Harnessing the Power of AI in Greece

EMBARKING ON THE PATH TO VALUE

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HARNESSING THE POWER OF AI IN GREECE

EMBARKING ON THE PATH TO VALUE

CHRYSSOS KAVOUNIDES

MARKOS GIAKOUMELOS

EVDOKIA KAFFE

In collaboration with

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EXECUTIVE SUMMARY

OVER THE YEARS, the potential of AI to generate business value has become apparent. Companies worldwide have jumped on the bandwagon, making significant investments in AI technologies.

According to International Data Corporation estimates[1], global AI investments will reach $97.9 billion in 2023, a 28.4% compound annual growth rate (CAGR) since 2018.

AI is especially critical during periods of global turmoil, such as economic or health crises. Its predictive and analytic capabilities enable businesses to anticipate and mitigate risks that can severely compromise operations and customer experience. And because AI has the ability to learn, it can help companies continuously improve upon these efforts.

Summary of the Report. Drawing on this research, the report compiles best practices and experiences into a structured guide for Greek organizations that wish to get started with AI.

We define AI as technologies that can display and augment human behavior because of their ability to analyze their environment and accomplish specific goals. As such, it offers tremendous potential for accelerating growth and unlocking benefits across the value chain. Although the myth that companies use AI to reduce costs still persists, it actually provides significant topline opportunities as well.

Players of different sizes and sectors dot the Greek AI landscape. Drawing on our executive interviews, we have segmented Greek players into three archetypes: start-ups, innovators, and large corporates. Each type faces its own opportunities and challenges when it comes to leveraging AI. Innovators are best poised to realize value from AI because they combine all the advantages that start-ups have (such as agility, talent, and so on) and large corporates have (including access to data and to capital) while having few of the disadvantages.

Our Greek competitive analysis yielded four key findings:

- **AI is already here in Greece.** In this report, we list more than 35 case studies in the Greek AI landscape. But this is only a partial listing: there are many more Greek companies actively pursuing AI opportunities.

- **There is more potential for growth in AI.** Even though there are multiple examples of AI application in Greece, most players do not apply a systematic and comprehensive approach at scale, that would enable them to realize the full potential AI.

- **To deliver on AI, a strong combination of business and technical skills is needed.** Our discussions with senior executives made it clear that a combination of business and technological roles is needed for the development of every use case.

- **Cloud is a key enabler for AI.** All of the executives we interviewed said they use cloud platforms for developing AI solutions.

Leveraging both best practices from BCG case experience and insights from interviews with Greek executives, this report discusses the five key success factors for implementing AI: a focus on the business opportunity, an iterative development process for use cases, a cross-functional team, an incremental approach, and seamless embedment of the technologies in business processes. The vast majority (80%) of the executives interviewed confirmed, for example, that they selected their use cases on the basis of specific business criteria.

Greek players from several industries have made significant steps towards deploying AI solutions and we see a plethora of use cases. However, Greek companies still don't harness the full power of AI, as they could follow a more strategic and structured approach which would help them benefit across their value chain.

To get the most impact out of AI, companies need to develop a portfolio of use cases and a road map for implementing them. Use cases should be developed with a structured approach and piloted before investments in industrialization are made. Agile ways of working are crucial because they facilitate better decisions, faster development, and better products.

Organizations also need to focus on certain enablers needed for scale. They include not only technology, but also data governance and people capabilities. The technology consists of a data and digital platform, usually cloud-based, to provide the increased processing power and scalability needed for coping with the growing amount of data. Since the data is often of poor quality, proper data governance will also be critical. Investments in technical skills and general awareness will also be important, so that teams have what they need to communicate and make good decisions when developing use cases.

An appendix at the end of the report provides a summary of how various companies in Greece are deploying AI in their operations to boost value.

How the Report Was Produced. In collaboration with Microsoft, BCG launched this study both to demonstrate how organizations in Greece are already leveraging AI and to make high-level recommendations on how to succeed in AI. The findings in this report come from a variety of sources. We conducted interviews with more than 30 executives at Greece-based companies (including startups), academic institutions, and tech investors and venture capitalists to collect case studies and insights regarding best practices. In addition, we drew on BCG case experience and thought leadership, on Microsoft insights, and on information available in the public domain.

NOTE

1. https://www.idc.com/getdoc.jsp?containerId=prUS45481219.

PART I:

UNDERSTANDING THE POTENTIAL OF ARTIFICIAL INTELLIGENCE FOR GREECE

According to ancient Greek mythology, Talos was a giant bronze robot created to protect Europa and the island of Crete from pirates and invaders. What began as a myth—and is perhaps the earliest instance of AI on record—is a reality today in Greece.

Data and digital technologies are driving a world of rapid change. The explosion of data has created unprecedented visibility of customer behaviors and needs, business activities, and market trends. Enabling technologies like cloud solutions make it possible for companies to collect, store, and process. And the pervasiveness of digital technologies means data can be collected 24/7.

The consumer, too, has changed. Ready to engage with brands anywhere, anytime, the consumer has come to expect more personalized products and services. New market forces are at play, with trends like crowdsourcing, a sharing economy, and disintermediation upending old business and operational models.

As the digital landscape continues to evolve, the ability to build and monetize data assets will be crucial for competitive advantage. AI will be a key component of the digital transformation journey of every organization. To better understand how Greek companies can best leverage this opportunity, we identified best practices for launching and scaling AI initiatives followed by global leaders as well as companies headquartered in Greece. (See "About the Study" section at the end of this report.)

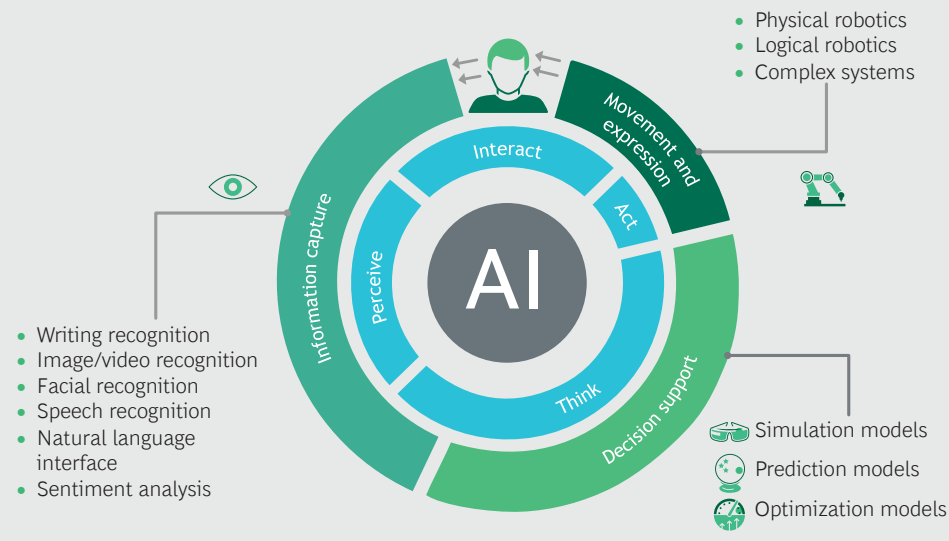
DEFINING AI

The term "AI" refers to technologies that display intelligent behavior by virtue of the fact that they are able to analyze their environment and take actions—with some degree of autonomy—to achieve specific goals. More specifically, AI can augment human functioning in areas such as visual and speech recognition, decision making, and motion. (See Exhibit 1.)

These applications support a wide range of different use cases and open the door to many business opportunities:

- **Information capture.** Tools such as machine vision, speech recognition, and natural language processing enable data collection.
- **Decision support.** Advanced analytics (AA) can be used for information processing, learning from data, planning, and exploring.
- **Movement and expression.** Robotics solutions enable image generation, speech

EXHIBIT 1 | AI Can Augment Human Functions in Multiple Ways



Source: BCG analysis.

generation, handling and control, and navigation and movement.

With their undisputed processing power and speed, machines are now able to recognize and react in today's fast-changing environment. AI can take on repetitive and time-consuming tasks, allowing humans to focus their attention on more interesting and demanding activities. When used in conjunction with human ingenuity, it can do amazing things.

AI'S ABILITY TO ACCELERATE DIGITAL TRANSFORMATION

Together, these AI tools can turbocharge digital transformation because they help provide new ways to address emerging needs across the value chain. (See Exhibit 2.) Machine learning (ML) algorithms can improve the customer experience by enabling the development of personalized recommendations and content. Optimization algorithms can help with product pricing and promotion because they can evaluate customer transaction information along with public information. AI is also key for predictive maintenance: data, statistical algorithms, and ML algorithms can read the data to anticipate equipment failure before it happens.

These are only a few examples. Needs related to customers, products, operations, networks, risk, and enterprise can all benefit. The potential is huge: Tractica projected that annual worldwide revenue for enterprise applications of AI would reach $126 billion by 2025.

