



NTT DATA

FUTURE
AT HEART

AI FOR BUSINESS VALUE GENERATION

JUNE 2022

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AI FOR BUSINESS VALUE GENERATION

June 2022



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INTRODUCTION

In the current context of disruption, Artificial Intelligence is becoming the technology with the greatest potential to reshape how organizations develop their activities and generate value through new business models.

This revolution is changing the rules of market competitiveness and frames a new era for all those organizations that aspire to succeed and lead the market by **leveraging Data & Intelligence (D&I) capabilities**. Thus, we are witnessing an impact whose dimension exceeds the concept of “traditional organization” to become a “D&I-driven organization”.

In this sense, D&I-driven companies seek to harness the combinatorial power of technology to drive innovation and generate incremental benefits through new technological products, advanced services and differential customer-centric experiences that are supported by intelligent operational processes.

However, these organizations **are facing multiple challenges** to take off their new operating models and release their products, possibly due to a lack of knowledge of existing technological solutions in the market, the sometimes poor strategic alignment between the business and technical areas, or a low-level technological maturity .

For these reasons, **NTT DATA, as a technology leader, provides solutions** that help identifying our clients’ needs and opportunities both at a strategic level and on a day-to-day basis, analyzing changing market movements, defining a united business-tech corporate strategy, and driving AI initiatives through the latest cutting-edge technological solutions, resulting in the creation of new digital intelligent services.

This is why at NTT DATA, we bring to our clients the **“AI FOR BUSINESS VALUE GENERATION”**. A guide to address business challenges, elevate business models to the next step and lead market disruption in this new environment by harnessing D&I capabilities.



David Pereira Paz
Head of Data & Intelligence Europe
NTT DATA

“We talk about strategy and technological vision, because what we intend is not only to focus on the latest technologies from a laboratory point of view, but to see how technological innovation can be part of the strategy of our customers”.



Jacinto Estrecha Cadiz
Executive Director Data & Intelligence
NTT DATA

“NTT DATA has a complex ecosystem of AI capabilities, in this paper we show how we leverage our differential skills, expertise, assets and methodologies to solve the demanding challenges of the market”.



Marc Sangüesa Puigventos
Manager Data & Intelligence CoE
NTT DATA

“We work in a continuous process of research, improvement, experimentation and progress in order to be at the edge of innovation, focusing on the topics that are emerging at any given moment in order to enrich our vision of AI”.

An aerial view of a city with a digital network overlay. The city buildings are rendered in a light, golden-brown color. A complex network of glowing blue lines and dots is superimposed over the city, representing a digital or data network. The lines connect various points across the city, creating a web-like structure. The overall scene is futuristic and high-tech.

01

**D&I Observatory
& Open Ecosystem**



State Of Data & Intelligence

We live in an increasingly digital world, where consumers and users have limitless expectations and demand products and services that are fast, simple and fit into their lifestyles. For this reason, organizations have embarked on a fierce race to provide the best D&I solutions delivered with a differential customer experience.

This was exacerbated by the COVID-19 crisis, when much of the world moved online and all organizations were forced to adapt to the circumstances betting all on technology. For example, researchers employed AI models to better understand how the virus was spreading and evolving, and so, supporting speed up the vaccine research. (1)

For this matter, Data & Intelligence technologies are becoming essential to extract the most valuable insights out of raw data, being one of the fastest-growing technologies in the recent years. In this sense, the global artificial intelligence market size is expected to reach \$169,411.8 million in 2025. In terms of investment dedicated to AI, the global amount including private investment, public offering, merge and acquisition (M&A) and minority stakes increased by 40% in 2020 relative to 2019, reaching a total of \$67.9billion. (2)

GLOBAL CORPORATE INVESTMENT in AI by Investment Activity, 2015-20



D&I employment by sector

The rise of D&I solutions is permeating all industries and sectors. However there is still a **gap between leaders' organizations**, thirsty for AI investment and solutions' development, and **laggards' organizations** more traditional and risk-averse.

By 2025, more than 30% of new drugs and materials will be discovered using AI techniques

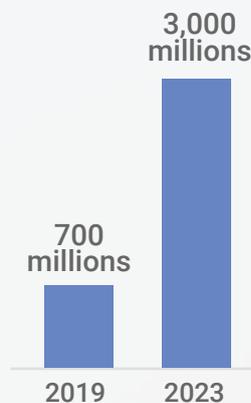
AI in Retail: Market Summary & Key Takeaways

Total Retail ML Spend (\$bn) in 2023



- Americas
- Europe
- Rest of world

Annual Software for AI Demand Forecasting



For instance, the pharmaceutical field is the one of the top investors in AI systems. The need to speed up and reduce the cost of research processes without losing quality information has made it a **favorable industry** for this type of solutions. The urgency created by the Covid crisis also caused an exponential growth, achieving a total investment of more than \$13.8 billion in 2020. (3) This trend is poised to continue, as it is expected that by 2025 more than 30% of new drugs and materials will be discovered using AI techniques. (4)

However, the retail sector is the one experiencing the greatest growth in the use of D&I systems. In particular, the investment in Machine Learning systems is expected to exceed \$12 billion in 2023, a 230% growth compared to 2019 figures. (5)

The use of AI technologies in the **banking sector has become mainstream**. For example, 56% of financial organizations are already implementing **risk prevention and management solutions powered by AI**; while 52% of them are increasing their revenue generation through new products and processes. (6)

Another sector that invests heavily in AI is logistics and transportation, for which it is forecasted a high growth in the AI market, expecting to go from \$1.2 billion in 2017 to more than \$10.30 billion projected for in 2030. This implies a CAGR of 17.87%. (7)

On a global scale, there is a significant acceleration in the maturation of D&I solutions. In line with this, it is expected that **by 2025, 70% of organizations worldwide will have operationalized AI architectures.** (8)

Cross-sectoral applications

Most widespread D&I applications provide useful **cross-cutting value** for all types of organizations.

One of the use cases that is gaining momentum is the creation of **AI solutions to assist software development.** In fact, it is expected that by the end of 2022 nearly **every development tool will have an AI bot** either by adding natural language or other capabilities to the developer's toolbox.

Overall, **increasing the efficiency and improving the internal processes** is one of the biggest aims when implementing AI initiatives. In a survey conducted by the Harvard Business Review, 36% of executives stated that

their primary goal for incorporating AI is to optimize internal business operations. (9)

A further growing trend is the brand's use of **Virtual Assistants**, as they provide a completely unique formula for building user experience and **are helping to reinvent the relationship patterns** between customers, their brands and technology.

Virtual Assistant implementation is already a reality and by the end of 2020, 30% of **searches and web browsing were performed without a screen** (10). The voice-first interaction trend looks set to continue to gain traction in the coming years.

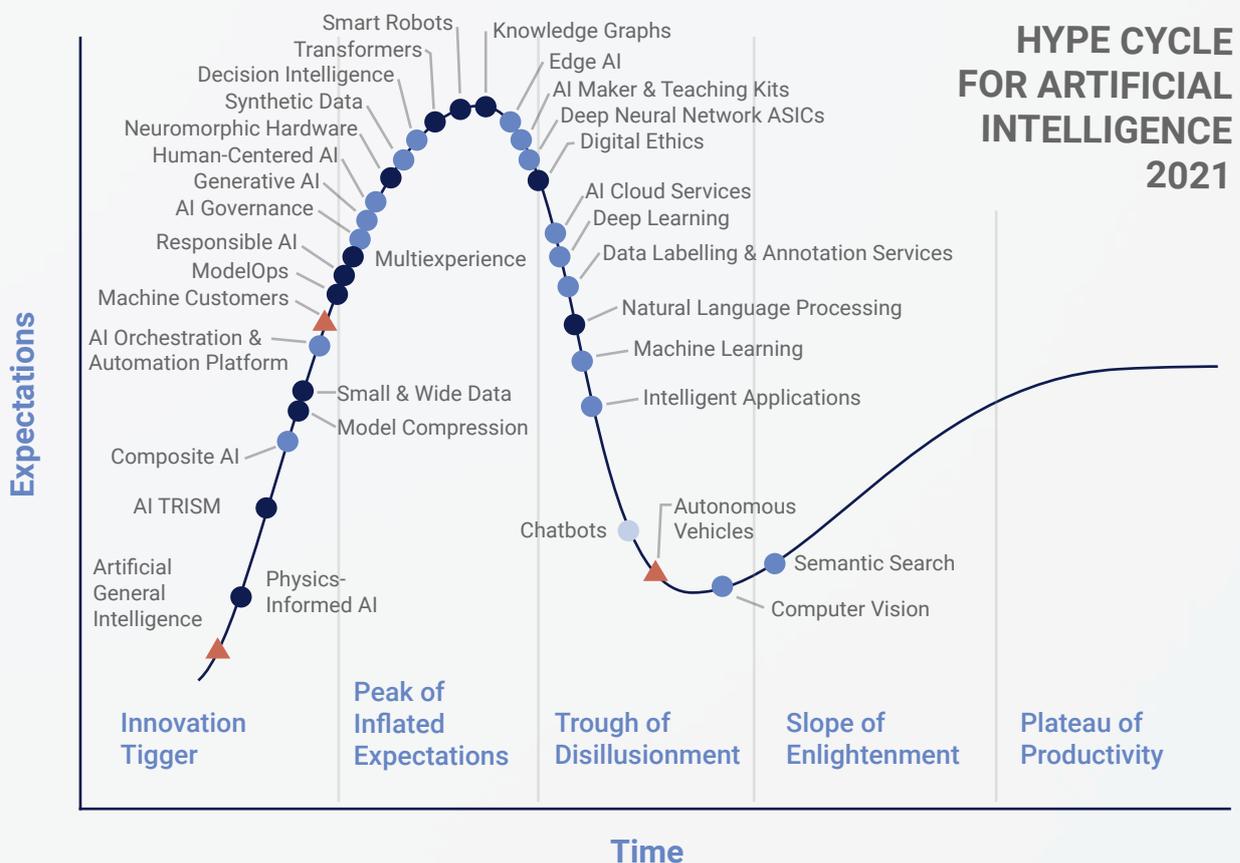


What's next?

The Hype cycle, developed by Gartner, highlights that investments and interest in AI remain high. Some AI capabilities such as semantic search or computer vision are already in the stabilization phase.

Meanwhile, most of the bulk of solutions are reaching the peak of inflated expectations, which means that in the coming years the inclusion of D&I solutions in the technological core of companies is expected to be increasingly higher.

It is noteworthy that compared with other Hype Cycles, the AI Hype Cycle is more fast-paced, with an above average number of innovations reaching mainstream adoption within two to five years.



Plateau will be reached:

- less than 2 years
- 2 to 5 years
- 5 to 10 years
- ▲ + 10 years
- ⊗ obsolete before plateau

The importance of hyperscalers in the productization of D&I initiatives is another trend to highlight. Cloud technology giants such as Amazon Web Services, Microsoft Azure or Google, already offer complete technology suites. Thus, organizations can benefit from all types of Applications-as-a-Service (AaaS) which represents a major advantage, reducing the go-to-market timings and decreasing costs.



01 D&I OBSERVATORY & OPEN ECOYSTEM

D&I Observatory

When embarking on a D&I adoption journey and taking full advantage of new technology stacks, organizations must be aware of the **current technology challenges**:

- The **AI space is very dynamic and constantly updating**, where new companies and large software vendors fiercely launch new offerings and solutions.
- It is challenging to navigate this space and be able to select a **value proposition with well-structured AI solutions**.
- It is a difficult task to **identify and attract AI talent**, especially engineers and data scientists with the right AI and data analytics skills, due to the market talent competitiveness.

A D&I Observatory is essential to learn about the **latest market trends and movements**, identify the **best solutions and innovative services** as well as find **potential partners** and be aware of top players' strategies. The ultimate goal of D&I Observatory is **to achieve technical excellence, identify business value** and gain the skills and capabilities to make the most out of technology. The main benefits are cost reduction in the adoption of new solutions and a **better positioning in the market** by being at the forefront of technologies.



Business Observatory

From the business point of view, an observatory performs a **continuous market monitoring** and goes hand-in-hand with the **participation in the open ecosystem**. In this way, organizations will be able to be aware of the latest industry trends, new solutions for different business domains, learn about their competitors' latest digital services and capabilities and be aware of existing challenges and opportunities that can be solved with D&I technologies.

This information can be obtained through a variety of sources:

- **internal collaboration tools**, it is essential to be informed of what is happening across the organization and have the ability to collect and leverage business knowledge within the organization
- information from different **collaborators and partners**, both from technological or business backgrounds to alert any market movements.
- **Open ecosystem** in the form of specialized forums, dialogues in social media, sectorial media, technology gurus, research centers, consortiums, etc.

These approaches will provide the organization with worthy observations about the market behavior and the company's position. The resulting insights will contribute to keep **sharing of discoveries** with all the interested business areas and support **drawing conclusions**, serving as a basis for **decision making** and a source for **devising new initiatives**.

Technological Observatory

From the technological dimension, the **great speed with which new applications, models and solutions emerge** makes it essential for organizations to be updated in order to make the most of technology.

In other words, it is necessary to **lookout closely the technological offer** in order to be aware of the latest offering of the top vendors, the latest updates in the public domain and the most relevant scientific publications.

Thus, to garner these insightful information, organizations need to pay attention to different sources, such as direct contact with their suppliers, participate in forums and events or even get a subscription to newsletters to keep up to date to the latest tech discoveries, developments and trends.

The technological observatory should keep a close relationship with the **business side** of the observatory to **take advantage of their insights in order** to identify potential value-adding solutions for the organization that deserve to be studied and tested.

On top of that, the technological observatory puts under the microscope all the market tech suppliers and **vendors, as in many scenarios**, their offerings and solutions may appear to be very similar to each other.

By benchmarking their solutions, you can gain a more profound comprehension of their intrinsic characteristics, empowering the organization to **make an optimal decision** based on its state of maturity and needs.

The tech players ecosystem for D&I is wide:

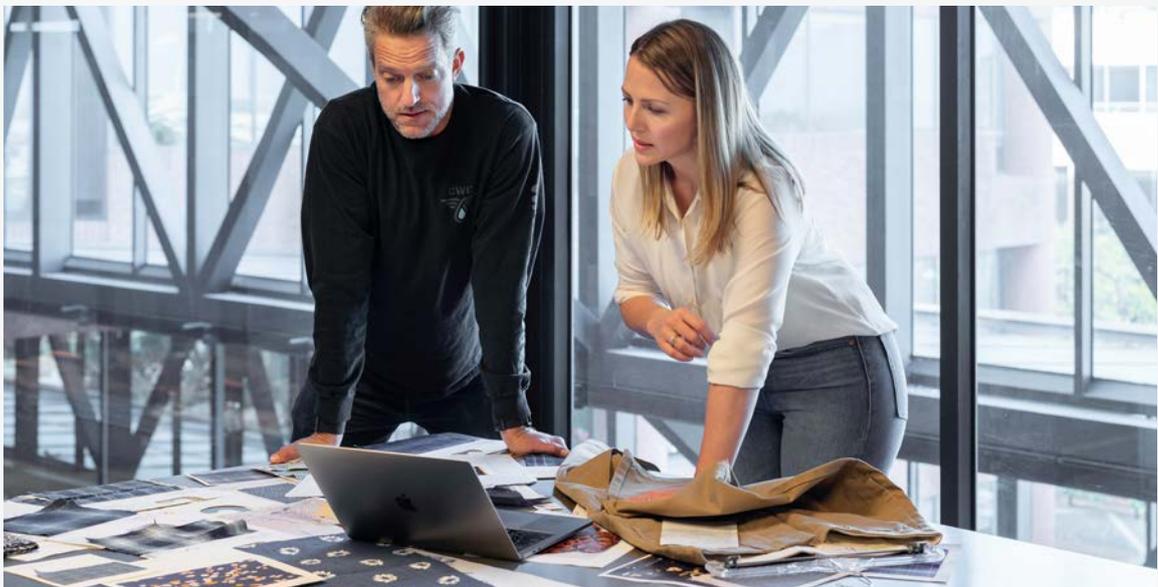


New solutions and functionalities that are of interest to the organization **must be tested**. Only with a practical study, the team will be able to properly judge the potential of the new offerings. Performing a demo or Proof of Concept (PoC) will also provide the technical team with a **tangible tool to show the discoveries** to other areas. It can also serve as a starting point for a possible initiative.

