovation teams**

A leader in the energy sector has deployed what it calls a “free zone” for breakthrough innovative projects. All the labeled projects in this zone have simplified compliance constraints, for example:

- Request For Quotation rules are simplified, and a formal EU consultation is not required.
- Purchasing contract requirements are simplified, allowing a reduction from more than 50 pages to less than 10. This includes removal of warranty bonds that are not appropriate for the limited size of SMEs and start-ups.

However, constraints remain in some domains, as the free zone still belongs to the corporation. For example:

- HR contract changes are limited to avoid any conflict with unions. Some adaptation can be done (for example, using more external resources and freelancers than normal), but the salary policy has to stay the same.
- IT compliance is still required for security.

Projects leave the free zone after launch and commercialization, after which the normal compliance policy applies.

**BRINGING IT ALL TOGETHER – THE  
ITERATION ZERO APPROACH**

Adequate consideration of the four topics in the above BIP framework will go a long way toward ensuring the BIP’s success. However, one other key aspect is important for success, relating to how the BIP is initiated. We refer to this as the “Iteration Zero” approach. This approach involves, at the outset, setting up a multidisciplinary taskforce to identify and mitigate the main uncertainties – which, for a BIP, are much larger than for a normal project. The taskforce is set up to be the first iteration of the new company to be created, not just a concept phase study group.

The Iteration Zero taskforce starts by clarifying aims, ambitions, and scoping, including targets for features, cost and time to market. It then takes initial steps to flesh out the four-pillar framework as outlined above. It articulates the gap between the current status and capabilities and the desired target, and also identifies the main

uncertainties and how they will be progressively reduced. Based on the results of this work, the leadership can then gain a much more realistic picture of the business goals of the BIP, the necessary resources, and the funding, especially for the resource-intensive delivery phase and the best organization and governance to ensure success. (See also Box 4.)

**Box 4: Examples of the Iteration Zero approach**

- A leading company in the space market set up an Iteration Zero taskforce and, within three months, developed a basic product design, organizational design, and business plan for a new product innovation. This multidisciplinary analysis provided confidence for management to launch the project with a new legal entity and newly recruited resources, including some from other sectors to provide fresh ideas (for example, an industrialization specialist from automotive and manufacturing goods).
- An energy company adopted an Iteration Zero approach, managed using a three-sprint process; this showed that an envisaged disruptive technology would not be competitive enough to meet company standards, even after full redesign and optimization of the business plan. The quality of the initial analysis allowed an early management decision to be made without commitment of significant resources.

## INSIGHTS FOR THE EXECUTIVE – COMBINING STRENGTH AND AGILITY

Breakthrough innovation is inherently more challenging for the complex product and system industry than it is for other industries. To succeed, players need to focus on the interface between the BIP and the parent organization, carefully combining the agility of the BIP with the strength of the corporation. This means focusing on practices such as:

- Setting up a multidisciplinary Iteration Zero taskforce to identify and mitigate the main uncertainties at the outset and define the actions to mitigate them
- Achieving early precision on the target offer requirements
- Designing the product architecture to minimize interface complexity and enable agile working on individual modules
- Adopting a careful Make/Use/Buy strategy that balances the need to leverage corporate assets with flexibility to engage the external innovation ecosystem
- Considering brand and market access at an early stage to minimize the likelihood of failure at the scale-up phase
- Using resourcing tactics that provide a dedicated core team while leveraging corporate specialist expertise in a concentrated way to enable agile approaches
- Setting up the right governance and funding model to suit the nature of the new business, with the highest-possible level of sponsorship within the parent organization

Despite the challenges, some players in the A&D sectors have been very successful using these practices, for example, Airbus DS with its OneWeb satellites joint venture, and General Dynamics Electric Boat with its state-of-the-art Virginia-class submarine, which is the US Navy's latest submarine. Ultimately, there is no reason any big corporate, even in a highly regulated sector, cannot combine strength with agility to deliver world-beating breakthroughs.

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# AN INTERVIEW WITH ANDREAS MATTHÄ



**ANDREAS MATTHÄ**

CEO AND CHAIRMAN OF AUSTRIAN FEDERAL RAILWAYS (ÖBB)

## INTRODUCTION

**ÖBB – or Österreichische Bundesbahnen – is an Austrian railway mobility and logistics service provider that was first formed in 1923. Today, ÖBB has over 40,000 employees, and it transported over 320 million passengers and 94 million tons of goods during 2021. ÖBB had a national monopoly on the railway in Austria, but since 2011 this monopoly has been broken up, and ÖBB now needs to prove its worth to its customers every day. One vital part of staying at the top of their customers' minds is having a clearly defined purpose to guide strategic decision-making. In 2018, Eurobarometer's survey showed that Austrian railway passengers were among the most satisfied in all of Europe. Today ÖBB is a modern company that is well positioned for the future – operating Europe's second-strongest railway cargo company and largest night-train fleet, competing with short flights.**

Andreas Matthä has had a long career at ÖBB, starting in 1982 as a Construction Supervisor and advancing into different management positions ranging from Team Leader to Head of Finance & Controlling. In 2016 Andreas became ÖBB's Group CEO. In this interview he shares fascinating personal insights about his journey at ÖBB and the future of the European mobility market.