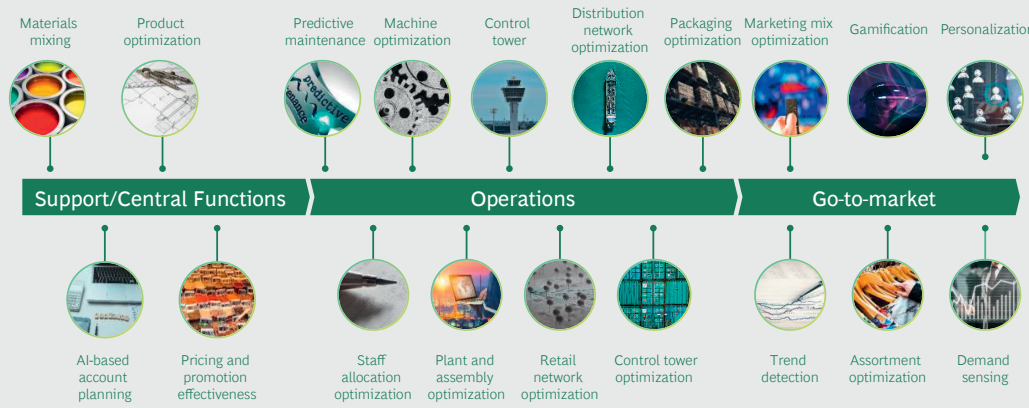
"AI and machine learning is being infused into every experience in a deep way, and you're going to see a lot of that."

—Satya Nadella, CEO, Microsoft

RECOGNIZING AI'S IMPORTANCE

Senior executives of technology giants that include Microsoft, IBM, Alphabet, and Amazon have publicly acknowledged and extolled the value of AI for business. They are not alone. The European Union (EU) plans to invest €20 billion per year in various AI-related initiatives. These include €1.04 billion for platform development and large-scale pilots, €1.5 billion for establishing sites for testing AI-powered products and services throughout Europe, and €100 million for AI start-ups in the early stage and for companies in their scale-up phase.

EXHIBIT 2 | AI Can Help Transform the Entire Value Chain



Source: BCG analysis.

MYTHS VS. REALITY

Along with the hype about AI, several myths continue to be perpetuated. (See Exhibit 3.) Some people believe, for example, that the application of AI does not yield any benefit, mainly because of the excessive amount of investments needed. But thanks to cloud technology, algorithms, and the increasing prominence of data, many different organizations have used AI to build huge sources of competitive advantage.

Netflix, one of the first companies to develop a recommendation algorithm, has deployed AI to shore up its competitive edge in a variety of ways. In addition to making personalized movie and TV recommendations, Netflix ML algorithms are used to personalize the artwork, movie categories, and ranking of titles that appear on each customer's movie page. Algorithms also shape the content of the movies Netflix produces in-house and determine its advertising and channel mix.

Other AI myths have been shown to be equally false. Although it's often said that companies use the technology primarily to reduce costs through automation, most of its potential comes from improving revenue through providing more offerings better suited to customer needs.

BCG helped Starbucks, for example, use AI to develop personalized emails for its customers as a way to meet their need for individualized attention and immediate satisfaction. The impact was huge: in just one year, marketing campaigns with 400,000 email variants helped boost incremental revenue by $250 million and customer engagement by 150%.

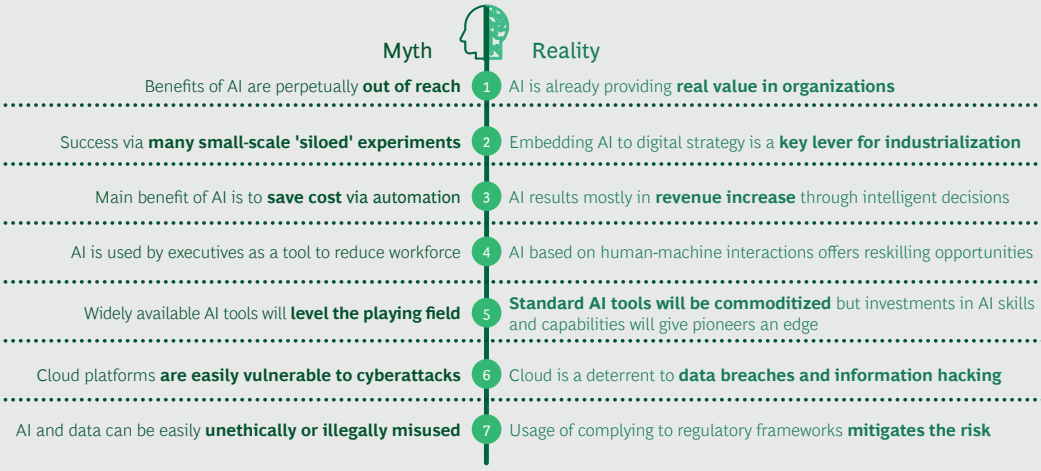
"Some people call this artificial intelligence, but the reality is this technology will enhance us. So instead of artificial intelligence, I think we'll augment our intelligence."

—Virginia Rometty, CEO, IBM

While it's often said that organizations use AI to reduce the size of the workforce, firms in fact regard it as an opportunity for employees to take on higher-value work.

The same can be said of the misconception about the vulnerability of cloud-based AI platforms to cyberattacks. Today, centrally located cloud platforms are considered generally safer than on-premise infrastructure. Even companies that work with highly confidential data, such as banks and insurance companies, increasingly rely on tech giants' cloud systems.

EXHIBIT 3 | Several AI Myths Have Been Dispelled



Source: BCG analysis.

THE GREEK AI LANDSCAPE

Numerous players from many sectors are successfully leveraging AI in Greece today. HELPE, one of the leading energy groups in South Eastern Europe, developed a proprietary tool that leverages ML algorithms to optimize crude blend in its refineries. Stoiximan, the leading online gaming operator in Greece, leverages the power of AI to automate time-consuming and repetitive internal processes, offering a better experience not only to customers but also to employees by providing more interesting and challenging work. "We want our people to use their intelligence and creativity while letting the machines deal with repetitive tasks," added Constantinos Liapis, head of applied AI at Stoiximan. And Signal Maritime's AI-based platform can increase revenues by up to €1 million per ship annually.

Our conversations with various executives yielded some important insights about the ways their organizations have implemented AI. Greek companies deploying AI fall into three categories based on their size and maturity: start-ups, innovators, and large corporates. (See Exhibit 4.) The challenges and opportunities these companies face, are related to their ways of working, their access to data, and their skills and capabilities.

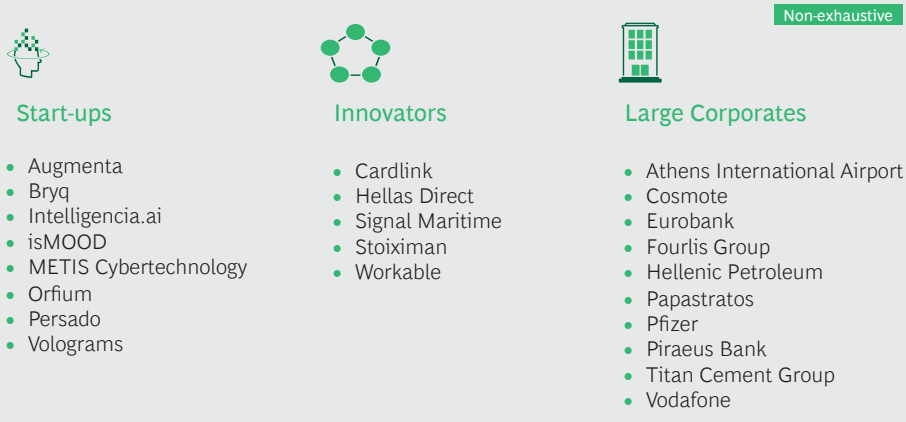
Start-Ups. At one end of the spectrum are start-ups. These young companies develop and integrate AI as part of their service or solution offering. Intelligencia.ai, for example, provides predictive analytics to pharmaceutical companies to help them evaluate the probability of a clinical trial's success and optimize their design. The large number of start-ups is evidence of the many new business opportunities AI offers.

"It's hard to overstate how big of an impact [AI] will have on society over the next 20 years... We're on the edge of the golden age...There is so much more to come. It's just the tip of the iceberg."

—Jeff Bezos, CEO, Amazon

Start-ups are usually able to leverage AI because they have talent with the needed skill sets and are able to attract it as well. The founders of these companies, who are often software engineers, have the social network needed to bring on board people who are eager to participate in a new undertaking despite the risk. These young companies have usually adopted agile ways of working and are data-driven, which makes it easier to develop and use new kinds of technologies and platforms.

EXHIBIT 4 | Numerous Players of Different Sizes and Sectors are Active in the AI Space in Greece



Source: BCG analysis.

But start-ups also face substantial challenges. It can be difficult to access large amounts of data or secure the funding needed for infrastructure investments. These companies also lack the strong networks needed to scale their solutions and get an acceptable ROI in order to fund new initiatives and further expand their operations.

Large Corporates. At the other end of the spectrum are large corporates. Typically, these companies have been in existence for years, often with global operations and customer bases. They are AI users rather than developers.