All technical knowledge generated should be shared with the members of the D&I team. If a potential initiative has been identified, it should also be showed to other relevant areas.

Thus, proper documentation and sharing of expertise will help to **elevate the technological talent and deepen the D&I maturity** of the organization.

Talent Observatory



The work of the observatory helps to **attract, elevate and retain talent** in the organization, one of the main challenges in the field of AI. The correct documentation of the tasks performed together with the sharing of the knowledge obtained among the different employees serves to **create an information base**, cultivating internal talent.

Professionals also benefit from continuous updating and learning, which helps them to **develop as experts** and to feel motivated. Finally, participation in forums and events serves to meet and identify new talent to collaborate with or even to **incorporate into the team**.

Having a **talented, curious and proactive team** will help the organization to identify new opportunities, create new capabilities and push forward D&I developments.

Real life example: NTT DATA's Observatory

NTT DATA has its own D&I observatory through the **Artificial Intelligence Center of Excellence (CoE)**, based in Barcelona (Spain). The CoE has the mission to generate new AI capabilities, **empowering NTT Data's clients** with the most advanced technologies to support them progress in their D&I strategy and help them achieve their business goals by leveraging the power of new technologies.

At the business level, we work with multidisciplinary teams and specialists in different sectors, fostering cross-industry knowledge and expertise through a diversity of tools meant to collect and filter information from different technological and industrial fields. As a result, **we are constantly aware** of the ongoing challenges faced by our clients, as well as the latest use cases and business models developed by other entities.

On the technical side, we monitor the latest solutions. When it comes to identifying what's new to analyze, NTT DATA has an annual innovation plan that marks the main strategic pioneering technologies to focus on.

This plan is enriched and updated based on news & trends gathered thanks to our **participation in the open AI ecosystem** and carrying out agreements with leading vendors.

Following this idea, NTT DATA has signed **global partnerships with top vendors**, such as Google Cloud, Amazon Web Services and Microsoft Azure, which allow us to develop and test new demos and prototypes, delivering new value to our clients.





01 D&I OBSERVATORY & OPEN ECOYSTEM

Open Ecosystem

The technology advancements are developing at a skyrocket velocity and a new Data & Intelligence landscape is rising on the horizon.

These events are unleashing a **tsunami of growth and innovation** for those organizations with the capabilities and maturity to **grab the opportunities that are emerging**.

The best way to boost business innovation is by **harnessing the levers an Open AI Ecosystem** offers, where groundbreaking ideas, unexploited data, fresh capital, and cutting-edge AI services and solutions are awaiting to be exchanged.

In the Open AI Ecosystem, organizations can interact and interoperate with multiple players creating a new environment of collaboration and **achieving collective ambitions** in relation to tackling technological challenges and attaining higher benefits for themselves and society.

In this way, the Open AI Ecosystem provide several benefits:

- **More advanced solutions** as the collaboration between different agents operating and sharing know-how and insights in multidisciplinary environments increases the wealth of ideas and make possible to achieve cutting-edge solutions.
- **Flexibility and adaptability** as organizations no longer need to develop their own solutions from scratch, but **benefit from a wide range of solutions already developed** shared in the ecosystem.
- **Gain notoriety** in your projects and increase the visibility of your own solutions, as well as to **know firsthand the new advances** of other companies and to be able to mutually enrich each other.
- Cooperation opens the door to **new opportunities** such new goals, international markets or new customer database.



Thus, the transition to Open AI Ecosystems requires a change of mentality in the organizations, moving from an “ME /MINE” mentality to a “WE/OURS” mentality.

In other words, they no longer remain self-contained, but seek to cooperate, increasing the creation of value and benefits for society through an ever-widening network formed by a wide variety of external agents with different nature and characteristics:



Open and informative spaces for talks and forums to learn about the latest advances in technologies, discover new opportunities and meet new agents.



Harness Technological Giants’ products and large-scale solutions to boost the applications and benefits for each technology and raise the technological maturity across the market.



Open Competition / Hackathons for identifying talent, sourcing innovative ideas, collaborating with winners to drive and push forward solutions with social impact.



Open-source communities to enhance and distribute open-source solutions, access libraries and code, as well as share knowledge and experience.



Universities & Educational Academies that promote the participation in research and development projects, besides publishing reports and articles to widespread knowledge.



Institutions and Foundations, where possible 1-to-1 collaborations push forward the democratization and spreading of the best practices in data and AI, broadcasting the common knowledge and expertise, as well as, increasing the benefits for society.



Start-ups or Firms Collaboration expanding capabilities, collaborating in projects to create state-of-the-art and disruptive solutions.



Partnerships and consortiums collaborations under the umbrella of a new entity that brings both entities together, in order to generate knowledge and create cutting-edge projects in common.

NTT DATA Open Ecosystem

In this context, NTT DATA is characterized as a “**Trusted Global Innovator**”, who is a leader in solving business challenges and making a positive impact on global society by bringing transformation and innovation to clients in Europe, North America, Latin America, and Asia.

NTT DATA has been driving its Open AI Innovation activities through agreements carried out with third party and agents of society, institutions, public, private, academic or even the general public to exchange knowledge and experiences, build common D&I solutions, creating both business value and positive impact on communities:



TOYOSU NO MINATO KARA (Divulgative talks and forums)

To keep up with the speed of change in technological and market advances, NTT DATA believes that the co-creation with external partners will be an essential standard for open innovation in the future.

Therefore, it launched “**Toyosu no Minato kara**” (From Toyosu Harbor), which is a project that seeks to foster open innovation and build a win-win-win beneficial relationship for all relationships: startups, NTT DATA clients and NTT DATA itself.

In this context, Toyosu holds regular open innovation meetings and forums, where different startups discuss topics that look ahead to the future, such as 5G, Token Economy, AI and IoT. In this way, more and more members have become involved in this ecosystem, creating a community of more than 2,000 people, integrated by multidisciplinary profiles.





GLOBAL OPEN INNOVATION CONTEST (Open Competition/ Hackathons)

Another important activity to drive the Open AI Ecosystem and cutting-edge innovation is through the Global Open Innovation Contest.

The Global Open Innovation Contest is a competition between start-ups and emerging firms from around the world that are suitable to collaborate with NTT Group companies in leading-edge areas where new businesses can be created using NTT DATA's assets.

Since 2013, NTT DATA has materialized several collaborative deals of innovation through this ecosystem, especially with FinTech, Retail Tech and HealthTech companies.



As an example, in the latest edition of the competition held on January 29, 2021, the **Grand Champion Title** was earned by Inspektlabs. Inspektlabs' proposal for NTT DATA was to create a business using their AI technology and Computer Vision platform to automate inspections by capturing a 360° video of a vehicle or damage on a vehicle using a smartphone, and within seconds, getting an inspection report, eliminating the need for physical inspections.



MIT Media Lab & NTT DATA (Universities & Educational Academies)

Open AI Ecosystem brings together the most ambitious organizations and academic experts and scholars to push forward research and papers with a high-level component on innovation and growth to expand new fields and deliver greater benefits to the communities.

In this matter, we want to highlight the collaboration between the MIT Media Lab and NTT DATA, which pushes forward research projects that contribute to enhancement the society. Among all the works, it is worth mentioning the following:

- **“Emotion navigation” within the area of Affective Computing.** This project seeks to analyze the

emotions and stress levels of drivers while they are behind the wheel to improve driving safety and overall performance, including helping them reach their destination with greater well-being.

- **Support the correct intake of medication with Jibo Social Robot,** which is a joint research project between Media Lab’s Personal Robots group and NTT DATA.

Jibo not only helps to remember when to medicate, but also proactively remembers which medication is being consumed and whether it is being taken correctly, helping people with dementia and cognitive ability deficits.





SERES (Institutions and Foundations)

In this same ecosystem, NTT DATA also promotes collaborations with foundations that promote the commitment of companies towards a better society. A great example to highlight would be the three-year collaboration with Fundación SERES, which seeks to promote responsible actions aligned with the organizations' strategy to generate value for all stakeholders.

In this sense, the most fruitful project includes the publication of a "Labs Decalogue for a Responsible and Inclusive AI" in 2020 and the development of an AI lab for the design of AI services with a human-centric approach in 2021. We also participate in the Radar Seres forums.



MAVENIR & NTT DATA (Firms Collaboration)

Since September 2021, NTT DATA and Mavenir Systems are globally collaborating to provide products, solutions, systems and integration services for **5G networks based on cloud native, open architecture-based systems**, including Open RAN (Radio Access Network) to drive openness and virtualization in 5G networks.

Through this collaboration, the two companies will combine various IT and telecommunication

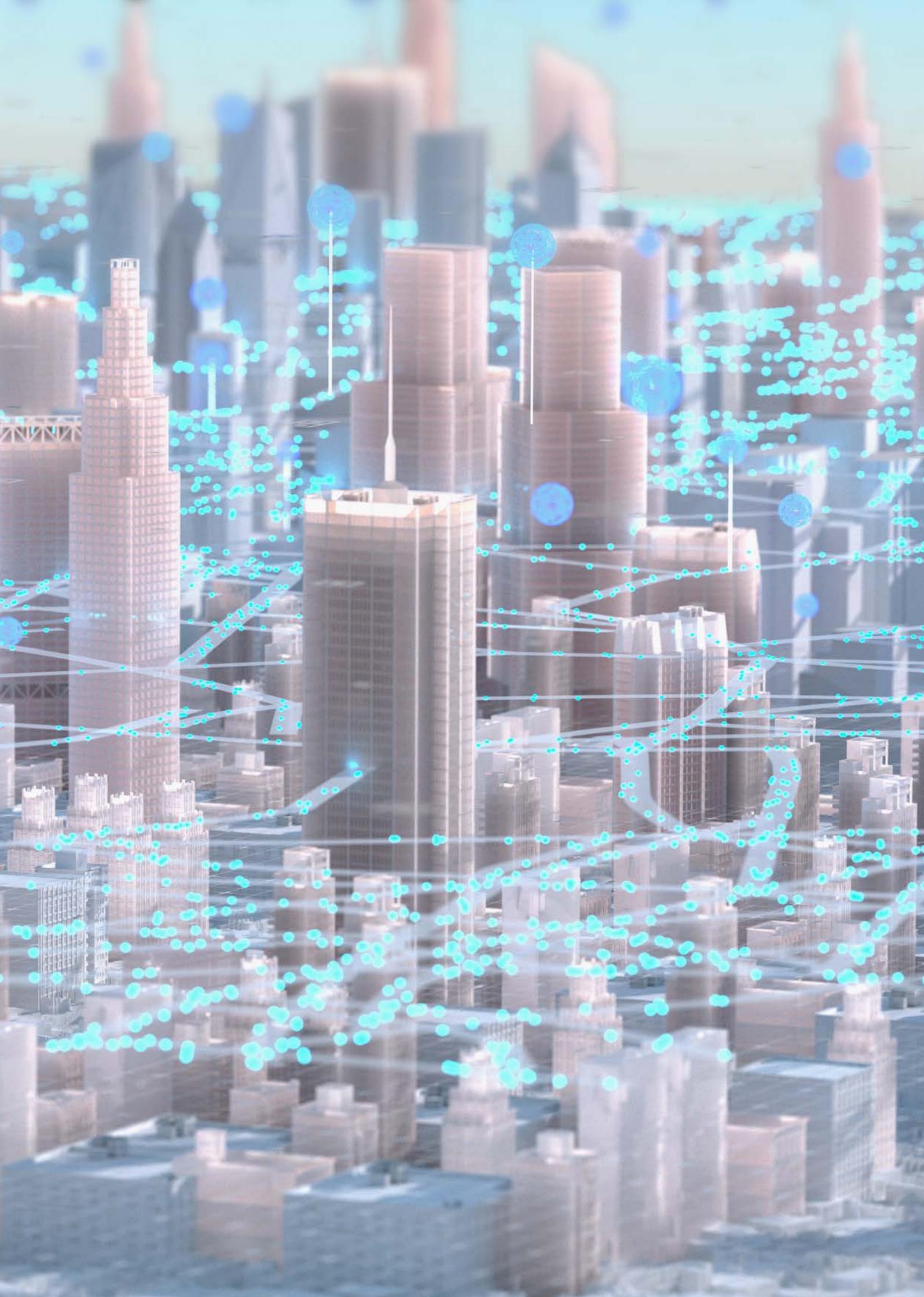
services, including integration services provided by NTT DATA worldwide with Mavenir's Open Virtualized RAN solutions technologies to support the Digital Transformation of enterprises and telecom operators using 5G.

As a result of leveraging an Open Ecosystem, the two companies will prioritize and work closely together on pioneering projects to drive open architecture-based approaches in enabling bigger and broader ecosystems to unlock the true potential of 5G networks.

A cityscape with a digital network overlay of blue nodes and lines. The background shows a dense urban environment with various skyscrapers and buildings. Overlaid on this is a complex network of glowing blue dots connected by thin white lines, creating a sense of connectivity and data flow. The overall color palette is dominated by warm, golden-brown tones from the city buildings and cool, cyan-blue tones from the digital overlay.

02

D&I Visioning



Business Value: Aligning objectives to initiatives

HOW TO IDENTIFY THE MOST VALUABLE D&I INITIATIVES AND CREATE AND D&I PORTFOLIO?

The race for organizations in all business sectors to become more competitive and differential in an increasingly harsh competitive environment has only just begun.

As a result, the leading players in the market are becoming those organizations that combine operational and specialized sector expertise with state-of-the-art data and artificial intelligence technologies such as Machine Learning (ML), Natural Language Processing (NLP), Robotics, Robot Processing Automation (RPA), Deep Learning and Computer Vision among others.

Investing in D&I know-how and capabilities and embed them into the business streams offer unseen opportunities to create value in disruptive ways and elevate the current business activities while changing the collaborative model between humans and technologies.

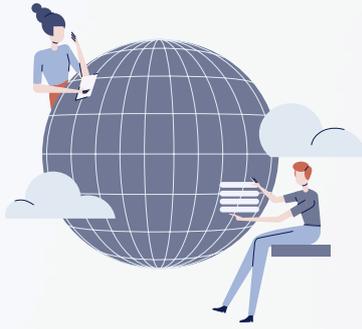
However, for organizations to capitalize on this challenging momentum it is necessary for them to define how to bring strategic value to the organization's business by envisioning innovative D&I initiatives.