## HOW HAVE YOUR VARIOUS PERSPECTIVES AND ROLES HELPED YOU IN YOUR CURRENT POSITION AS CEO?

As a professional bridge engineer, I started at ÖBB with the knowledge that bridges only work if there are stable abutments and strong foundations on both sides. Using this as a metaphor for ÖBB as a company, it means balanced relationships with residents, clients, stakeholders, suppliers, and society are important to keep all our projects on track – in time and on budget. Our focus must always remain on people and a sustainable prospect for society and the economy.

In addition, I would like to emphasize that a single person cannot manage a huge company group such as ÖBB. It needs teams at all levels – cross-functional and cross-cultural – and a spirit of trust.

## WHAT HAVE BEEN THE BIGGEST AND MOST IMPORTANT DEVELOPMENTS (SUCH AS MARKET, TECHNOLOGY, REGULATORY) IN THE AUSTRIAN RAIL INDUSTRY, FROM YOUR PERSPECTIVE, DURING YOUR YEARS AT ÖBB? HOW HAVE THESE IMPACTED ÖBB?

40 years ago, ÖBB was purely a railway company. It was stable and traditional, but the road – cars and trucks – and airplanes stood for modernity and innovation. That has changed tremendously over the years. Today, ÖBB has a refreshingly young image; it is a modern, sustainable and smart mobility and logistics provider!

The basis for this change in image and customer loyalty involved huge investments by Austrian taxpayers in railway infrastructure and trains – new lines, fast tracks, modern railway stations, and a rather big new-train fleet. In addition, there has been an enormous push toward digitalization, which made rail travel and transport faster, easier, and more efficient. At ÖBB we are quite proud of our good cooperation with the Austrian railway industry. This has allowed us to take up a pioneering role in many technical fields in the European railway sector. At the same time, our willingness to pilot new solutions has increased the domestic industry's innovation power and strengthened its worldwide market position.

In recent years, railway market liberalization has drastically changed conditions for ÖBB in its passenger home market. We have to prove ourselves every day and deliver the best offer and service for our customers. ÖBB has successfully met this challenge, and we have managed to remain the leading mobility provider in Austria. Furthermore, with our new brand, "ÖBB Nightjet," we have initiated a sort of renaissance for night trains in Europe, successfully stretching our network from France to Poland and Belgium to Croatia.

## COMPANY PURPOSE

**YOU HAVE REVISITED YOUR PURPOSE TO GUIDE STRATEGIC DECISION-MAKING. WHAT MAIN TRIGGERS MADE YOU LOOK INTO AND MORE CLEARLY DEFINE YOUR COMPANY PURPOSE?**

I am strongly convinced that purpose and commitment drive people to their best performance – to do their best for their clients, their company, and their country. At ÖBB we have always observed this energy of purpose in times of crisis – throughout the company's 100 years of history. When the going gets tough, the cohesion and crisis management power of railway workers is enormous – as you can see now in Ukraine, with the railway people of Ukrzaliznytsia (UZ) doing an incredible job keeping the country going during wartime.

And it is this energy, this driving force of purpose, that I want to use for pushing ÖBB forward.

**MANY COMPANIES TEND TO FOCUS ON THE "WHAT" AND "HOW." WHICH IMPACTS AND BENEFITS HAVE YOU OBSERVED FROM HAVING A CLEAR AND ANCHORED "WHY" (PURPOSE) ACROSS THE ORGANIZATION?**

Revisiting ÖBB's purpose helped us redefine our strategy and refocus the leadership team on the major market challenges. It also helped us manage the multiple crises we have faced in the past three years – starting with the massive impact of COVID-19, especially in the passenger transport sector, which was followed by a shock in the cargo sector caused by the energy and supply chain crises due to the war in Ukraine.

However, ÖBB's purpose is also an asset in the labor market. Today the "why" behind a job, a service, is a major incentive for young people to take up a job and to join a specific company. This goes especially for ÖBB, with its strong commitment to sustainability and climate protection. We now see a lot of young, high-qualified people who would like to join ÖBB because of its clear purpose – its beneficial contribution to healthy, sustainable development of the society and economy. Therefore, our purpose, the bigger meaning behind railway jobs, is now a crucial part of our recruiting activities and campaigns.