These companies have some significant advantages. They have enormous amounts of largely untapped data that they can mine for customer and operational insights. They also have the funds to make any needed infrastructure investments. Since many of their processes can be automated with AI, these organizations have an opportunity to shift some of their employees to more value adding activities that require human involvement.

But big companies also face significant challenges. Their large size can hamper agile ways of working and decision-making. It's often difficult to achieve the buy-in and cultural change needed for digital transformation. Although there is a lot of data on hand, much of it is of poor quality—it's unstructured, outdated, or incomplete—and so requires significant resources to make it accessible and usable. And the large number of employees makes training difficult as well.

Innovators. In the middle of the spectrum are innovators. A hybrid of start-ups and large corporates, innovators enjoy the advantages of both start-ups and large corporates without most of the disadvantages. Like start-ups, they are able to leverage AI because of their data-driven culture, agile ways of working, and ability to attract talent with the needed skill sets at moderate cost. Unlike start-ups, they are able to develop multiple use cases at the same time and give each employee a role with pre-specified duties, which prevents overlapping. And like large corporates, they have funding and enormous amounts of their own data as well as a broad network. For all of these reasons, innovators are in a better position to exploit AI opportunities.

Although through our research with several Greek start-ups, innovators, and large corporations we identified AI applications across the value chain, most organizations have not realized its full potential: they have yet to follow a strategic approach and a structured methodology to be able to scale it and treat it as an inherent component of their organization.

Signal Maritime, a commercial ship management company, operates a platform that uses multiple AI models to help shipowners make better-informed chartering decisions

Chartering optimization. The Signal Ocean Platform's multiple AI models (including ML and NLP algorithms) comb through unstructured data to provide customers with useful information on ship and harbor availability. More specifically, the platform extracts relevant information from e-mails and uses fusion algorithms to determine the state of each vessel. State-of-the-art algorithms process ship locations and information on commercial deals so companies can assess the competition in real time. In addition, planning algorithms assess commercial data to predict how much tonnage will be available in the near-term. The platform can also instantly calculate and compare profitability across all vessels competing for a cargo. All of this information helps customers make better chartering decisions faster and more confidently.

PART II:

EMBEDDING AI IN THE DIGITAL TRANSFORMATION AGENDA

To overcome the challenges mentioned above and realize AI's full potential, Greek companies need to embed it firmly in their digital transformation agenda. This requires a solid understanding of the factors for success and a structured approach to implementation that outlines the key steps to be followed.

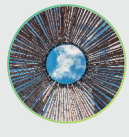
KEY SUCCESS FACTORS

Successful adoption of AI requires five practices. (See Exhibit 5.)

Success factor No. 1: The business opportunity is addressed first. Organizations commonly focus on the technology first, without knowledge of which business problem or business opportunity the technology needs to address; they then retrofit the technology to the business processes. Instead, companies need to start with the business problem or opportunity and identify the AI use cases they can develop to address it. The vast majority (80%) of the executives interviewed confirmed that they selected their use cases on the basis of specific business criteria.

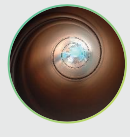
Success factor No. 2: An iterative process is key for developing optimal use cases. The perfect AI use case cannot be developed all at once—it's a continuous learning exercise. Companies, therefore, need to continuously test, learn, and revise the use case, in an agile

EXHIBIT 5 | Five Key Success Factors to Maximize Impact From AI



Business

Focus first on identifying the business problem/ opportunity to address impact by leveraging AI



Iterative process

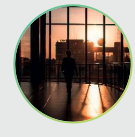
Follow a continuous 'test and learn' process for the development to achieve better outcome

Cross–functional team

Establish the appropriate mix of business and technical capabilities required for execution

Incremental capability building

Gradually develop the required people and technology capabilities, parallel to use cases development to maximize ROI



Embedding AI in business process

Adjust business processes and drive the appropriate change management effort to ensure seamless integration of AI

Source: BCG analysis.

COSMOTE, the largest mobile network operator in Greece, has several advanced analytics and AI applications that deploy the appropriate safeguards (such as pseudonymization) for personal data and in compliance with data protection rules

Network analytics for real-time quality control and service improvement. Cosmote developed this use case to optimize the quality of service in its network. The company developed an algorithm that can assess the quality of DSL and VDSL connections in real time, making it easier to manage network overloads and thereby avoid slow or interrupted internet connections. The algorithm captures sensor data (such as temperature) from different telecommunication distribution cabins on streets and combines it with data on network usage and overloads. Using big data infrastructure to process this data, the algorithm predicts when the cabins will overheat and notifies technicians to preemptively resolve any problems.

way of working. Speed is of the essence: teams need to follow a "fail-fast" approach that exposes the potential flaws in a use case before significant effort is invested in development.

Success factor No. 3: A cross-functional team will help ensure successful delivery. It's essential for the teams that develop use cases to have a variety of complementary business and technical skills and capabilities. Since use cases need to address business needs first, the business needs should lead or at least be heavily involved in developing the technical deliverable. The different skill sets in concert with an iterative development process provide the agility needed for quick and targeted outcomes. An empowered product owner from the business should guide the team's effort and have ownership of the results to ensure they have business impact.

Success factor No. 4: Building capabilities incrementally and simultaneously with use cases helps to avoid wasteful investments. Companies should not build skill sets and technology infrastructure capabilities all at once, but incrementally in parallel with the building of use cases, in order to fund the journey. Two types of capabilities are needed; technical (e.g., data scientists) for the digital team and general on AI for the wider organization, to ensure the ability to propose use cases and integration in business processes. This will allow companies to see the impact of their investments and avoid developing redundant infrastructure. Moreover, they can use the value created by the initiative to fund the rest of the journey with confidence.

Success factor No. 5: AI adoption will be more successful if the solution is seamlessly embedded in business processes. To get the most value from AI, organizations must dedicate most of their efforts to adjusting business processes, developing robust and intuitive user interfaces, and driving the

Hellas Direct, an online direct insurance company, developed an automated, ML-driven tool to personalize insurance plan pricing

Pricing determination. The company developed a fully automated ML-driven tool that uses many different parameters—car technical specifications, customer statistics, competitors, and so on—to price insurance plans. The data engineers don't treat the tool as a black box because they want to have visibility on which parameters affect the output. As a result, they're able to evaluate and back-test the algorithm regularly.

relevant change management activities. BCG's analysis found that in companies where initiatives were successful, 70% of the effort focused on people and business processes, 20% on the technology, and 10% on the data models.

TAKING A STRUCTURED APPROACH

For companies launching AI initiatives, it's essential to follow three practices. (See Exhibit 6.)

- **Establish a portfolio and roadmap.** Companies need to develop a portfolio of use cases and a roadmap for implementing them. AI initiatives should be clearly linked to the general business strategy. That way, AI use cases will be based on business needs or opportunities and prioritized to deliver value to the organization.

- **Deliver use cases.** It's important to follow a structured methodology, with cross-functional teams working in agile sprints to deliver each use case in phases, including piloting and industrialization. Tracking use case performance provides a way to prove success to management and reprioritize the portfolio if necessary.

- **Build enablers for scale.** No less important, companies need to build the enablers needed for scale. In order for the organization to progress on its digital transformation journey and to leverage AI at scale, it should focus on evolving the foundations that will enable it to scale on three fronts: digital and data architecture, data governance, and people.

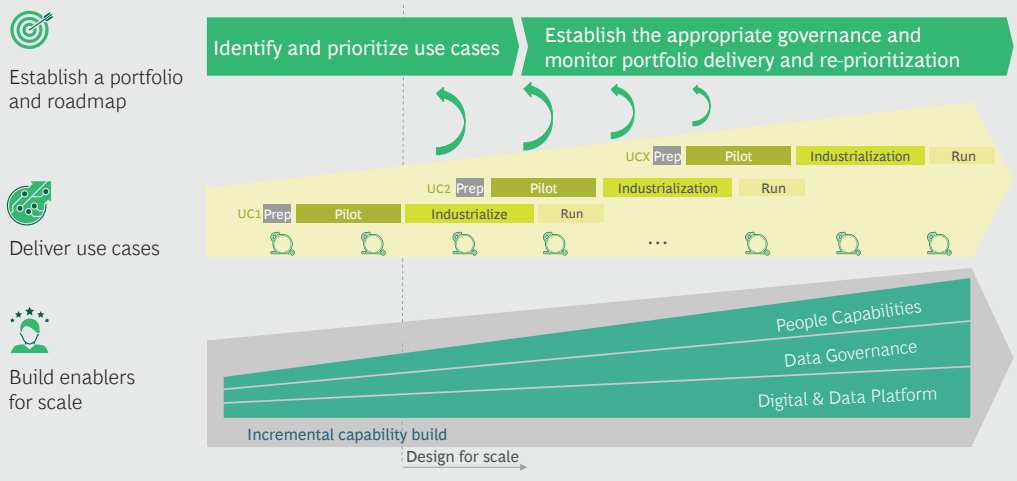
Establish a Portfolio and Roadmap

The first step is to identify the most important initiatives and link them to the overall strategic value and the digital agenda. What type of value creation is the goal—for example, strengthening efficiency, supporting existing revenue streams, or creating new ones? What role will AI play in achieving this goal—will it improve decision making, process automation, or personalization of customer experience? How will the strategy be realized—can efforts be focused to avoid distractions on less crucial digital issues? Companies should identify use case opportunities in conjunction with these objectives.