For all those reasons, leading companies are harnessing a structured guide presented in a four-phase process, starting with the organization's overall objectives and culminating with an actionable portfolio of D&I initiatives that can be developed.

- Identify the Business Value

- Seize the market momentum

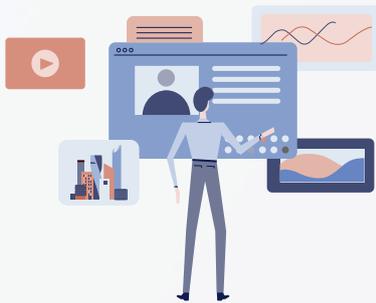
- Capitalize cutting edge technologies



Comprehend the corporate strategic objectives

01

Understand the organization's strategic goals and current lines of action where AI can be a lever for change.



Perform a thorough scan of the business unit/domain

02

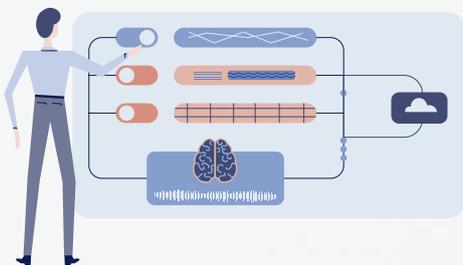
Analyze the business units' objectives and identify their main challenges and opportunities that could be tackled with D&I solutions.



Identify and define D&I initiatives

03

Identify and define the D&I initiatives that best address the challenges posed in the previous step.



Assess and prioritize D&I initiatives

04

Obtain a portfolio of viable initiatives sorted in an actionable plan of gradual increase of D&I maturity and achievement of objectives.

NEXT CHAPTER
AI DRIVEN DESIGN

Business Value: Comprehend the corporate Strategic Objectives



D&I-driven organizations need to plan the integration of Artificial Intelligence by first comprehending where the organization is headed (mission) and what its strategic goals will be.

This requires conceiving AI as a lever of change that will enable your organization to achieve those objectives, and not making it a destination in itself.

So, the best way to begin is to ask yourself:

What objectives do you have within the organization?
Which priorities may be addressed through AI?
What support in terms of budget and resources may it demand?

So, to unlock the value and potential that AI has to offer, it is important to:

Acknowledge what the strategic goals are and have a clear vision of the priorities that the organization has set at the corporate level.

01

Discover the relationship between these lines of action and the business domains and business units.

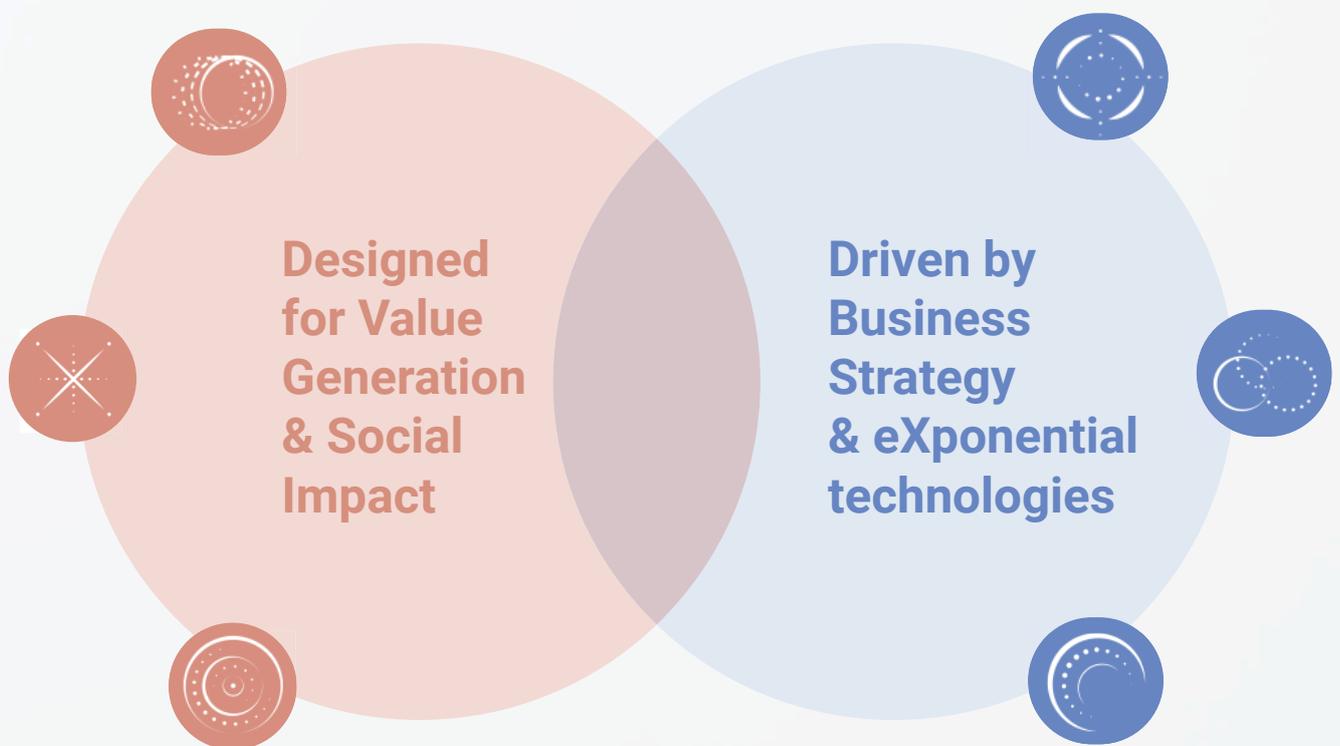
03

Identify those strategic lines of action with the greatest potential impact, and to which priority will be given through the use of AI capabilities as a driver of innovation and differentiation.

02

To this end, the NTT Data's proprietary eXponential Business Framework supports clients in identifying the most promising lines of action by orchestrating corporate objectives and business strategy through data and AI capabilities to generate internal growth and drive competitiveness.

In other words, the Framework customizes pathways to empower organizations through a comprehensive process of defining, assessing and executing specific value domains, comprising new business and value models, internal organizational practices, and new innovative and disruptive services and experiences.



External lines of action designed for **value generation and business transformation:**

- New business models
- New products and services
- Human-centric interactions and experiences

Internal lines of action that will drive **business strategy and internal transformation:**

- Increased operational competitiveness
- Organizational advantage
- Open ecosystem

Business Value: Comprehend the corporate Strategic Objectives



New business models

Identify how AI and innovation may transform existing business models, services and experiences, by defining the technology model that best fits the business goals and pursued impact. As well as, support those new business models, which have room to capitalize new value.



Differential products and services

Develop tech-enabled businesses that quickly bring to market digitally relevant products and services that deliver differential value.



Persona-centric experiences

Stakeholders' centrality is becoming reality through data-driven and hyper-personalized experiences, where every interaction leads to strengthening the collaborative model between machines and humans and delivering the value proposal.

Possible examples of Strategic Objectives

Embed flexible consumption models to provide "as-a-service" models

Increase domestic market penetration

Address new market trends as the economies of sharing

Broaden the portfolio with new Digital Intelligent services

Become more relevant in the arena of new product design

Build brand loyalty

Improve customer satisfaction rate on the service

Create hyper personalized experiences tailor-made to each stakeholder's necessities

Grow the most profitable segments of customers

The eXponential Business Framework can be applied for data and intelligence transformation and helps to illustrate some examples of different strategic objectives that a company may have. This framework can become a guide to address where the biggest challenges lie down and start moving forward its resolution.



Operational competitiveness

Simplify operational processes to make a better use of data in real-time, improving both efficiency and productivity. This internal process transformation also enhances the strategic and operational management, making the organization more agile to face market changes.

Reduction of time to market

Optimize the lifecycle of omnichannel initiatives

Provide end-to-end solutions to mitigate operational risks



Organizational Advantage

Organizations look to champion on increasing competitiveness by developing a new type of organization that empowers talent and fosters collaborative intelligence, as a result on the human and technology convergence.

Gain greater productivity by reducing routine tasks

Elevate the organization D&I capabilities

Create an innovation and D&I-driven culture



Open Innovation

Ability to innovate is increasingly related to the organization ecosystem. Permanent participation and promotion of open innovation ecosystems ultimately determine the ability of companies to take advantage of the digital revolution.

Become a leader in the open-ecosystem

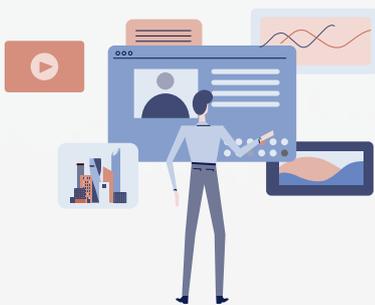
Foster continuous innovation that meets the speed of market opportunities

Have a better understanding of market dynamics to meet speed opportunities



02 D&I VISIONING

Business Value: Perform A Deep Scan Of The Business Unit/Domain



The clear understanding of the mission and strategic objectives is the backbone of any D&I organization, which will be materialized in **action lines** articulated by those business domains and business units that will generate the greatest value and drive its success in the future, leveraging cutting-edge technologies.



For this purpose, it is necessary that those potential areas have previously set up a clear and conscious self-awareness base through an **internal scanner**, revealing:

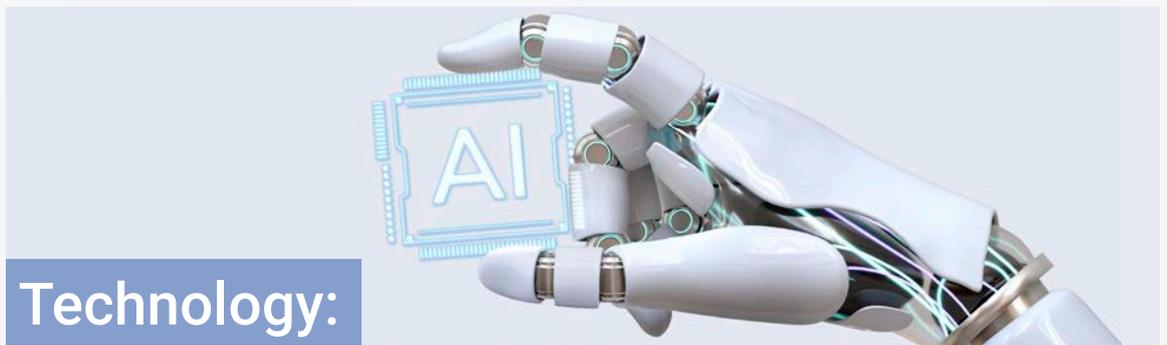
- **The relationship models** between business domains and business units, and how they interrelate with the AI and technology development teams.
- **The state of the art of in-house technologies**, gaining a better understanding of the technological capabilities, the level of maturity of AI-leveraged digital solutions and the degree of D&I knowledge and expertise that can be offered to the business areas.

The internal scan will further empower business units to gather in a meeting with the purpose of jointly present needs and opportunities and **define key challenges** to be tackled by D&I's capabilities.

Business Value: Identify and define D&I Initiatives

When business domains and business units have brought a challenge to us, it is not swept it under the rug, but rather brought it to light. It is time to work together with the technical experts to provide the best viable solution through the use of D&I technologies.

More precisely, the resolution to the pain points raised in the previous step requires a contextualization of what is happening in the market, from three points of view:



Technology:

As mentioned in previous chapters (Chapter #1. Observatory and Open Ecosystem), we leverage the capabilities of our technology observatory to examine how other organizations are addressing the same or similar challenges using cutting-edge technologies.



Business:

We also benefit from a business observatory integrated by the most knowledgeable business experts in the targeted field.



Competition:

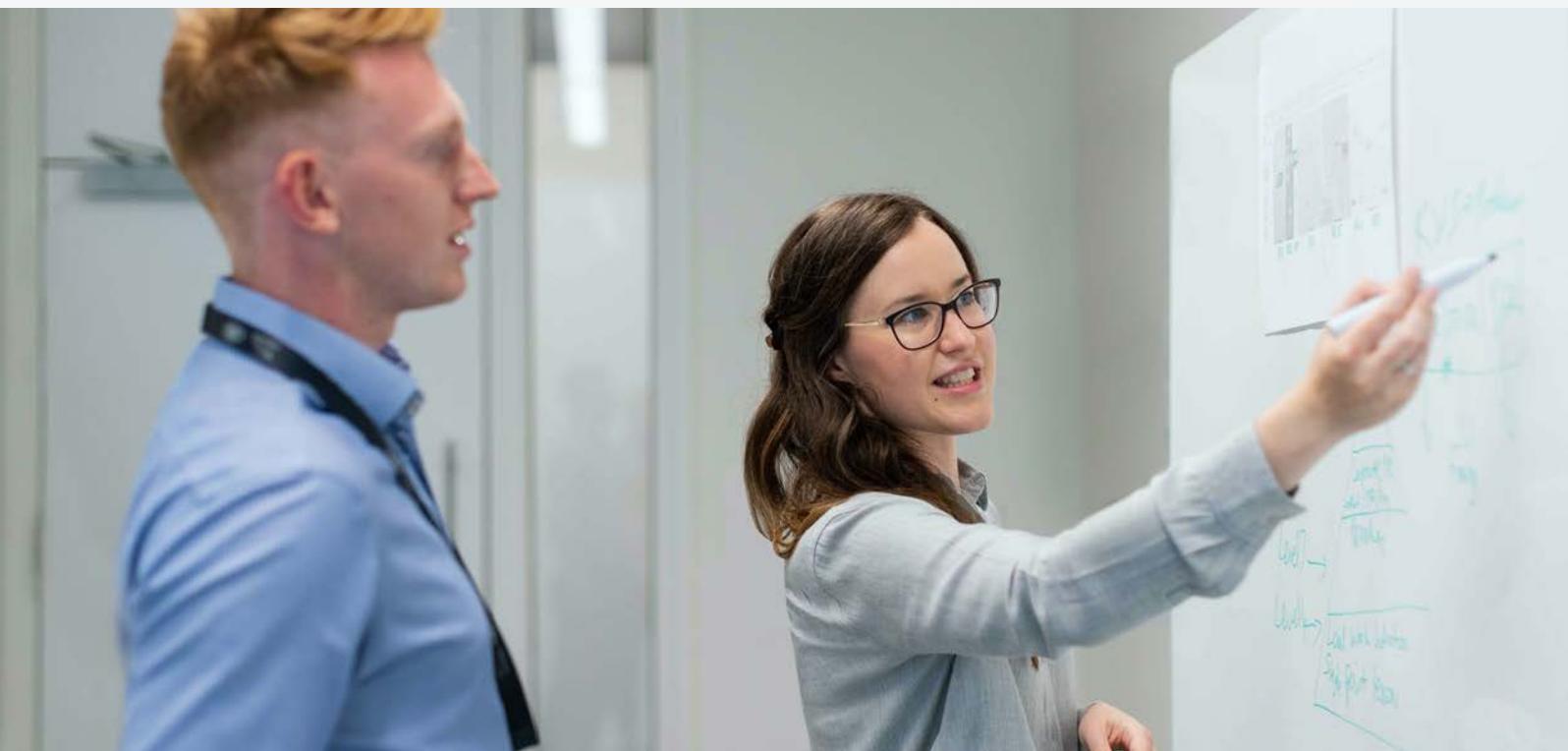
It is necessary to perform a comprehensive market analysis to identify the top players in the market that are already generating exponential value and competitiveness.