## HOW HAVE YOU WORKED TO ALIGN AND DECIDE ON A COMMON PURPOSE ACROSS SUCH A LARGE AND COMPLEX ORGANIZATION AS ÖBB?

We have put quite a lot of energy and workforce power into the definition of ÖBB's purpose – actually, it has been more of an excavation project, as our purpose has always been there. It has always been part of railway workers' DNA, without having been verbalized or written down. However, now we are in the middle of a massive generation switch. About half of our 40,000 employees will be leaving the company within the next seven years. So we need to transfer the strong ÖBB purpose to the next generation of railway workers – and this can no longer be done by a slow oral history transfer. In 2017, with the guidance and support of ADL, we started a company-wide program of workshops, surveys, and interviews to excavate and write down ÖBB's purpose. The next step was to transfer this purpose to our market and employer branding. This was done in 2018, again with a company-wide set of interviews and workshops. More than 800 colleagues were involved in this two-year, multilevel program.

## WHICH LEVERS AND MEASURES HAVE YOU TAKEN TO "ACTIVATE" THE PURPOSE IN THE WIDER ORGANIZATION?

The company's purpose and values must be clear and consistently communicated through all channels. Every employee must know what the company stands for. It is even more important everyone practices the values daily. Of course, the executives and the management team of ÖBB play a very special part as role models.



## BUSINESS RESILIENCE

**TODAY EUROPE IS FACING SEVERAL CHALLENGES IN TERMS OF ENERGY SCARCITY, SUSTAINABILITY, HIGH INFLATION, AND GEOPOLITICAL TENSIONS. WHICH MAIN MACRO TRENDS ARE CURRENTLY IMPACTING AND TRANSFORMING YOUR INDUSTRY, AND HOW DO YOU SEE ÖBB CHANGING IN THE COMING YEARS?**

We have all gone through difficult challenges in recent years, whether this was the COVID-19 pandemic or the energy price crisis. Nevertheless, the biggest and most threatening challenge for our society and economy is the climate crisis. The transport sector plays a crucial role here, as it is the one sector in Europe's economy still with growing rates of CO<sub>2</sub> emissions. However, the climate crisis provides us with the opportunity of shifting traffic from road and airplane to rail.

The European railway sector is ready to start the transformation and greening of transport. But to reach this, politics at both the national and European level have to set the necessary framework conditions – such as cost transparency and a level playing field concerning regulations, taxes, and standards for all modes of transport.

WHAT WOULD YOU CONSIDER TO BE SOME OF YOUR KEY ACHIEVEMENTS IN TERMS OF INNOVATION, PARTNERSHIPS, AND NEW OFFERINGS AND/OR CUSTOMER EXPERIENCE? WHAT WERE THE MAIN DRIVERS FOR THESE AND WHAT BENEFITS DO YOU SEE?

The railway sector has changed dramatically in the past 20 years – moving from a public administration approach to a customer-focused service sector. For example, look at our rail stations: They are modern mobility hubs, directly connecting trains with buses and individual

shared mobility. With our new service, “ÖBB 360,” we offer sharing of bicycles, e-bikes, scooters, and ÖBB Rail&Drive cars for the last mile.

**MANY EUROPEAN RAIL OPERATORS HAVE ABANDONED THEIR NIGHT TRAINS. ÖBB HAS ALWAYS BELIEVED IN THIS SEGMENT, AND CONSISTENTLY EXPANDED ITS NIGHT-TRAIN SERVICES SINCE 2016.**

Many European rail operators have abandoned their night trains. ÖBB has always believed in this segment, and consistently expanded its night-train services since

2016. Today, we are the leader in Europe with our Nightjets, offering the most environmentally friendly way to travel across Europe. Since the demand and political pressure for night trains is increasing in many countries, there is broad interest in cooperating with ÖBB. We now have agreements with Deutsche Bahn, SBB, SNCF, and the Dutch NS to further expand the night-train network.

## LASTLY, YOU'VE BEEN WORKING AT ÖBB FOR 40 YEARS – CAN YOU DESCRIBE WHAT YOU THINK ÖBB WILL LOOK LIKE 40 YEARS INTO THE FUTURE, IN 2062?

During the last 40 years I have spent at ÖBB, the railway system has changed dramatically, and I am sure this trend will continue for the next 40 years. As the cleanest, most climate-friendly mode of mass transport, railway will play an even greater role in the future



***ALL MAJOR EUROPEAN CITIES WILL BE CONNECTED BY HIGH-SPEED RAIL, WHICH WILL REDUCE TRAVEL TIMES SIGNIFICANTLY AND THEREBY REPLACE SHORT- AND MID-DISTANCE FLIGHTS.***

traffic system than now. All major European cities will be connected by high-speed rail, which will reduce travel times significantly and thereby replace short- and mid-distance flights. Rural areas will be far better integrated in public transport schemes thanks to sharing and alternative means of transport. Connectivity between the various modes of cargo transport

will become closer, and the number of trains in the European rail infrastructure network will almost double thanks to digitalization. And still, railway people will be proud of their trains and their strong contribution to a sustainable society and a high-performing economy.











**ARTHUR  LITTLE**