According to the MIT-BCG report, the vast majority (88%) of organizations that see business impact from AI integrate with their broader digital strategy. (See Exhibit 7.) That's because integration gives the entire organization access to necessary data and allows information to flow to current business processes, both of which are critical for scale.

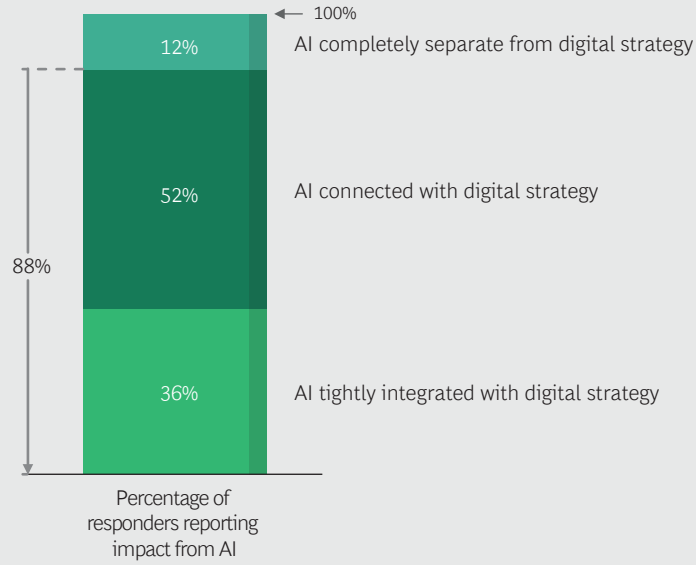
AI contributes to the top line and creates costs savings that go beyond automation.

Exhibit 6 | Companies Should Implement Use Cases with a Focus on Three Elements



Source: BCG analysis.

EXHIBIT 7 | Integrating AI Initiatives with the Overall Corporate Strategy Creates Business Impact



Source: Winning with AI MIT-Sloan Mangement Review, October 2019.

According to BCG research, they are 12 percentage points more likely to see revenue impact and 20 percentage points more likely to have seen cost or revenue impact.

The business needs and strategy determine which use cases should be developed. It's important to set up a balanced portfolio that prioritizes use cases that best deliver value, use resources efficiently, and manage risk. This means including use cases that address key pain points, focusing on areas quick to impact financial performance, and allowing for experimentation and stable performance.

To create a prioritized portfolio and roadmap, each use case needs to be evaluated across multiple criteria: what the value impact of the initiative will be; how long it will take to see bottom-line results; what effort is needed to make it succeed; whether it will provide an opportunity to build strategic capabilities; and whether there are any specific considerations for securing compliance. Other criteria may also be worth considering, such as the use case's potential to disrupt traditional ways of working and whether it's scalable to other business areas. It's also important to consider whether the data foundation is in place.

The number of use cases being developed simultaneously is another important consideration. Antonis Kyrkos, group strategic

Titan Cement Group, a cement producer, developed an AI algorithm to increase productivity

Grinding mill productivity increase. In collaboration with a start-up company, Titan developed a proprietary AI algorithm to optimize throughput in real time. By using the algorithm to assess the operations of one of its grinding mills in the US, the company increased the mill's productivity by 10% to 15%. Because Titan elected to pilot the project in the US, where whatever produced is sold, the higher productivity was quickly translated into higher profitability. Titan's follow-on projects in more sophisticated factories that deployed sensors improved throughput between 8% and 10%.

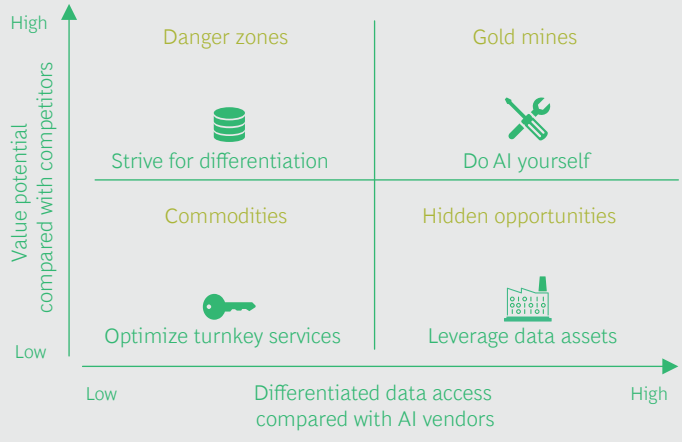
planning director of Titan Cement Group notes, "Keep a manageable number of use cases that would be able to transition from pilots to scaled solutions considering three factors: lack of skills, factory overload, and the need to keep costs at a comfortable level." Companies need to use strong governance to structurally ensure that projects stay in line with the roadmap and use case prioritization. This is especially important when there are many ongoing use cases.

Determining Whether to Build or Buy AI Solutions. Companies at this point need to ask a key question: should they build or buy their AI solutions? According to a BCG Henderson Institute[2] analysis, the build-or-buy dilemma is rarely an either-or choice.[3] In general, when it comes to building areas of competitive advantage, purchasing standard solutions will usually prove to be risky: after all, a company that is using the same instruments as the competition will not be able to differentiate itself and will ultimately put its existence at stake. To illustrate with an example from the automotive industry, car manufacturers will outsource production of their steering wheels, but not of the engine. Building every AI solution is also not a usual practice because of the cost and effort involved. In the end, most organizations follow a hybrid approach, building some solutions and buying others, with consideration of their specific strategic goals and data and skills requirements.

Firms should reframe build-or-buy decisions along two dimensions: how valuable the process or offering is for competitive advantage, and how strong their control or access to high-quality, unique data is relative to the vendor. (See Exhibit 8.) When combined to form a matrix, analysis of these dimensions makes it clear that AI efforts fall into four groups:

- **Commodities.** When the AI solution is a commodity and data cannot be used to add a competitive advantage, companies should buy it. This approach is useful for improving processes like HR and finance as well as IT infrastructure without incurring high costs.
- **Hidden opportunities.** When firms have data that is not in areas of competitive advantage, they should build AI solutions in partnership with vendors that have technological expertise. This way they can gain experience in training algorithms and even sell application services to other companies in related fields. Companies that are able to capture their employees' expert knowledge can take advantage of NLP solutions to analyze the data and mine insights from it.
- **Danger zones.** In some instances, a vendor may have better access to strategically vital data than the company itself. A vendor that works with multiple

EXHIBIT 8 | Four ways to approach the Build-or-Buy choice



Source: The Big Leap Toward AI at Scale, Philipp Gerbert, Sukand Ramachandran, Jan-Hinnerk Mohr, and Michael Spira, June 2018

companies on the same topic, such as insurance fraud detection, can create a comprehensive, high-quality database far superior to what any single company could create. In this instance, insurance companies can profit from these large and differentiated datasets; but because they are locked in to the specific vendor, they lose their independence and pay high fees. If, however, companies can limit their dependency on the vendor and develop or acquire differentiated data on their own, they have an opportunity to create high value.

- **Gold mines.** In areas key to competitive differentiation, companies should build the AI solutions themselves. Vendors can help accelerate development, but companies need to keep the IP and development capability in-house. Companies need to have a good understanding of what needs to be managed in-house to protect their competitive position. Strong in-house talent and the right mix of vendors are critical, as are robust vendor negotiation and management skills. A global tire manufacturer followed this approach when, with BCG's support, it developed an AI platform to predict the demand for different tire models at individual stores on the basis of anticipated tire wear.

Regardless of how an AI solution is categorized, the key is understanding how to work with vendors to implement AI in the most cost-efficient and future-proof way, strengthening rather than sacrificing competitive advantage. Of the companies interviewed for this report, only 10% chose to buy ready-made tools and adjust them afterwards. Almost 90% built their solutions and tools from scratch, either alone or with a partner. Market-available cloud platforms were a key component of both purchased and internally built solutions.

Omilia and Intelligencia are examples of vendors that sell and adapt their own solutions to satisfy the requirements of the client company.

Omilia provides Natural Language Understanding (NLU)-enabled Interactive Voice Response (IVR) and chat technologies to enterprises throughout the world.throughout the world

Omilia's deepNLU® Voice IVR.
Conversational IVR is a voice-driven, hands-free customer self-service that uses NLU to understand the content and the context of spoken requests. The company has developed specialized banking and telecommunication systems for most local and several international financial institutions and telecommunication providers. Piraeus Direct Solutions (PDS) is a good example. Drawing on the retail banking knowledge base as well as the context, the system can analyze clients' responses in depth. The result is a completely natural dialogue, almost without limitation, ensuring excellent customer experience and very high automation rates.