Our thorough three-pronged analysis will shed light on the challenges that are at stake, transferring the findings and insights to the relevant stakeholders in a collaborative workshop process.

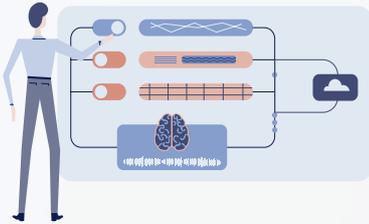
Furthermore, during this collaborative workshop, it will be possible to co-identify and co-define the D&I technologies (e.g. RPA, NLP, Computer vision...), which will later be the driving force for the development of the AI initiatives.

The third step's final deliverable will be a portfolio of AI initiatives that address the challenges outlined and that are solved with state-of-the-art technologies.

However, the portfolio of initiatives is not definitive, it is necessary to evaluate and prioritize them before moving on to the design and rapid prototyping phase.



Business Value: Assess and prioritize D&I Initiatives

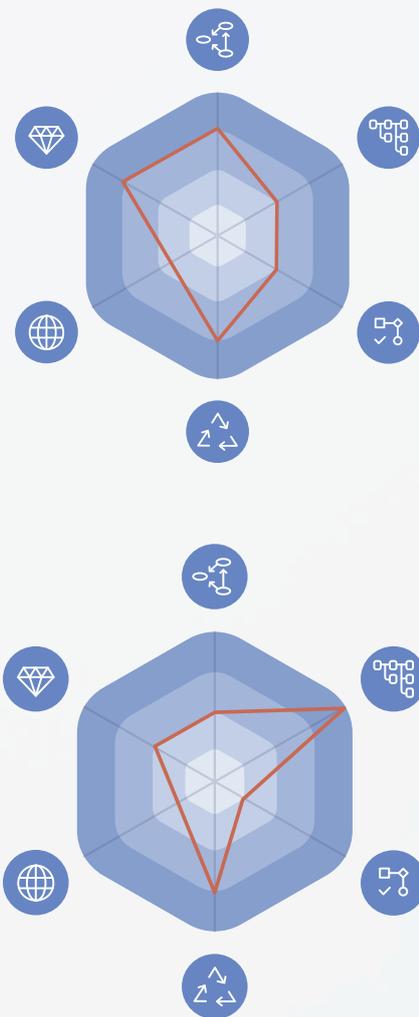


The set of initiatives identified in the previous phase should not be handled as a collection of isolated business cases, but rather it is important to create an orderly work plan that articulates the different initiatives to achieve an organic development oriented towards achieving the business objectives.

To this end, each initiative must be evaluated individually and prioritized, arranging them in such outline so as to gradually expand D&I capabilities and add value to the business, obtaining synergies between all the initiatives aligned with the organization's corporate strategy. For that reason, organizations must leverage a standardized prioritization methodology for both aligning AI initiatives within a cross-business units and guide building up a strategic AI roadmap.

Our proprietary 6S Model is just what you need in this step of the process. It consists of a robust model on six levers to quickly assess AI initiatives' impact and support your decision-making process when creating an AI initiatives portfolio.





These graphics are an example of what to expect as output. Having identified some potential D&I initiatives, it is time to put them under the microscope of our assessment and prioritization Model.

The 6S model supported organization's leaders to compare these different initiatives using a standard criteria in order to select the one to start with and arrange the rest in a structured backlog.

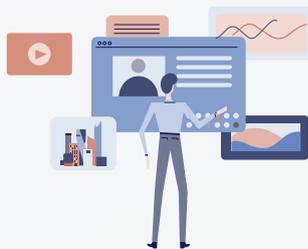
Therefore, the resulting portfolio will form a progressive action plan where the initiatives will be developed, bringing the maximum value in time and form.

Real life AI industry application example: Pharma

This envisioning process is carried out by NTT DATA when companies seek to start making D&I initiatives but do not have yet a defined D&I strategy. Below we will expose a real case of a pharmaceutical company that had a 10-year strategic plan and seek to know how they can take advantage of the potential of D&I technologies to achieve their plan.



On the first step of the process, NTT DATA had to understand the corporate strategic goals and identified the lines **of action that are likely to be addressed with D&I solutions**, among which the following stood out: improve the patient experience, streamline clinical and data-intensive processes, foster global competition and boost the productivity of doctors and researchers.



Then the team met with the **different business domains** to detail the **specific challenges** of each unit regarding D&I:

Research and Discovery

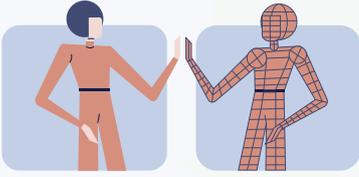
- Distributed drug investigation teams & research partnerships need interoperable systems
- Need for multi-stakeholder data aggregation

Patient Support

- Inability to monitor patients effectively during clinical trials
- Need to extract meaningful insights from large amounts of unstructured data
- Lack adherence by patients due to complex trials

Clinical Trials

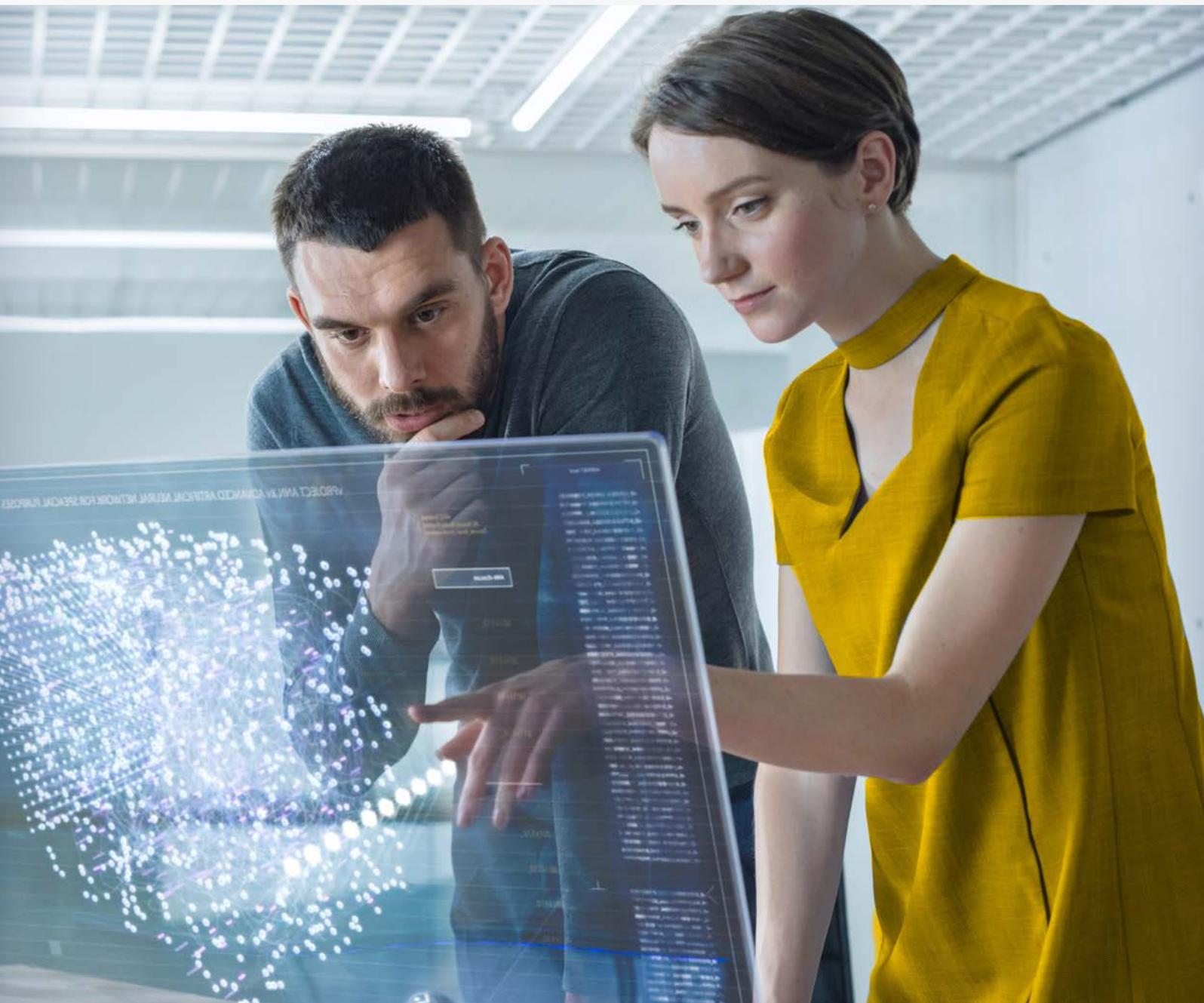
- Siloed and poor data quality sourced that difficult and slow down the trial
- Lots of manual labour in data treatment and review
- Imbalanced data-sets and overfitting AI models

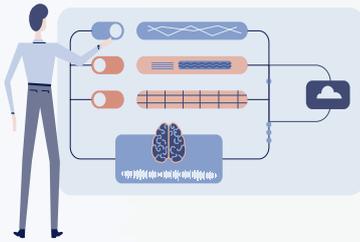


After the identification of the challenges, NTT DATA's team performed a benchmark to examine how other companies respond to these challenges. It was also researched which cutting-edge technologies are being leveraged to solve these challenges.

Following the inspiration session, we worked hand-in-hand with the client to think of potential initiatives. The resulting outcome of that exercise was a list of 12 initiatives tailored-made to their organizational needs and the current maturity stage, highlighting:

- Connected patient
- Decentralized data and distributed learning
- Human-first interfaces with NLP

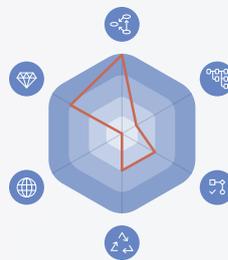




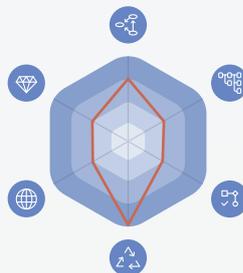
Once we had a portfolio of potential initiatives, we had to assess those, in which the pharmaceutical organization had the most stake, by leveraging our 6S framework to evaluate, prioritize and rank the initiatives.



Connected patient



Decentralized data & distributed learning

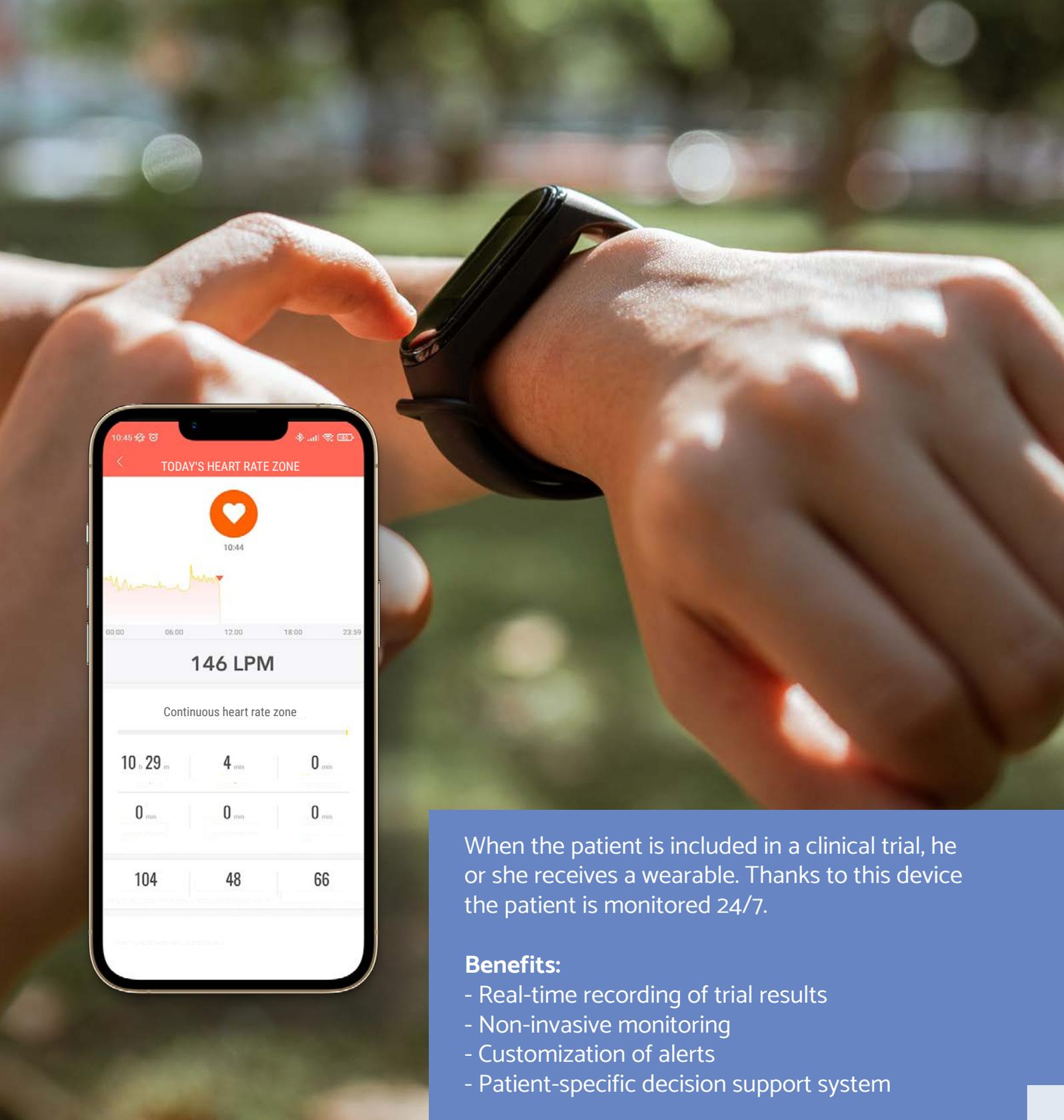


Human-first interfaces with NLP

This is an illustrative example of the initiatives' evaluation performance, thanks to which, the client could:

- Understand the value and viability of the business cases
- Create the best valued portfolio of initiatives
- Select the one to start working

By leveraging our end-to-end process, after knowing the client's strategic goals, detailing the specific challenges and brainstorming and prioritizing different initiatives, the pharmaceutical organization made the informed decision of beginning with the Connected patient one:



When the patient is included in a clinical trial, he or she receives a wearable. Thanks to this device the patient is monitored 24/7.

Benefits:

- Real-time recording of trial results
- Non-invasive monitoring
- Customization of alerts
- Patient-specific decision support system

Do you want to know what happens after you select a high-valued AI initiative?
Are you looking forward to designing it and prototyping it fastly using an agile methodology?

AI for Social Impact





Nowadays organizations are no longer just chasing profit goals, but also looking forward to being agents of change in society by leading responsible innovation, promoting responsible environmental, pursuing social benefit and driving economic progress by developing reliable and inclusive AI systems.

Five key axes of Social Impact are identified* for organizations to be more relevant as an important consequence of their business:

Impact on Preservation:

New ways of consumption, Environment Sustainability and Collaborative Economy.

Impact on People Progress:

Progress by Knowledge and hybrid human-machine models.

Impact on System Ethics:

Open Data Transparency, and algorithm white boxes (Explainable AI).

Impact on Diversity:

Women and Community Empowerment.

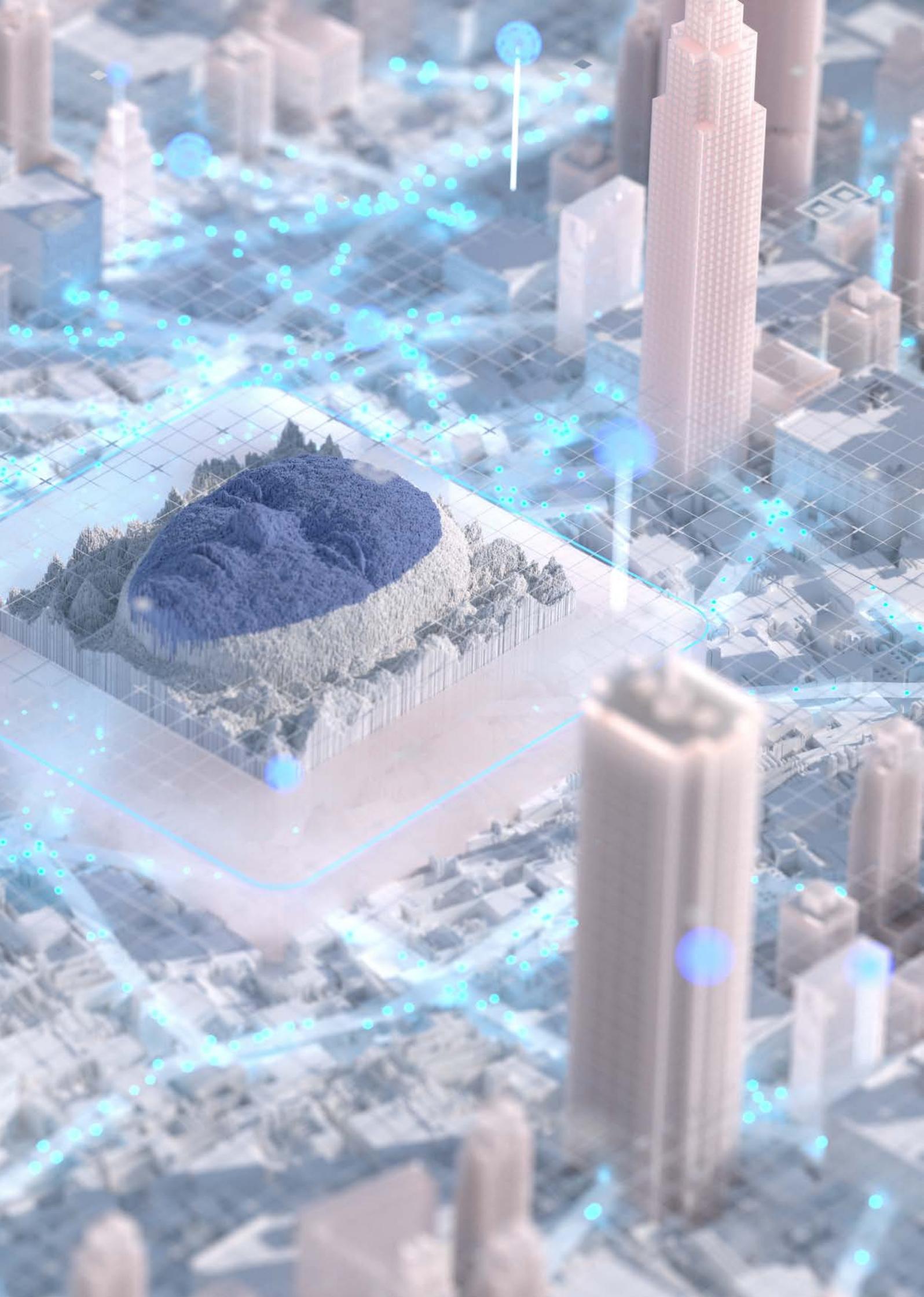
Impact on Social Fairness:

Financial Inclusion.

A futuristic cityscape with a grid overlay and glowing blue data points. The scene is dominated by tall, modern buildings in shades of blue and white, set against a background of a glowing blue grid. Several large, glowing blue spheres are scattered across the grid, some with white lines extending downwards, resembling data points or markers. The overall aesthetic is clean, modern, and high-tech.

03

**Design
& Innovation**





03 DESIGN & INNOVATION

Prototyping Lab

Speeding up innovation and unlocking the full potential that Artificial Intelligence initiatives have to offer have become a conundrum for many organizations. In fact, a recent research study conducted by Gartner (11) shows that of the total number of AI initiatives that are raised, only 53% of the projects move on to the production phase of AI prototypes.

Let's recall that in the previous chapter, organizations have been able to identify and categorize the best D&I initiatives that bring the greatest potential, aligned with the goals that the organization is pursuing.

The AI Lab acts as an innovation center, facilitating rapid experimentation with AI prototypes AI. The first step towards the creation of Intelligent Digital Services.

Thus, what are the main challenges the organization faces with their AI projects? According to the report, technical managers and leaders struggle to productize and scale AI projects because they lack the environment and the tools to create and manage rapid testing and fast production of AI prototypes.

So how do you go from here? To materialize your previous D&I initiatives and boost the percentage of disruptive AI prototypes, we provide our **Rapid Prototyping Studio**, which consists of a controlled experimentation environment where in a few iterations designs and products can be refined and validated so that only the right products are released.

The Rapid Prototyping Lab is presented as a redefinition of how organizations could prototype, transitioning from pure code to visual interfaces that show the power of AI while supporting them by:



Translating business questions into actionable AI & Data-driven prototypes and services.



Harnessing a robust end-to-end conception and development of services and products embedding AI.



Accelerating experimentation through visually compelling prototypes with a curated storytelling.



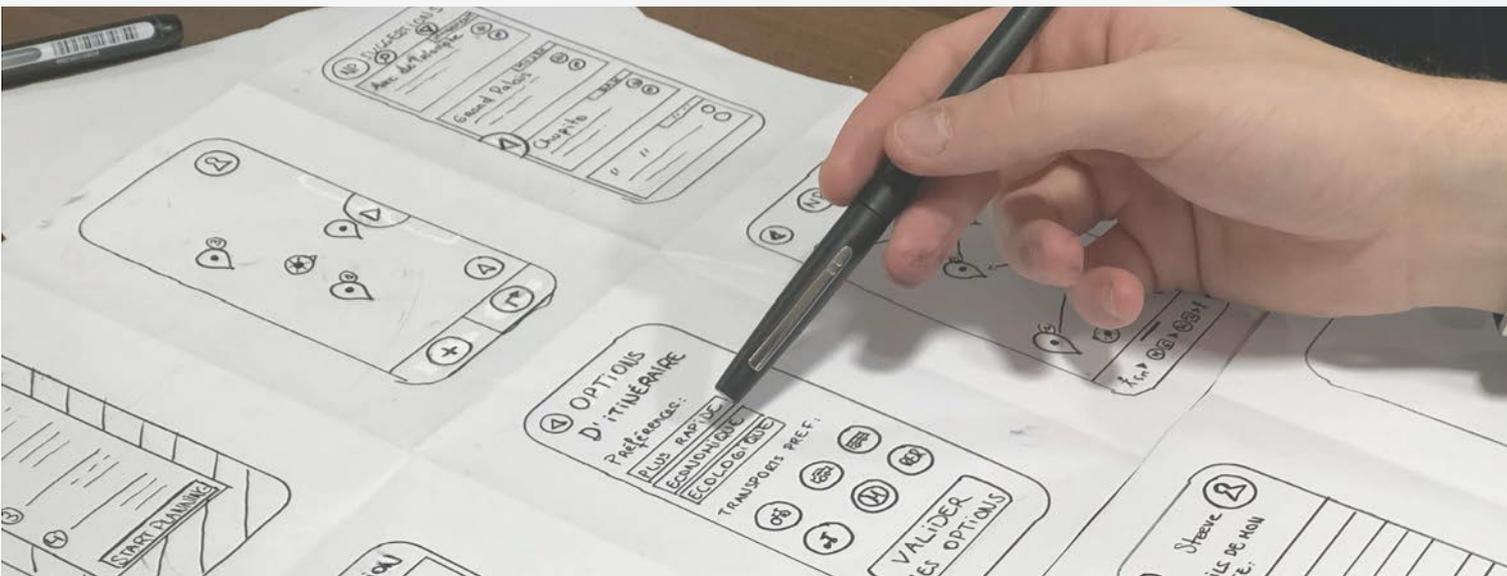
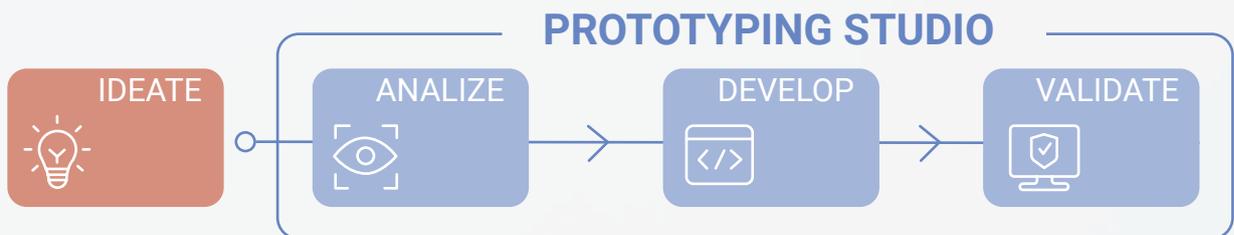
Augmenting data scientists capabilities in a two-fold manner: extending their perimeter towards full-stack & providing better storytelling tools to defend their work.



Seizing the benefits of collaborations between the Lab and Cloud providers, taking advantage from their most innovative solutions and up-to-date capabilities.



Orchestrating resources (cloud technologies, data, infrastructure) and talent for taking AI services at Scale.



THE IMPORTANCE AND TANGIBLE BENEFITS OF LEVERAGING A RAPID PROTOTYPING STUDIO



BUSINESS VALUE

More efficient feedback loops will be created, as the visual representation of the power of the AI models will inspire subject matter experts in order to formulate recommendations.



ORGANIZATIONAL IMPACT

By transforming written code into a compelling visual storytelling, a smoother dialogue will arise between AI experts and non-AI workers, unlocking new transformation opportunities.



QUALITY

Agile Methodologies are embraced, which leads to a high number of small iterations on the product idea. As rapid feedback is included on each iteration, the quality of the product increases over time, which leads to **a high-quality product.**

SUCCESS STORIES

A **Spanish banking** firm with worldwide prestige is leveraging the capabilities provided by our AI Lab, generating **AI prototypes completely tailor-made** to the requirements of the financial firm.

As the Lab facilitates the incorporation of agile methodologies, it provides small **feedback interactions every 3 days**, resulting in an **increase in the quality and precision of the prototype.**

In addition, this new approach is **enabling new dialogues between technical and business teams, unlocking the value that AI brings** to this financial institution.



COST

Use cases are validated before being deployed, which prevents costly errors in advance and guarantees the cost of opportunity of the investment in AI projects.



CULTURE OF EXPERIMENTATION

The successful fast prototyping allows AI to permeate in all business areas and processes, showing its potential and reducing frictions that lengthy, unsuccessful projects may generate.



DELIVERY TIME

With prototyping, not valuable use cases are rapidly stopped, **so the speed to market the valuable use cases is significantly increased**, allowing fast innovation.

SUCCESS STORIES

An **Italian client in the automotive industry** was able to benefit from the Lab by having their **AI prototype set up in just 3 days**.

The AI model developed allowed them to predict the resale time of vehicles and to have an optimization that allowed them **to gain insights** on which features help sell a car faster and how they influence the sale.

The advantage of rapid prototyping, identifying which AI model will work best for the Italian company, and discarding those that don't, helped the firm **to reduce costs and drive innovation** across the whole organization.

Real life example: Fashion Retail



Using as an example our customers in the fashion industry, whose market is characterized by variability and unpredictability due to the difficulty of identifying changes in fashion trends and understanding the new customer needs, further unforeseeable due to the COVID-19 crisis.

For this reason, to support them in their crusade and accelerate experimentation around AI initiatives and the development of prototypes of Intelligent Digital Services, NTT DATA and Google Cloud have partnered to launch **The AI Prototyping Labs**.

“The AI Labs powered by NTT DATA & Google brings fashion brands the differentiating capabilities offered by AI to lead the market.”

These Labs are an innovative collaboration model at the service of our clients in the fashion retail sector, providing state-of-the-art technologies, cloud capabilities and expertise to take AI initiatives to the next level. So that projects can be rapidly prototyped, betting only on the most successful ones.

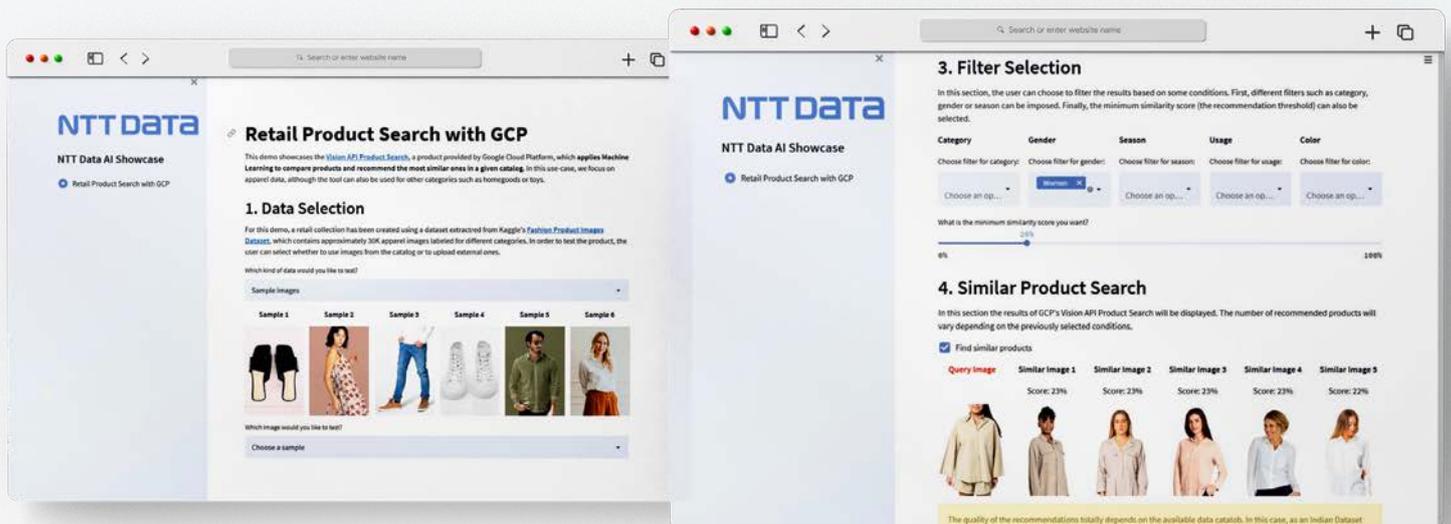
In line with the previous statement, we detect that fashion brands are looking for cutting-edge solutions to differentiate their online stores from their competitors', seeking to offer a premium digital shopping experience that translates a boost in conversion into sales and an improvement in customer loyalty bonds.