Intelligencia is a start-up that uses machine learning algorithms to assess the probability of a clinical trial's success and thereby reduce drug development risks

Clinical trial risk optimization.
Intelligencia's ML algorithm assesses the probability that a clinical trial will be successful and move to the next phase and/or result in regulatory approval. This helps pharmaceutical companies review their priorities and efficiently manage their portfolio. Algorithms can also identify the factors that most increase risk, and therefore recommend the parameters that should be changed to make success more likely.

Other AI players, like Satori Analytics, Margera, Pobuca, and Space Hellas, partner with companies to develop custom-made infrastructure and tools.

Deliver Use Cases

Successful development and implementation of an AI solution makes it critical to create a use case that demonstrates how the solution can be leveraged to address a specific business problem or opportunity.

Follow Four Phases of Development. There are four major phases of development: prepare, pilot, industrialize, and run and continuously improve. (See Exhibit 9.)

Step 1. During the prepare phase, companies should align on the scope of the use case and set expectations regarding the timeline. It's also important to set up a cross-functional team to steer the effort.

Step 2. During the pilot phase, the first proof of concept is built and tested against historic data to confirm data availability and the business case. A pilot use case is then run on limited data to test the user interface and apply the new ways of working in a controlled environment.

Step 3. The industrialization phase follows. During this phase, teams are trained, and the technology is scaled to ensure adoption by the business will be successful and well embedded in business-as-usual operations.

Step 4. Now that the use case is operational at scale, the run and continuously improve phase can begin. During this phase, the team monitors the industrialized solution's performance and uses the feedback to make improvements on an ongoing basis. Industrialized use cases also provide learnings that can inform the development of successive use cases.

Engage Cross-functional teams. Our discussions with senior executives made it clear that a combination of business and technological roles is needed for the development of every use case. (See Exhibit 10.)

- **Product owner.** Leading the project from design to launch, the product owner is

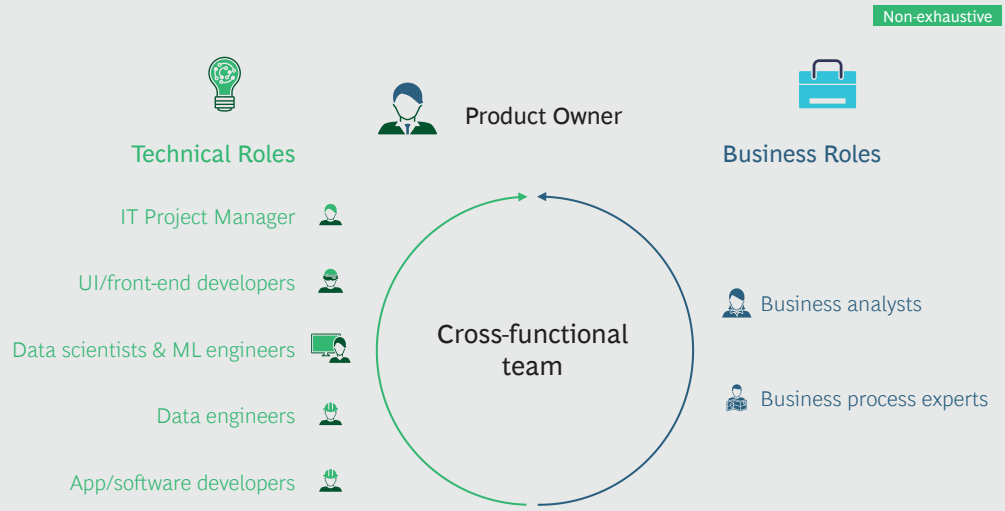
EXHIBIT 9 | Four Phases are Essential for Delivering Optimal Use Cases

Source: BCG analysis.

Workable is a recruiting platform that provides hiring recommendations using NLP and ML algorithms

Hiring recommendations. Workable's Resumé Parser uses NLP algorithms to transform the unstructured data from resumés and job descriptions into structured data. ML algorithms then review past hiring decisions to make hiring recommendations. They can also be used to scan for similar job postings and match candidates' resumés with them.

EXHIBIT 10 | A combination of Business and Technical Roles is Needed for the Development of Every Use Case



Source: BCG analysis.

responsible for making sure that the AI solution is designed with the appropriate product features, and for aligning technical and business capabilities to develop the solution accordingly. As the head of change management efforts, the product owner needs credibility to mobilize business users as well as the ability to take a holistic view of the company's needs over the long-term.

- **Technical roles.** Deep expertise in AI, data analytics, and application solution development is needed to develop AI-based use cases. Technical roles, such as user-interface developers, data scientists, data engineers, and software developers, are key components of the cross-functional team responsible for the solution design; data extraction, transformation, and loading; algorithm development and integration; and front-end and application development. These roles also ensure that the systems, platforms, and software are integrated and user-friendly.

- **Business roles.** Deep understanding of the business practices and processes in order to develop use cases in a way that best address the business problem or opportunity. Roles such as business analysts and business process experts analyze the processes, working hand in hand with the technical roles to make sure the use case meets the defined goals. The participation of people with business capabilities is crucial because they can understand both the technicalities and the business targets and interpret the results of the project in relation to the management team's requirements.

Identifying people with the appropriate business capabilities is no easy task. "Algorithms, technical processes, data processes are not a constraint—they are well documented in various sources," noted Group CIO at Hellenic Petroleum, Leonidas Kovaios. "Business experience, however, is more difficult to find."

One important role operates outside of the cross-functional team: that of the business sponsors, who provide resources and ensure that the use case delivers value overall. Typically, sponsors are members of the leadership team.

Adopt Agile Ways of Working. The cross-functional team should use agile ways of working when developing use cases. First used for software development, the agile approach is now common practice for most projects requiring flexibility and quick results.

The cross-functional team works in iterative sprints, short sessions of a fixed length. Each iteration should result in a working prototype, with feedback from the prototype informing design and prioritization designs for the next iteration. Iterations need to be quick to encourage teams to "fail fast".

The sum total of the series of sprints is a minimum viable product (MVP)—a use case that has just enough features to deliver its most basic functions. This approach has clear benefits: better decision making, better analytics solutions, and faster time to market. Many of the executives we spoke with, especially those at start-up and innovator companies, said their firms used agile ways of working to deliver AI use cases.

Collocation, locating team members near each other, facilitates continuous communication and collaboration. In today's era, online collaboration platforms are a ready substitute; companies can also set up informal communication channels or provide videoconferencing rooms. In addition, the workspace should provide facilities to simplify agile routines and daily work.

Firms also need to define how the use case's value will be measured up front, before development begins. Every MVP's performance must be measurable because it's the basis for determining how portfolio resources are allocated. It's important to set and measure key performance indicators (KPIs) for every use case in the portfolio to see if they are delivering on their full potential. Companies also need to make sure that the use cases that they have prioritized have sufficient resources and capabilities, releasing "VC style" funding and directing other types of investments to use cases where value is proven.

The value of the use case should be monitored on an ongoing basis. This activity is vital for proving the analytics value proposition and identifying risks before they become costly. It's also crucial for identifying the areas that need improvement and providing the basis for funding requests. No less important, this activity makes it possible to hold people accountable.

Build Enablers for Scale

When scaling AI, companies need to build the following resources and capabilities critical for successful deployment over time.

- **Data and digital platforms.** New cloud-based digital platforms enable the rapid development of AI-based use cases while providing the increased processing power and scalability needed for coping with the growing amount of data in companies' possession. To leverage these platforms, organizations should integrate them into their core systems architecture.

- **Data governance.** To get the most value from their data, firms need to put the appropriate data governance capabilities in place. This will be vital for improving data quality, availability, and accessibility in the format needed for supporting the company's use cases.

- **People capabilities.** It's important to develop employee capabilities on both the technical and the business fronts. Technical skills will be crucial for the people who develop the AI solutions, while digital savviness will be crucial for the business people who identify the use cases and support their development.

Evolve Your Data and Digital Platforms.

Building AI solutions requires greater processing power and greater infrastructure and platform capabilities for dealing with all kinds of data—both structured and unstructured—captured from internal systems as well as from the external ecosystem. Companies need to evolve the overall digital architecture to enable scalability, agility, and leverage of advanced tools and AI technologies.

"By targeting AI in real time, we are building our data infrastructure in the cloud, ensuring that the data is accessible to all and at scale," Constantinos Liapis, head of applied AI at Stoiximan, explained. Companies should make only the investments that are absolutely necessary for the delivery of the first use cases.

New cloud-based platforms instantly provide

Stoiximan, the leading online gaming operator in Greece, leverages the power of AI to automate time-consuming and repetitive internal processes

Withdrawal approval automation. ML algorithms can accelerate the approval process of the withdrawals by reducing the number of repetitive tasks in the review process. This has resulted in a minimal error rate (0.3%) and reduced the response time for withdrawal requests from approximately 30 minutes to 10 seconds. Stoiximan thus managed to improve the customer experience while locating money laundering activities or suspicious money transfers.

these capabilities without the need for major investments. Leveraging a cloud-based data and digital platform in lieu of replacing in-house architecture automates scalability and capacity management while reducing costs. That's because cloud technology makes it easier to deploy solutions more quickly and improves the efficiency ratio; at the same time, it enables fuller leveraging of data and advanced analytics, machine learning, and AI services. Moreover, cloud technology builds in high availability and fault tolerance. And since the cloud vendor manages the platform, developers are able to focus on rapid iterations.