That's why thanks to the AI Prototyping Lab, our fashion clients have been able to incorporate new Artificial Intelligence technologies and cloud capabilities into their digital environment, creating an innovative business use case, called **Visual Search and Computer Vision** in just 2 days.

The goal was to make it easy for any user to find the clothes they are looking for by simply uploading an inspirational and similar photo to what they want on the brand's digital channel.

In this way, the AI visual search engine will compare the original image with the products in the catalog and provide a complete list of garment results or total looks.

Additionally, we supported our customers by enriching the performance of the results with extended functionalities, such as recommendation based on browsing and shopping history or similar products of interest to other customers.



Digital Intelligence everywhere

An innovative culture and mentality together with the ability to accelerate the process of creating and testing AI prototypes is essential for organizations to be able to create powerful Digital Intelligent Services that allow them to be competitive in an increasingly digital and data-driven world.

35%
Gen X and millennial customers want hyper-personalized digital services



From the most everyday activities to the most disruptive applications, new digital intelligent services are increasingly present in people's lives. In a research made by NTT DATA (12), we found out that 35% of Gen X and millennial customers want hyper-personalized digital services to help them meet their life goals. And they're willing to share their personal data and pay more for those services.

70%
organizations will have operationalized AI architectures in 2025



This growth trend was accelerated by the global COVID 19 pandemic that acted as a catalyst forcing many companies to create new intelligent services. In 2021, the new digital era based on intelligent solutions keeps growing strong and it is expected that by 2025, 70% of organizations will have operationalized AI architectures (13).

This trend of new digital services and the increase in the use of AI is transversal to all sectors and companies, regardless of their size or maturity. From digital native companies to century-old entities, everyone takes advantage of the benefits of digital intelligent services.

Among the focus areas that receive the greatest amount of private investment, we can find research and development in the creation of Digital Intelligent services and products such autonomous vehicles, Edtech, speech recognition, machine translation, fraud prevention, shopping experience, entertainment industry (games, sports, fan engagement, etc.) and financial services, among others.

Insurance companies are improving the claim experience by relying on computer vision applications in the evaluation of vehicle damage. People avoid the need to wait for an expert and just upload a photograph of the damage. Reducing time and effort both for the customer and the company.



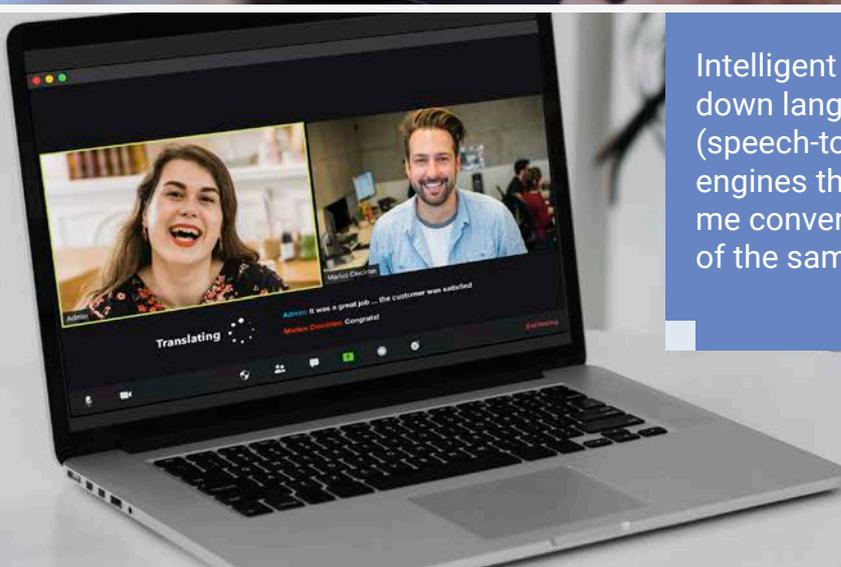
Using Augmented Reality glasses for detecting damages on a specific server within a rack and guiding the operator by giving detailed and visual instructions to perform the necessary repairs or checks.



Intelligent investment systems monitor and obtain insights from different sources of data, offering recommendation of financial assets and stocks according to the preferences of the entities and even allowing the automation of portfolio management.



Intelligent digital services are breaking down language barriers, by using NLP (speech-to-text) tools and translation engines that allow having real-time conversations with non-speakers of the same language.



Why Digital-Intelligent Services?

People are increasingly accustomed to Digital-Intelligent Services characterized by being intuitive and offering capabilities that make life easier. This generates liquid expectations making customers demand quick and intuitive procedures having high-standards and demanding expectations for all services, whether it's their trusted e-commerce or a public registry.

Organizations need to create quality digital intelligence services to face the increasing competition.

Organizations need to create quality Digital Intelligent Services that provide a differential experience not only compared to their direct market competition but to any provider of digital services. Companies now are increasingly offering more services in addition to their traditional business, blurring the lines between sectors and increasing the number of competitors.

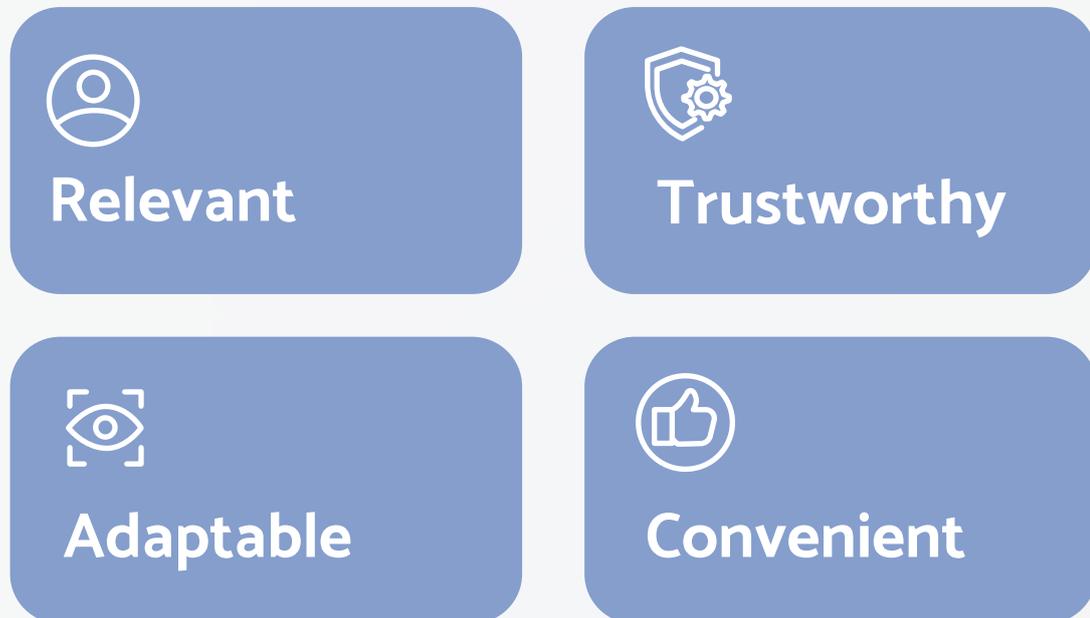
What is a Digital-Intelligent Service?

A Digital Intelligent Service elevates traditional digital services with a combination of data-science and advanced AI technologies to leverage the power of data and to deliver differential experiences. It allows organizations to have a better understanding of their business and customers, improving the decision-making process.



With large amounts of data being generated and accessed every minute of every day, organizations are impacted by constant flows of information that need to be addressed and capitalized. Traditional data sources and analytics are not enough to face this challenge on their own, so it is necessary to develop robust Digital-Intelligent Services.

Having quality intelligent digital services will allow organizations to provide unique value, with solutions that create a new model of relationship with customers and make them feel that the organization is:



Relevant: The solutions get to know the users to offer them a hyper-personalized experience tailored to their needs. For example, they offer recommendations based on their tastes or history, allow customization of the functionalities or assist the user on a daily basis.

Trustworthy: Solutions must be transparent and explainable with to user, making them feel that they can trust them. This is achieved through the explicability of what the algorithm does or is based on, which information it uses in addition to telling ethical conception of the application itself.

Adaptable: D&I technologies open up a new space where solutions can learn and evolve with the user. For example, they offer alternatives if they have not given the expected response, allow the user to value results and include this feedback in the model automatically, adapting it to the specific users and improving future interactions.

Convenient: Nowadays people are surrounded by information and need to make hundreds of decisions a day. Digital-Intelligent Services makes some of the leg work, by offering the maximum output from the minimum input, simplifying the decision making processs and minimizing manual tasks thanks to their knowledge about the user.

Our methodology: AI-Driven Design

In the era of the new digital, when the organization start to develop their portfolio of AI initiatives, it is important to have a methodology that allows achieving maximum business value through the development of Digital Intelligent Services that embeds D&I technologies to deliver outstanding customer experiences.

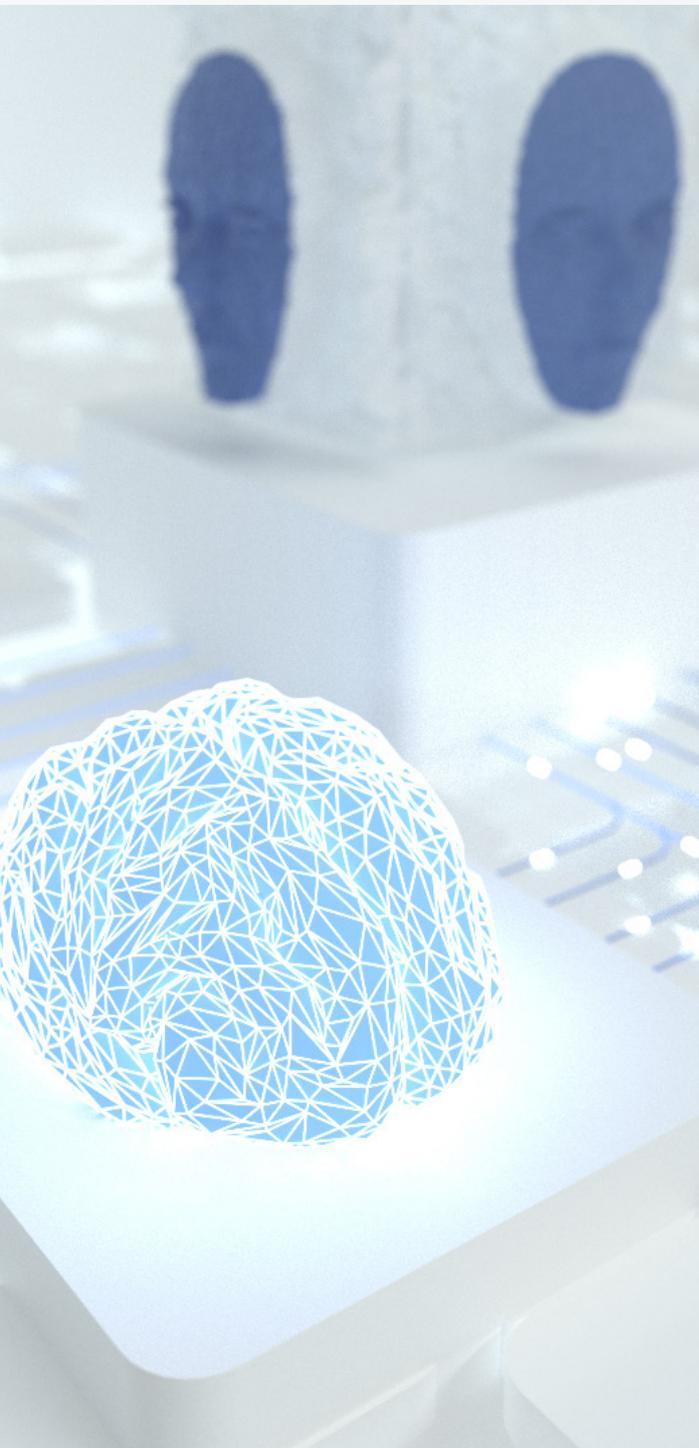
For this reason, NTT DATA offers its own **AI Driven Design methodology**, which merges business strategy with the design and development of solutions to identify, define, test and scale Digital Intelligent services.

AI Driven Design also integrates multidisciplinary teams where specialized profiles collaborate in the different phases of the solution combining business expertise with the highest technical excellence.

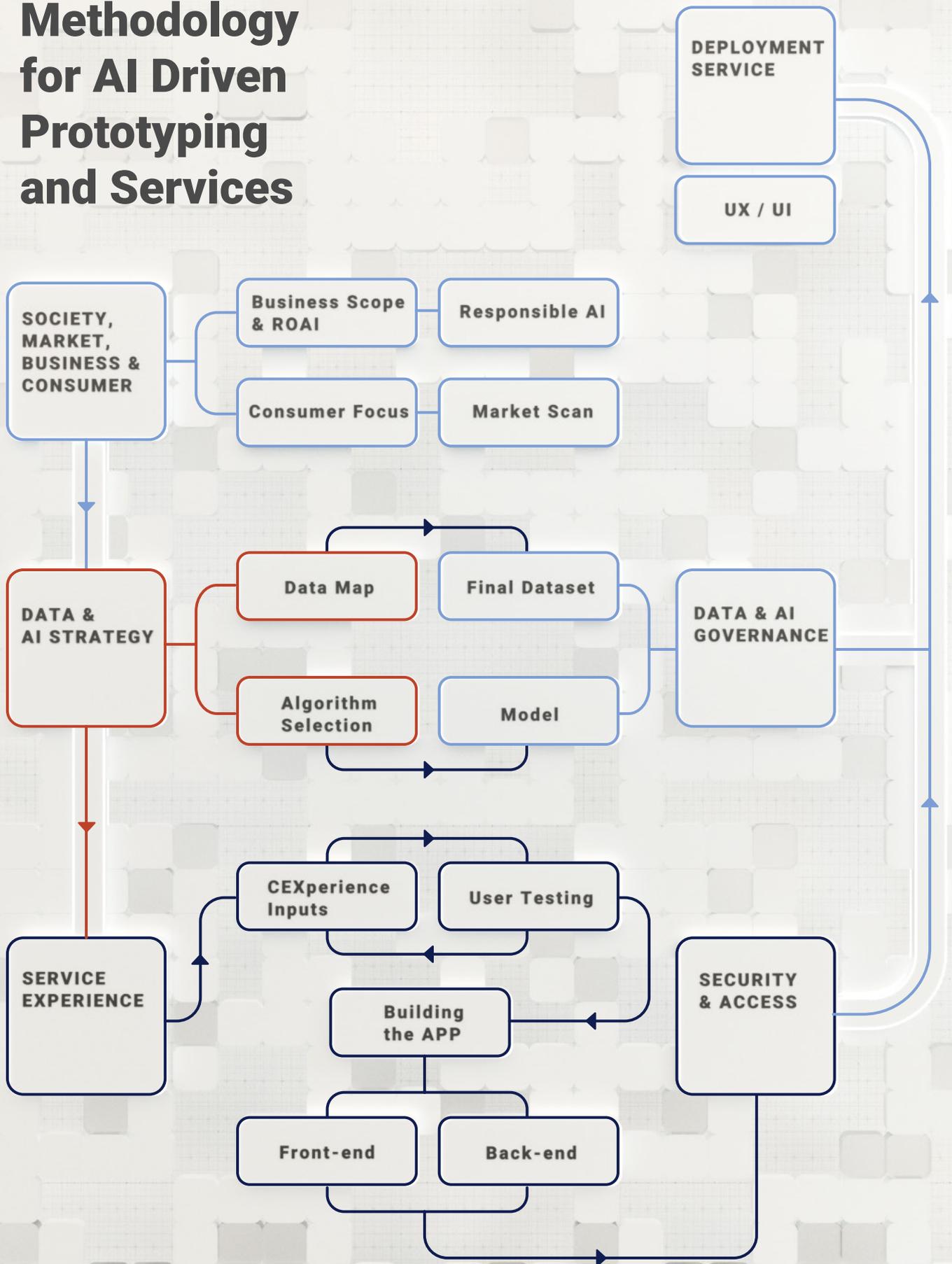
In this way, a rapid development of solutions is achieved and allows to accelerate the cycle of iterations reaching higher quality levels.