Building solutions in-house is also possible but it is typically more costly and takes longer. Sometimes there is no alternative: several industries cannot use cloud for their data or data processes for regulatory reasons. However, all Greek executives interviewed for this report said that they managed to overcome such issues and use cloud platforms to develop AI solutions.

The adoption of cloud solutions can also help businesses capture substantial value, resulting in greater business agility, rapid digitization of processes, and a simpler, more cost-effective tech platform. BCG experience has found improvements of 30% to 60% faster time to market, 25% to 50% increased productivity, and 15% to 40% lower infrastructure costs.

Companies should select cloud providers for this journey on the basis of specific criteria:

- Platform openness is key for ensuring that the company is able to use other vendors' solutions as well.
- Data monetization avoidance will prevent the vendor from monetizing the company's data for other purposes.
- Compliance will ensure that the vendor's solutions comply with the company's regulations and legal framework.
- Security will ensure that all security standards are kept for cloud and local solutions.

Define Your Data Governance. As organizations move to deliver more use cases or scale up existing pilots, they will need to manage the complex data landscape, where there is no single source of truth and, in general, data is insufficient and of poor quality. To prevent these challenges from hindering any efforts to leverage AI, the organization needs to invest in improving its data quality and capabilities. Data governance, therefore, is crucial.

Proper data governance involves supporting the business strategy and maximizing value from data and analytics use cases; helping address data-related operational needs, including data landscape simplification and risk mitigation; and meeting tightening regulatory requirements.

Although the specifics of data governance differ with the company, four building blocks are always key, as highlighted in a recent BCG report:[4]

- *Description of the company's data,* a single data dictionary, is needed to promote a common understanding of the organiza-

tion's data landscape. This description should include mutually exclusive and collectively exhaustive (MECE) data domains and their owners, prioritization of data domains based on a company's projects, data glossaries, data flow maps, and so on.

- *Data governance policies,* also known as rulebooks on data quality, data accessibility, and master data management, need to be defined early on to promote the appropriate behaviors. It's important to use these policies not as bureaucratic tools, but as ways to address specific areas where clarification is required.

- *Data governance tools support data harmonization.* They come in two flavors: basic data hygiene tools that support data dictionaries, data flow maps, and so on; and advanced data management tools that are adapted to a company's needs.

- *An appropriate data organization and operating model setup* establish the necessary roles (such as chief data officer) and responsibilities for the key stakeholders as well as the decision framework that specifies the different levels of decision making.

Build Your People Capabilities. People with AI technical capabilities will be sorely needed to realize AI's full potential. Companies need to develop two kinds of capabilities:

- *Deep technical capabilities.* The cross-functional teams that develop use cases will require data scientists, data engineers, programmers, cloud architects, and people with solid project management experience.

- *Digital savviness.* Employees on the business side need to be able to have a basic understanding of new technologies like AI and agile ways of working so that they can collaborate effectively with the technically skilled employees. They also act as ambassadors, help to educate the rest of the organization on advanced analytics to ensure opportunities can be identified, and they support the adoption of solutions by the business.

There are two ways to build these new capabilities: recruiting new employees or by upskilling/reskilling current ones. Companies can also hire temporary contractors for specific projects. For example, tobacco company Papastratos worked with an external partner, Satori Analytics, to develop use cases and an on-the-job training program.

The talent is certainly available in Greece. Pfizer, for example, recently decided to set up a digital and technology hub in Thessaloniki. One of a multinational network, the facility will partner with universities and tech parks to assemble a world-class team which will include among others capabilities AI and big data analytics experts.

"Recruiting is the fastest and easiest way to acquire technical skills, though training of internal resources with the appropriate profile is another option that is being actively pursued," noted Antonis Kyrkos. "Titan, for example, recently organized its own data science academy (in collaboration with ReGeneration Greece and Code.Hub) to

Papastratos, the largest tobacco company in Greece, uses AI to analyze customer insights, personalize offerings, and improve the customer experience

Customer experience optimization.
Together with Satori Analytics, an analytics solution provider, Papastratos developed a data platform combining operational, behavioral and experiential sources. The data were collected across all touchpoints of the consumer's interaction with IQOS.

With the extensive use of advanced analytical tools & ML algorithms, the company segments Users based on their different experience & develops targeted actions to further support & upgrade its consumers along their Journey.

upskill STEM graduates and recruit future data scientists with a focus on industrial applications."

The hiring process should focus on people who are adept at agile ways of working. "Companies should hire mainly for attitude and not aptitude," noted Vangelis Vergetis, executive director of Intelligencia.ai. "Persistence and commitment are key elements in order to try and fail fast. You need "Doers."

Acquiring the skills and capabilities needed for successful AI adoption is a gradual process. At the beginning, skilled resources are usually only found in the central team. Gradually, through internal training programs, resources in several business functions should be upskilled so that they can participate in developing the solutions with the central team, which in turn will help ensure adoption of the new solution.

AI tools will soon be a standard component of most organizations' digital ecosystem. But companies that have already built people and technological capabilities will have a competitive edge.

NOTES

2. Boston Consulting Group's strategy think tank.

3. Philipp Gerbert, Sylvain Duranton, Sebastian Steinhäuser, and Patrick Ruwolt, "The Build or Buy Dilemma in AI," BCG Henderson Institute, January 4, 2018.

4. Elias Baltassis, Antoine Gourévitch, and Lucas Quarta, "Good Data Starts with Great Governance," BCG, November 11, 2019.

PART III:

CONCLUSIONS AND OUTLOOK

CONCLUSIONS

The plethora of data available today affords companies in Greece, as elsewhere, the opportunity to address a wide range of business challenges. Greek companies should use machine learning and other AI tools in order to harvest insights from this data to find solutions with financial impact. Our discussions with various senior executives at Greek companies have revealed that AI offers significant opportunities for boosting revenues and thus also boosting profits. Especially in times of crisis, those companies using AI are more capable of ensuring their business and operational continuity as well as gain a competitive advantage. That way, these organizations increase their opportunities for bigger revenues and profits.

Although AI is already here in Greece with multiple players showcasing applications, companies have not yet achieved the maximum possible yield. To realize the full potential of AI, a strategic and holistic approach is key.

The key takeaways senior executives should take into consideration when implementing AI are:

- **Understand what the business opportunities are, as well as the main challenges and pain points.** The democratization of models and algorithms has made them accessible to any company that wants to use them. The greatest challenge lies in identifying the business problem and then using them to give a solution. All AI initiatives should be firmly embedded in the digital strategy and clearly linked to the general business strategy. This means that the prioritized use case portfolio, as well as any build vs. buy decisions, should be based on strategic needs. That way, companies can be confident that their use cases will deliver value and not get lost in the data maze.

- **Identify where and how the technology can be leveraged.** Given the critical importance of data, companies need to evolve their data architecture and governance to ensure that data is high-quality, accessible, and secure. They should give full consideration to deploying cloud services, given their benefits for accelerating and reducing the cost of use case development.

- **Follow an incremental approach starting with a pilot and make sure you put together the right teams.** When developing each use case, organizations should follow a structured approach, with cross-functional teams working in agile sprints to deliver each use case MVP. Monitoring performance and capturing

the tangible results of these efforts will make it easier to demonstrate success to management.

- **Focus on the people part of the equation.** Organizations should develop or acquire hiring and training policies that ensure their technical and business staff have the requisite skill sets for developing and using the new AI solutions. At the same time, they should encourage the behaviors that will facilitate the cultural change that's essential for making the new ways stick.

Although many have emphasized the potential for reducing costs, that's only the beginning. Personalized offerings, unique customer experiences, predictive maintenance, and fraud detection—the opportunities are infinite.

OUTLOOK

AI technologies have unlimited potential for solving business problems and driving growth. Although Greece entered the AI arena later than some other countries, executives agree that Greek companies have made excellent progress in addressing the key challenges these technologies pose.

We are just at the beginning of the digital journey. Organizations already generate much more data than they can leverage because they are unable to make the right investment decisions at the right time. As the need for personalized, real-time applications grows, so will the need for inherent AI and cloud solutions. The capabilities of technology and people will need to evolve accordingly.

In addition, regulators and academic institutions will need to develop policies to facilitate this evolution. Policies that make more data available and introductory classes in entrepreneurship are just two examples of the steps that will be needed. The European Commission's plan to foster the development and use of AI in Europe provides solid direction in this regard.

Things are moving fast. Before long, it will be difficult to imagine a world without AI.

ABOUT THE STUDY

This report is based on BCG research and analysis as well as client experience. It was developed with major support from BCG's GAMMA[5] subsidiary, which specializes in data analytics and AI, and is the largest AI group outside Google, Apple, Facebook, Amazon, and Microsoft. Many insights also came from a 2019 MIT-BCG article based on an AI survey of more than 2,500 executives globally. To supplement that research, we conducted more than 30 interviews with senior executives at organizations with operations in Greece. The purpose of these interviews was to understand the approach they used for developing, implementing, and scaling AI initiatives. The executives hail from major industries (financial services, energy, technology, consumer goods, and so on) and institutions with broader experience in the digital sector (Academia, Venture Capitals, and Digital Hubs).

NOTE

5. BCG's global team dedicated to applying artificial intelligence and advanced analytics to business at leading companies and organizations.

APPENDIX:

GREEK CASE STUDIES

Athens International Airport (AIA)

Beginning operation in 2001, AIA is the largest and busiest airport in Greece. By the end of 2019, it was the 26th busiest airport in Europe, handling traffic totaling 25.57 million passengers.

- **Pepper Robot.** Athens International Airport launched a new collaboration with NCSR Demokritos, aiming in the exploitation of research results and innovative applications, in real-world aerospace environment. As part of this collaboration, a new dialogue system was developed for Pepper Robot with the integration of artificial intelligence. "Pepper" responds to AIA's visitors' questions in English, Chinese and Greek, as a way to understand their main concerns and improve customer satisfaction. For now, the topics addressed include flights information and educational games for passengers' amusement. Pepper Robot is the first humanoid robot, making customer interaction more attractive and user-friendly.

Cardlink

Active in the field of electronic payments, Cardlink accepts and manages card transactions, both in physical trade and in e-commerce. Founded in 2004 by Alpha Bank and Eurobank, the company aims to create a common point-of-sale (POS) network to assist in the development of electronic transactions in Greece.

- **AI-based forecasting and pricing tool.** Cardlink has developed forecast techniques and statistical methods that successfully predict the number of transactions for specific periods. This has enabled employees to take the appropriate actions, leading to reduced systems' risk and ensuring that everything is up and running.

- **ML-based transaction algorithm.** Cardlink has created ML algorithms based on past transactional data and features that allow specific transactions to be successfully completed even though the host system may not respond or might be facing technical issues.

- **Cardlink Pulse.** This data monetization tool uses AA to scan the company's POS data system and provides anonymized and aggregated insights on clientele as well as benchmarking with other companies in the industry and region.

Cosmote

Cosmote is the largest mobile network operator in Greece. The company is headquartered in Athens and is a fully owned subsidiary of the Hellenic Telecommunications Organization, the

incumbent telecommunications provider in Greece. Since July 2009, Deutsche Telekom has been the largest shareholder. Cosmote has several advanced analytics and AI applications, implementing the appropriate safeguards (e.g., pseudonymization) for personal data and in compliance with data protection rules. Cosmote's AI use cases apply to almost every business function of the company as well as for Deutsche Telekom subsidiaries through the COSMOTE Big Data Center; below we site two examples:

- **Network analytics for real-time quality control and service improvement.** Cosmote developed this use case to optimize the quality of service in their network. The company created an algorithm that can assess the quality of DSL and VDSL connections in real time, making it easier to manage network overloads and thereby avoid slow or interrupted internet connections. The algorithm captures sensor data (such as temperature) from different telecommunication distribution cabins on streets and combines it with data on network usage and overloads. Using big data infrastructure to process this data, the algorithm predicts when the cabins will overheat and notifies technicians to preemptively resolve any problems.

- **Service analytics for personalized customer experience to improve customer loyalty and retention.** To improve the customer experience, Cosmote has developed a Service Experience Index that combines data from multiple sources. The purpose of this initiative was to assess the service level provided to our customers, based on data from call centers, in-store interactions, and so on. The ML algorithm assigns a daily score to the service provided to each customer that determines how their requests and complaints should be handled. For example, when a customer calls the customer center with a low service index, the Cosmote agent is authorized to offer free data or a reduction in the bill. The company has developed many use cases based on this index. The use cases with the greatest impact have focused on handling complaints about technical issues and unsatisfying call center interactions.

Eurobank

One of the four largest banks in Greece and listed on the Athens Stock Exchange, the Eurobank Group is a financial organization that offers products and services to individuals and businesses in six countries.

- **"Commercial insights" model.** Eurobank's Propensity Model uses ML algorithms and transactional and holding data to segment clients based on their actual needs, financial status, transactional behavior, and several other factors. Furthermore, automated and trigger-based campaigns are initiated by a central recommendation engine where contact policy and optimization are applied. The goal is to create and promote relevant offerings to the right clients.

- **Voice of the Customer.** Natural language processing (NLP) algorithms analyze many thousands of customer comments captured from transactional net promoter score (NPS) surveys as well as from other sources. These algorithms help execute a series of actions with the goal of continuously improving customer service and satisfaction.

- **Trade Club Alliance.** The Trade Club Alliance is a unique digital global network of banks aiming to make international business simpler and better. The digital platform provides to SMEs and corporate clients international trade expertise and the opportunity to connect with trusted partners in new markets using ML algorithms. After forging a strategic partnership with Banco Santander, Eurobank became one of the first partner banks to join the Alliance. Initially, the platform based its matching queries on customs tariff numbers and members' interests. In 2018, Trade Club became one of the first globally applied cases that invested in AI technologies to provide high quality opportunities to businesses. The model is currently being trained with international trade transaction data from

digital customs sources and relevant databases. The Alliance has added an intelligent web-crawler with NLP capabilities that captures the products and services presented at each member's website to generate an automated business profile of that company. Since 2018, the platform model was introduced to more than 100 million pieces of transactional data available for its algorithm to train on. The algorithm can recommend partnerships even with companies not directly connected through customs tariff numbers. For example, the algorithm can match a wine producer with a bottle producer. This intelligence provides tremendous global potential for digital business matchmaking on a global level.

Fourlis Group

A Greece-based investment holding company, Fourlis Group focuses on the retail trading of home furniture and household goods and the retail trading of sporting goods, with IKEA, Intersport, and other franchises, as well as with direct subsidiaries.

- **IKEA chatbot.** Fourlis Group, in concert with Microsoft, designed a bot for IKEA in English and Greek for Greece and Cyprus, which went through three cycles of user acceptance tests. The bot answers frequently asked questions and provide information on IKEA products and their availability. A second phase of development may focus on giving the chatbot the ability to take shoppers to the IKEA online shop and help them complete a purchase.

Hellas Direct

Founded in 2012, Hellas Direct is an exclusively online insurance company that provides car insurance directly to consumers. It is the only insurance company in Greece that allows the consumer to determine the contract duration in days rather than years.

- **Pricing determination.** The company developed a fully automated ML-driven tool that uses many different parameters—car technical specs, customer statistics, competitors, and so on—to price different insurance plans. The data engineers don't treat the tool as a black box because they want to have visibility on which parameters affect the output. As a result, they're able to evaluate and back-test the algorithms regularly.

Hellenic Petroleum (HELPE)

HELPE is one of the leading energy groups in South Eastern Europe, with activities spanning the energy value chain, presence in six countries, and significant export activity.

- **Operational parameter prediction:** As refinery operations become more complex, certain operational parameters need to be optimized. HELPE developed a proprietary tool leveraging ML algorithms to predict some of these parameters. This virtual lab analysis will allow the company to optimize the specific operations in its refineries, maximizing margins while minimizing risk and the associated costs.

- **System anomaly detection:** HELPE developed a tool to monitor the health of a critical system for refining operations leveraging sensors and fragmented data sources available. The tool continuously monitors the subsystems health index using ML algorithms anomaly detection and in case of events generates alarms or notifications depending on how critical the anomaly is.

- **Refinery unit conversion prediction:** Using an ML model, HELPE identified key feedstock parameters affecting conversion of a high-margin refinery unit. HELPE created a tool to predict conversion of the unit based on several processes and key feedstock parameters.

intelligencia.ai

Intelligencia uses AI to reduce the risk of drug development. The company's platform focuses on estimating the risk associated with clinical trials and interpreting the multitude of factors that contribute to that risk.

- **Clinical trial risk estimation.** Intelligencia's ML algorithm assesses the probability that a clinical trial will be successful and move to the next phase and/or result in regulatory approval. This

helps pharmaceutical companies review their priorities and efficiently manage their portfolio.

- **Clinical trial optimization.** Intelligencia's algorithms can also identify the factors that most increase risk, and therefore recommend the parameters that should be changed to make success more likely.

- **Business development insights.** Intelligencia also works with pharmaceutical companies that are looking to acquire or in-license specific assets. The company's ML algorithms can help determine the degree to which the corresponding trials will be successful, rank those assets based on their attractiveness and risk profile, and therefore help decide if acquisition/licensing makes sense, and at what price.

METIS Cybertechnology

Established in 2016, METIS Cybertechnology specializes in electronics engineering, the Internet of Things (IoT), cloud computing, and AI solutions for global maritime needs.

- **Voyage optimization.** By using collected weather and geolocation data along with ship data, METIS's virtual assistant recommends ways to optimize a voyage—how to consume less fuel, improve the route, prevent damages, and so on. These recommendations help operations-related executives on their performance activities and optimize the decision making process. They can result in significant cost savings for a shipping company.