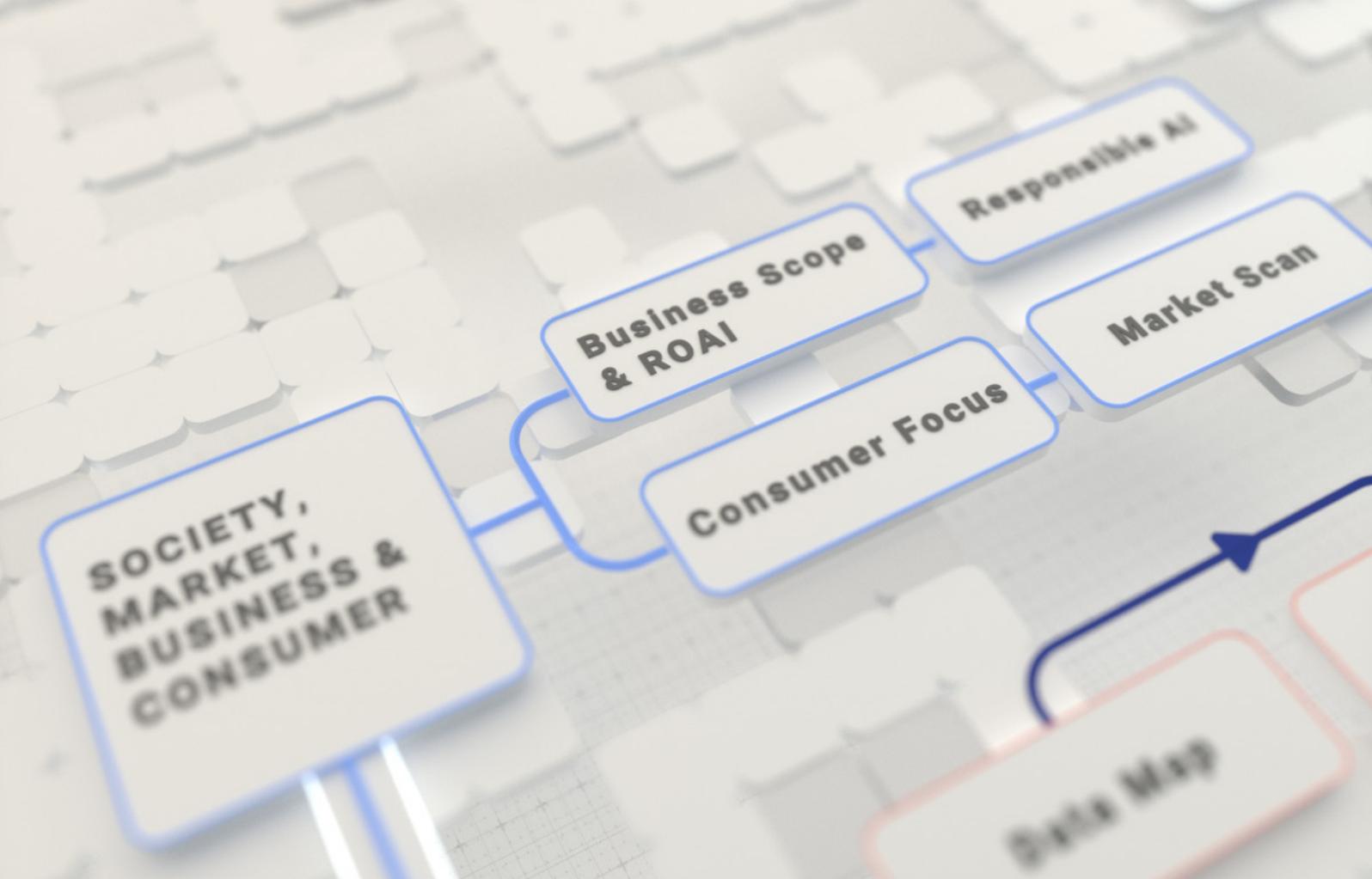
From prototyping to Digital Intelligent Services

This framework seeks to create value and accelerate innovation and makes it possible to orchestrate the different areas and knowledge involved in analytical projects. From the definition of the business case, market and customer analysis to the development and governance of initiatives. It also covers their implementation and the consumption experience of intelligent digital services, creating an agile and multidisciplinary collaboration model.



Methodology for AI Driven Prototyping and Services





03 DESIGN & INNOVATION

AI-DRIVEN DESIGN

Society, Market, Organization and Consumer

Before starting to develop the initiatives, it is necessary to guarantee as much as possible their viability and their ability to create value. For this, it will be necessary to analyze their economic viability, their fit within the organization, their ability to create impact, the customer needs that they aspire to cover and what will be their differential value in the market.

The AI-Driven methodology starts by properly framing the business opportunity to be addressed and explore both social and market trends and existing services related for a depth understanding of consumer drivers and competitive framework. For further profiling the AI initiative's potential audience, the team has UX Researchers that address users needs. A Human-centric perspective is guaranteed by ensuring the approach to the initiative is compliant with AI ethical principles.

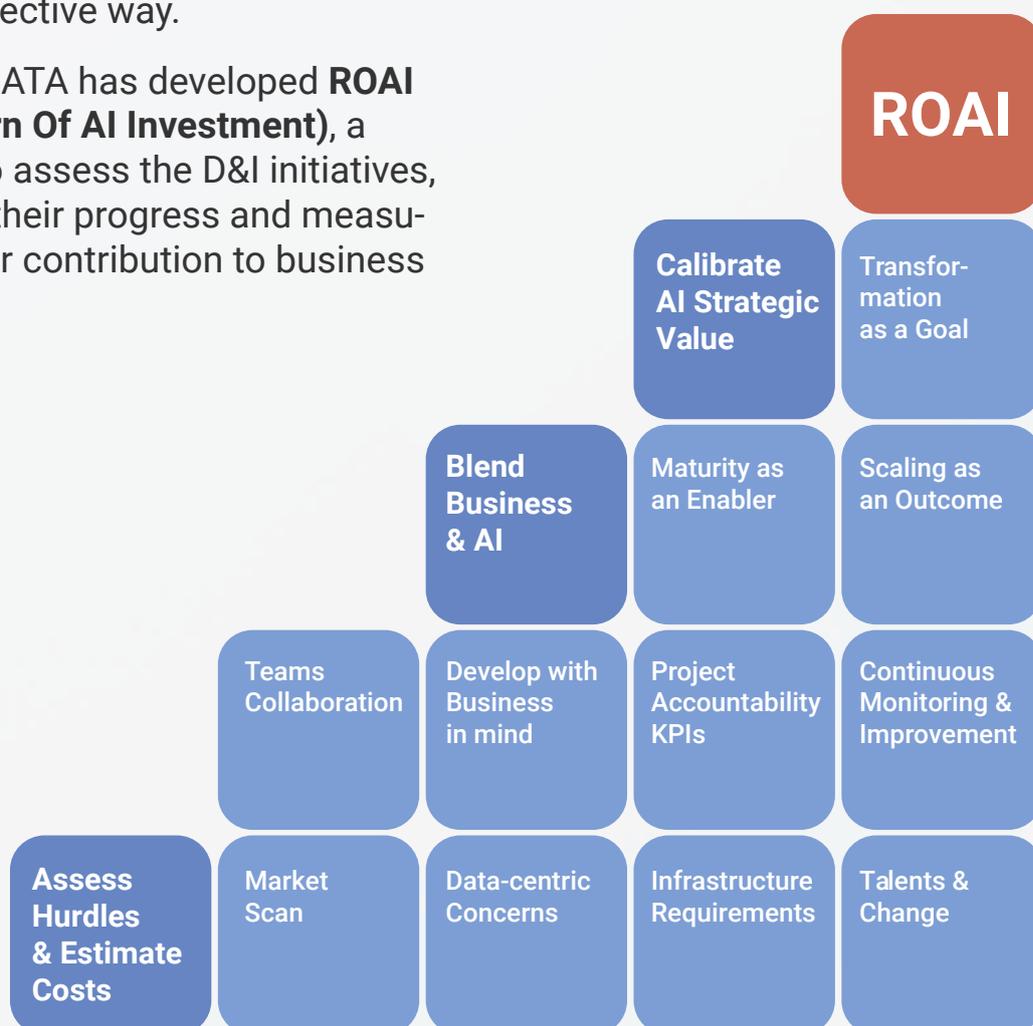
Ensuring viability and profitability of the initiatives

In order to ensure the proper use of the organization's time and resources, the first step will be to analyze the financial viability of the initiative. Organizations need to ensure that their D&I initiatives are capable of achieving a complete return on investment and have profitability in the future. However, it is not possible to calculate a ROI in the traditional way due to the nature of D&I Initiatives:

- **Uncertainty:** There is a non-negligible level of uncertainty intrinsic to AI, given its experimental nature as a lever for our data.
- **Intangible outcome:** Sometimes, AI effects are hard-to-grasp and its outcomes are vague, intangible or spread across various departments.
- **Unforeseen hurdles:** At the same time, technical difficulties and hurdles may arise at any stage of the developing & deployment process.

These limitations make it even more important the need to make the D&I initiatives accountable. By doing that, not only the economic risks that the initiative may entail are minimized, but it also helps to define an evaluation criteria to assess the performance of the solutions and the fulfilment of the expectations after their development in an objective way.

NTT DATA has developed **ROAI (Return Of AI Investment)**, a tool to assess the D&I initiatives, track their progress and measure their contribution to business value:



What is the strategic advance?

To measure the ROAI, the first thing to do is calibrate the strategic value, conceive and manage initiatives in a way that creates capabilities allowing the organization to advance in its technological maturity and enabling an innovation capable of harnessing the full power of data.

How does it fit in the business?

Having an ongoing collaboration and continuous validation is key to blending the business and the D&I initiatives. Value-driven AI can be attained by enabling cross-functional teams, where business leaders and future end-users engage in the design and development of the project.

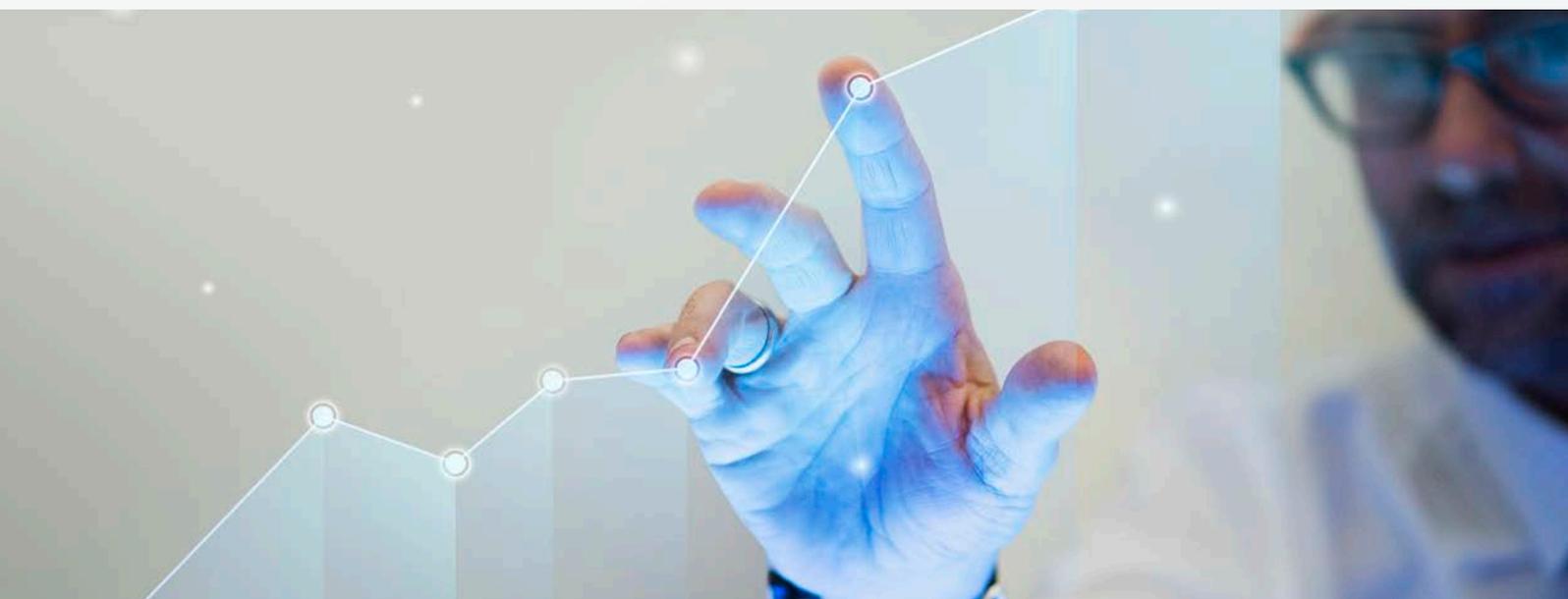
Defining financial metrics and operational KPIs will support tracking AI's contribution to the organization and foster greater alignment by:

- Allowing Data Scientists to direct their efforts towards a technical goal that is in perfect alignment with business needs.
- Monitoring business performance of AI models in real-time, having a clear picture of the business impact of AI in the organization.

What are the costs and hurdles?

To determine the ROAI, organizations need to account for the potential constraints and pitfalls that may arise in AI projects. These can translate into costs and frictions that may turn the project unfeasible or deviate it from its intended goals.

The technological maturity of the organization, the systems and infrastructures in which the new solution will be embedded, the quality of the data that it should use, and the knowledge of the professionals involved are some of the potential risks that the initiative will face. These risks need to be identified early in order to define and implement contingency plans.



PROJECT ACCOUNTABILITY: KPIs

KPIs to evaluate overall AI performance

- Speed to value metrics: projects delivered per unit of time, time from-start-to-production
- Project completion ratio
- Long-term growth benchmarks since the adoption of AI Strategy

Customer engagement

- Reduce churn
- Recommendation / Next Best Action systems: KPIs as % of conversions of our recommendation

Revenue-increasing initiatives

Customer segmentation initiatives

- Increasing average spend for the best customer segments
- Improving retention rates for average customer segments

Incremental sales initiatives

- Average cart value
- Customer lifetime value

In-store smart solutions

- % increase in foot traffic
- % increase in customer interactions

RPA, cost-saving initiatives

- Expected returns: measuring saved hours of labour
- Net Present Value: difference between the present value of cash inflows and present value of invested cash and future costs
- Payback period: the amount of time it takes to recover the cost of an investment

Workforce productivity gains

Augmented intelligence initiatives: KPIs as revenue per employee

Customer satisfaction-increasing initiatives

- Self-reported customer satisfaction score
- Chatbot for customer service use case:
 - Claim reduction
 - Query-to-solution time reduction
 - % of people that never reach the call center, which can be translated into saved hours of work

Operational efficiency-improving initiatives

Financial metrics

- Reversed opportunity cost: value of deferred projects that now we are able to undertake

- Product time-to-market reduction

Space & inventory optimizing initiatives:

- Gross margins growth in products by the project.