- **Natural language processing (NLP)-based virtual assistant.** METIS's virtual assistant uses NLP algorithms to interact with users in human-like interface, as well as turn unstructured text data (such as emails and texts) into structured information that can support decision-making. The virtual assistant can also generate automatic e-mail, texting, and messaging replies and reports in any selected channel or platform.

- **Predictive maintenance.** METIS has developed its own intelligent collectors to be connected to sensors, which can be installed in many different parts of a ship. Collecting data from these sensors, ML algorithms can identify which individual equipment parts are most likely to decay and suggest ways to mitigate these issues proactively.

Nomiki Bibliothiki Group

The leading private organization in Greece and Cyprus in the field of law and economics, NOMIKI BIBLIOTHIKI offers a full range of specialized publications, professional training, and legal tech applications designed specifically for practitioners and scholars in the legal, corporate, government, law enforcement, accounting, and academic sectors.

- **Statutes classification.** The company is a major legal information provider offering to clients a full range of legal documents to support legal decision making. The research is enabled through a number of indexing and classification tools. The goal of the AI integration was to reduce the time required by company personnel for manually classifying legislative acts and assigning associated metadata. NOMIKI BIBLIOTHIKI outsourced the development and training of ML algorithms to an AI provider (SciFY PNPC, an AI and technology transfer consultancy firm, in collaboration with NCSR "Demokritos" research center personnel), to support the semi-automatic, efficient extraction of topics and tags from the input documents and the resulting classification. The outcome was an increase in the capacity of the company to provide new content, and the reallocation of human resources to higher-value tasks. This investment empowered the company's existing web services and improved its positioning as a legal content provider.

Omilia

Having just raised $20 million in funding, Omilia provides NLU-enabled Interactive Voice Response (IVR) and chat technologies to enterprises throughout the world.

- **deepNLU® Voice IVR:** Conversational IVR is a voice-driven, hands-free customer

self-service that uses Natural Language Understanding (NLU) to understand content and the context of spoken requests. Omilia has developed specialized banking and telecommunication systems and serves most local and several international financial institutions and telecommunication providers. Piraeus Direct Solutions (PDS), for example, adopted the NLU banking system of Omilia. The system can analyze clients' responses in depth and "understand" like humans do, considering both context and Retail Banking knowledge base. The result is a completely natural dialogue, almost without limitation, ensuring excellent customer experience and very high automation rates.

Papastratos

Founded in 1931, Papastratos is the largest tobacco company in Greece and an affiliate of Philip Morris International Inc. (PMI). In recent years, Papastratos has undergone a huge transformation with the introduction of IQOS, PMI's smoke-free electronic device.

- **Customer experience optimization.** Since the launch of IQOS and under its vision for a truly customer-centric transformation, Papastratos embraced data as the gateway to its consumers' hearts, minds and needs. The objective has always been a holistic view of the consumer, utilizing everything technology had to offer and as such Papastratos developed a data platform combining operational, behavioral and experiential sources. The data were collected across all touchpoints of the consumer's interaction with IQOS (Online & Offline channels, Customer care, CRM, Social Media). With the extensive use of advanced analytical tools & ML algorithms along with the support of innovative analytics partners, like Satori Analytics, the company segments Users based on their different experience & develops targeted actions to further support & upgrade its consumers along their Journey.

Piraeus Bank

A Greek multinational financial services company, Piraeus Bank offers a full range of financial products and services to more than 5.4 million customers. With 29% market share of customer loans and deposits, it is the leading bank in Greece today.

- **Fraud detection platform.** Piraeus's platform deploys AI algorithms that detect suspicious patterns of activity. Taking a more conservative approach, the bank does not treat AI like a black box; instead of completely relying on its insights, humans check the results of the algorithmic work.

Signal Maritime

Signal Maritime is a commercial ship management company that brings together shipping best practices with internet-age AA and management. A spin-off from Thenamaris Ships Management, the company is focused on producing responsive, high-performance, and sustainable commercial management for a growing, modern fleet.

- **Chartering optimization.** The Signal Ocean Platform uses multiple AI models (including ML and NLP algorithms) that comb through unstructured data to provide customers with useful information on ship and harbor availability. More specifically, the platform extracts relevant information from e-mails and uses fusion algorithms to determine the state of each vessel. State-of-the-art algorithms process ship locations and information on commercial deals so companies can assess the competition in real time. In addition, planning algorithms assess commercial data to predict how much tonnage will be available in the near-term. In addition, the platform can instantly calculate and compare profitability across all vessels competing for a cargo. All of this information helps customers make better-informed chartering decisions faster and more confidently.

Stoiximan

Stoiximan is the leading online gaming operator in Greece and Cyprus, developing cutting-edge technology and always looking for new ways to disrupt the industry and change the game.

- **Fraud Activities—Early detection.** Stoiximan uses machine learning to detect fraudulent activities such as money laundering, account takeover, and suspicious playing behavior.

- **Casino Recommendation Engine.** Drawing on data such as user player behavior and demographics, Stoiximan algorithms can make personalized recommendations and offer an experience similar to Netflix or Spotify. Stoiximan initiated a pilot phase, using the opportunity to identify the data and skills that would be required for industrialization.

- **Withdrawal Approval Automation.** ML algorithms can accelerate the approval process of the withdrawals by reducing the number of repetitive tasks in the review process. This has resulted in a minimal error rate (0.3%) and reduced the response time for withdrawal requests from approximately 30 minutes to 10 seconds. Stoiximan thus managed to improve the customer experience while locating money laundering activities or suspicious money transfers.

- **Responsible gaming.** In collaboration with Microsoft, Stoiximan developed a tool to predict which players are likely to exhibit problematic behaviors so that they can be proactively identified and supported accordingly.

Titan Cement Group

A vertically integrated cement and building materials producer, Titan Cement Group has production facilities in 10 countries and presence in more than 15 countries.

- **Grinding mill productivity increase.** In collaboration with a start-up company, Titan developed a proprietary AI algorithm for real-time throughput optimization. The company used the algorithm to assess the operations of one of its grinding mills in the US, increasing the mill's productivity by 10% to 15%. The project was piloted in the US, and quickly translated into higher profitability. Follow-on projects improved throughput between 8% and 10%.

- **Predictive maintenance.** After installing sensors in one of its Balkan factories, the company used an AI algorithm to detect anomalies in the machinery there. The system generated hundreds of alerts for equipment that would soon require maintenance. TITAN proactively addressed these issues, avoiding high repair bills. On the basis of these promising results, the company plans to scale the pilot to many other plants.

- **Inventory optimization.** The company deployed analytics to model consumption patterns of fast-selling spare parts and thus reduce inventory by up to 20%.

Vodafone

Vodafone Greece is one of the leading telecommunications companies in the country as well as worldwide.

- **Tobi chatbot.** Following VF Group directions for a global chatbot platform, Vodafone launched its first chatbot in Greece in September 2019. In partnership with VF Group, they developed an NLU-enabled (Natural Language Understanding) chatbot in Greek. The chatbot is able to process customers' answers to open-ended questions like "How can I help you?" by making use of (non)-integrated scenarios. This capability is quite valuable for addressing high-volume customer care concerns, which Vodafone has made a priority.

Workable

Founded in 2012, Workable is a venture-backed recruiting platform that helps teams find, evaluate, and hire candidates. Workable leverages AI capabilities across its platform value chain.

- **Hiring recommendations.** Workable's Resumé Parser uses NLP algorithms to transform the unstructured data from resumés and job descriptions into structured data. ML algorithms then review past hiring decisions to make hiring recommendations. They can also be used to scan for similar job postings and match candidates' resumés with them.

- **Job description generator.** A natural language generator can automatically generate job descriptions with specific requirements based on information provided by hiring managers.

- **Anti-fraud system.** ML algorithms using multiple input parameters can detect fraudulent job openings and protect candidates from phishing attempts.

Other Greek Companies

Other companies in Greece have made AI part of their business or operating models, though the stage of deployment varies significantly. These include:

Augmenta. A service provider to farmers, Augmenta uses IoT technology and ML algorithms to analyze field conditions in real time to help farmers boost yield, enhance quality, and reduce input spend.

isMOOD. An online social media marketing platform, isMOOD uses AI to analyze brand data, consumers' sentiment, and historic data for many different purposes, including monitoring, predicting, and influencing.

Orfium. A provider of music rights management and monetization solutions, Orfium deploys ML and Audiomatching technologies to detain, manage, and claim copyrights.

Pobuca. A go-to-market platform for brands and retailers, Pobuca offers AI-enabled customer relationship management solutions to improve customer experience and employee productivity.

Persado. An AI platform for marketers, Persado deploys its AI-powered tool that analyzes the language in marketing briefs to develop the most compelling messaging for the target audience.

Space Hellas. A systems integrator, Space Hellas provides information and communication technology services and security solutions for enterprises.

About the Authors

Chryssos Kavounides is a partner and managing director and the office administrator in the Athens office of Boston Consulting Group. **Markos Giakoumelos** is a principal in the firm's Athens office. **Evdokia Kaffe** is a project leader in BCG's Athens office.

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