Predictive maintenance via digital twins

- Reduced maintenance costs and mean time to detect errors

Business transformation: new offerings and business models

Revenue originated by new products, subtracting investment

Ensuring ethical and responsible solutions

While the ROAI ensures that the initiative meets the company's financial expectations, developing a Responsible AI implies that the initiatives meet the values and code of ethics that customers expect from the organization.

When designing Digital Intelligence Solutions, it needs to be assessed the impact that its use will generate both on customers and on society.

One of the objectives of the design is to ensure that the service will not entail any exclusion, discrimination or harm to people. Another objective will be to help the organization achieve its Corporate Social Responsi-

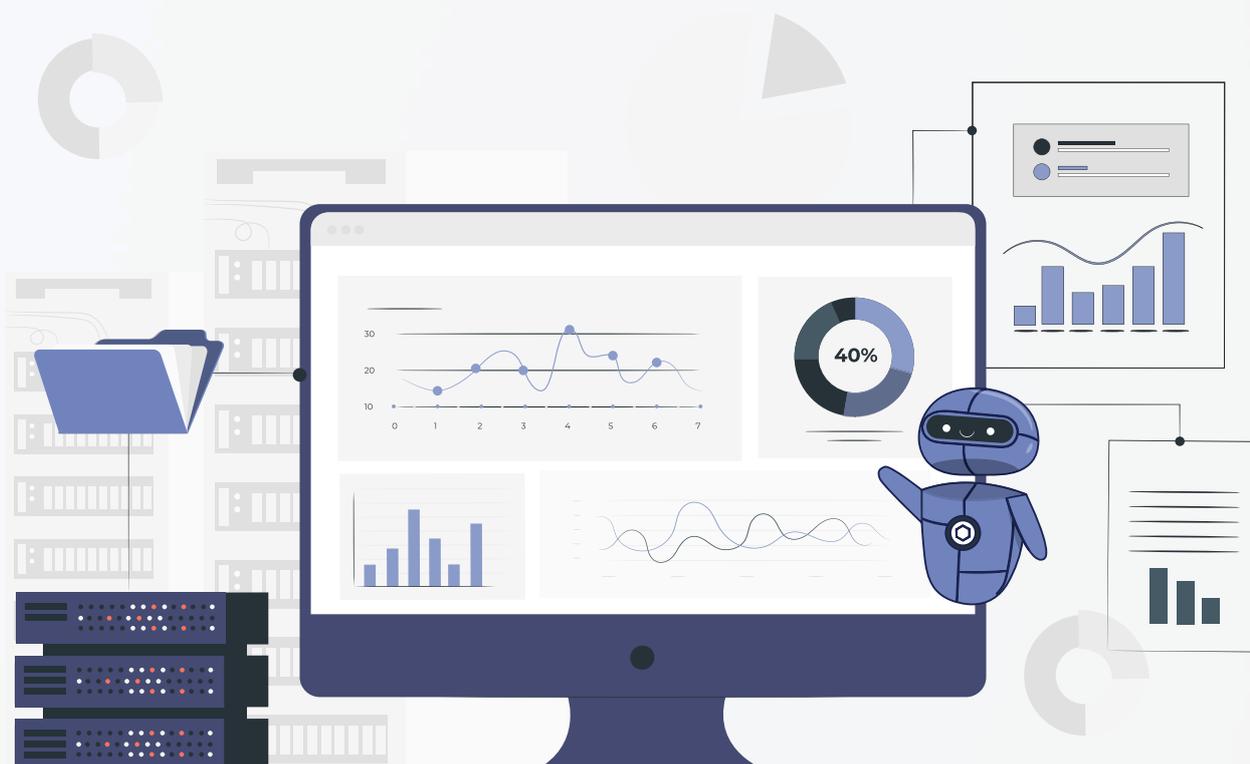
bility goals, as D&I solutions are powerful tools to create a better and fairer world.

Developing responsible solutions will also help the organizations to meet the needs and desires of their customers. Nowadays, customers are not only looking for the best quality-relation for an AI service, but also meeting brand's values and principles.

Creating a consumer-centric approach

In a completely globalized world where any competitor is within reach of a click, and where customers' high-maintenance expectations, changeable preferences and aspirational desires are on the agenda, organizations need to find disruptive ways to design hyper-personalized Digital Intelligent Services.





For that reason, a consumer-focused approach needs to be conceptualized since the birth of the AI solution. And so, our AI-Driven Methodology takes into account the client's needs, placing them at the center of the design.

A multidisciplinary team integrated by UX researchers, designers and business experts has the task to achieve a deep understanding of the real needs to respond to.

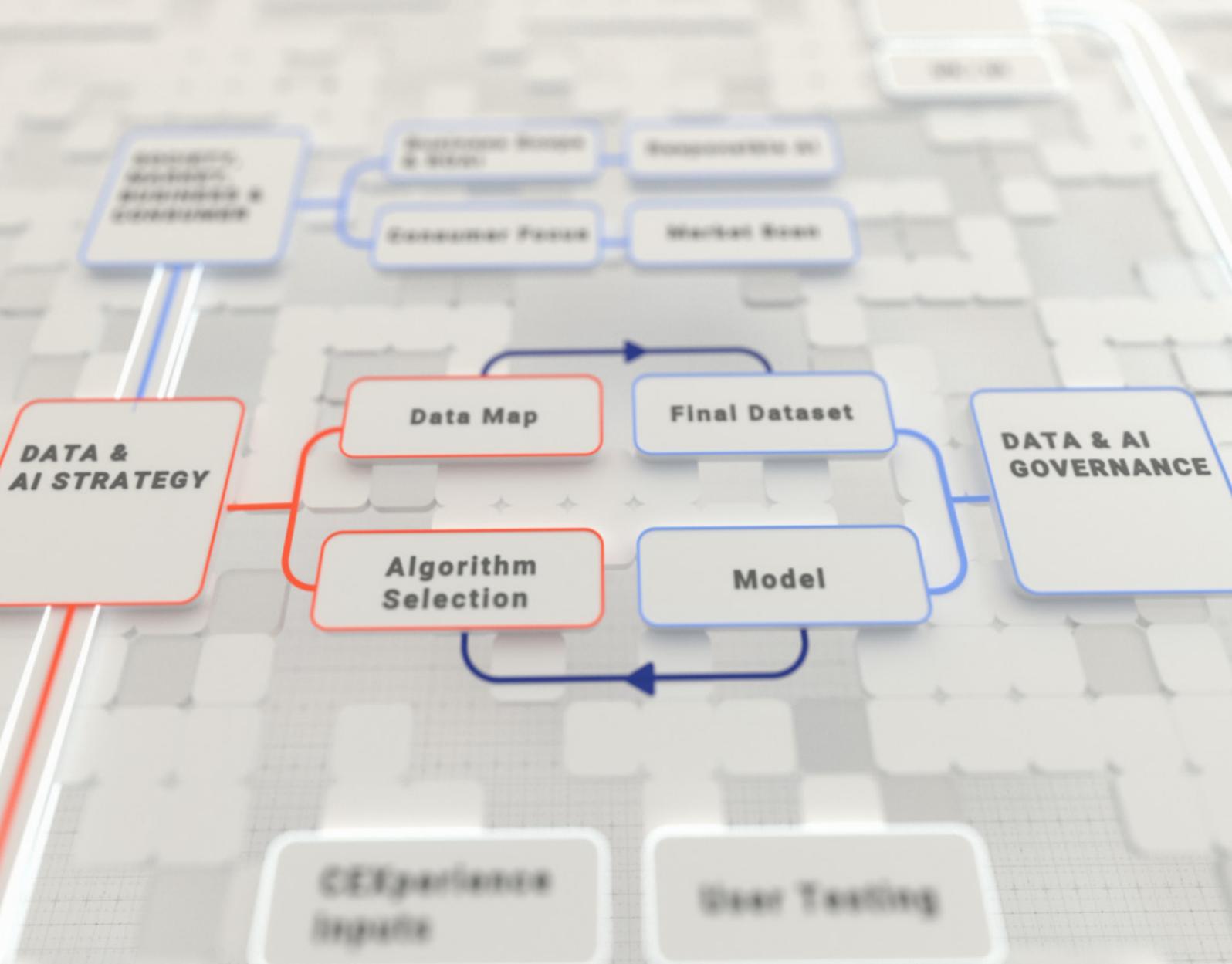
Knowing the market

Once the real needs are known, it is possible to design the solution and define a functional model that will satisfactorily respond to the client's demands.

For this matter, it is also vital to understand how organisations are responding to the same market constrains and to enrich this benchmark analysis with a new market scan approach.

The analysis should include the leaders of the sectors, direct and potential competitors and any other services that solve similar challenges, as all of them, can serve as inspiration for the new solution.

The goal of this market scan is both to discover innovative ways to solve the challenge faced by the design team and to identify opportunities where the new Digital Intelligent services can provide differential value to customers so the organization can create a real impact in the market.



03 DESIGN & INNOVATION

AI-DRIVEN DESIGN

Data & AI Strategy

Having created a differential digital service definition that embeds AI, which addresses market trends and understands the customer's needs, now it is time to translate it into a data and algorithm project.

The role of data is paramount to feed the AI gear successfully as the richness and relevance of AI automated decisions rely on how insightful the datasets we are giving the algorithms to learn from are.

From needs to a final dataset

For that reason, data scientists must be provided with their most important raw material, high-quality data. To do so, it is essential to deploy a sound data strategy that:

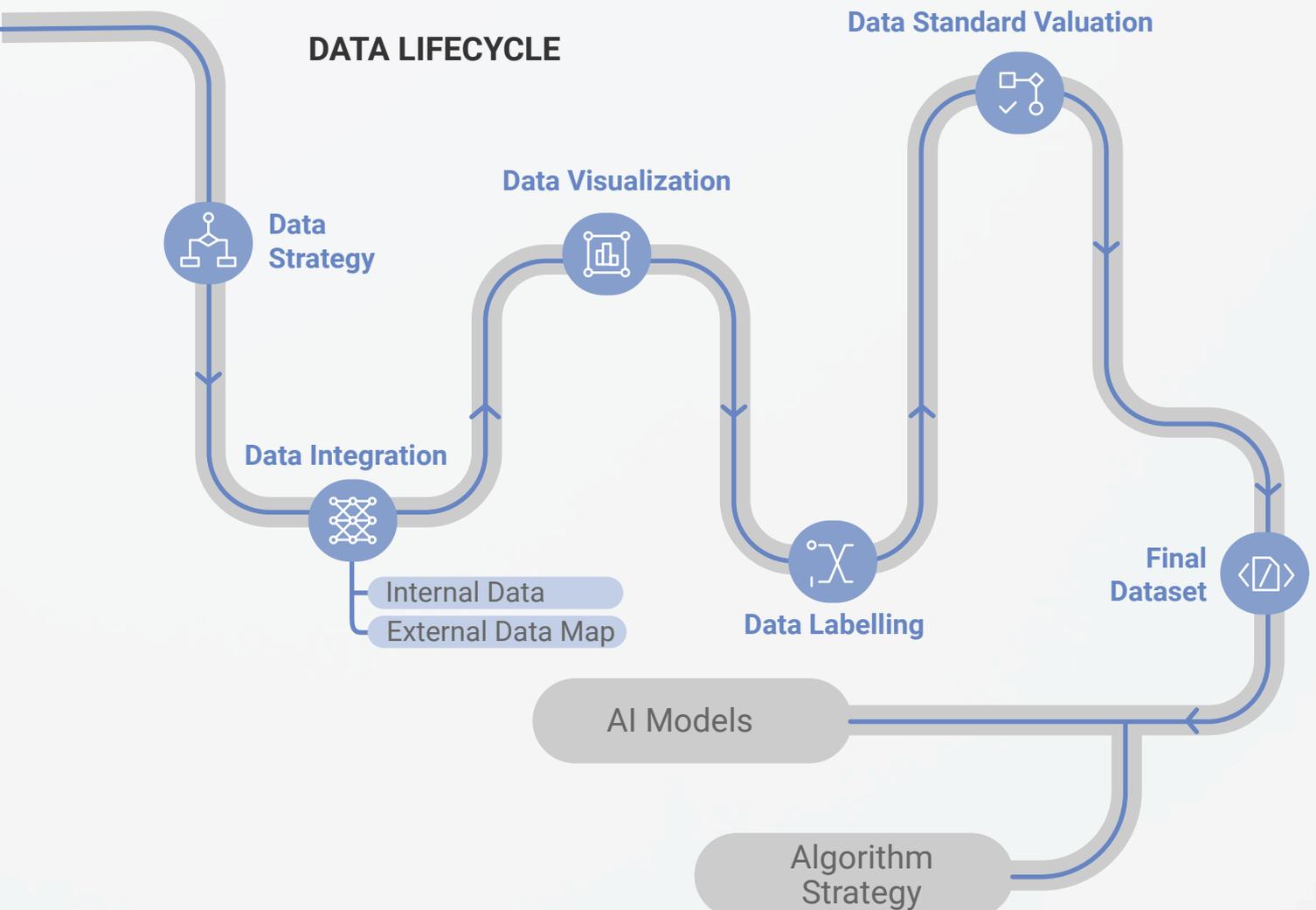
- 
- Divides the project into a set of tactical steps, identifying the areas where the data is needed.
 - Addresses which is the data needed (quantitative or qualitative or both, scope, sample number, features..).
 - Selects which sources of information are the best suited for obtaining the required data, checking whether available data will suffice, collecting it from external sources or developing new data collection procedures.
 - Looks forward to avoiding potential frictions in the data accessibility procedures.

In other words, one of the key capabilities a robust data strategy provides is to help identifying key data sources through **a comprehensive data map**, specifying the relevant data sources for each use case, how they are linked to each other and where the value of the results obtained for the client lies.

For pointing out, organizations are foreseen the importance of creating robust datasets based on both internal organizational information and the potential to draw on external data sources, in order to increase the value of the final datasets (**Augmented Data**), fueling the prototypes of the applications that may one day transform the organization.

Afterwards, we will build all the data moving and transformation pipelines required, so that the data scientists will be capable of constructing a final dataset that incorporates all relevant features to predict the relevant variables.

- **First**, data engineers will develop the necessary **pipelines to bring data from its original data sources**.
- **Second**, any data that needs to be bought or annotated will be handled as necessary, setting an adequate strategy for **data labelling** that may consider factors such as the complexity of the documents and the need of a certain expertise to succeed at the task.
- **Lastly**, a series of techniques performed by data scientists will be put in place to **evaluate the quality of our dataset**.



The intelligence is in the algorithm

AI is not only about data, but also about **algorithms!** Organizations can access a wide range of algorithms to allow them to create the most innovative AI solutions to tackle the business needs and attain their objectives.

Are you willing to rely on pre-defined APIs offered by AI vendors?

In this sense, the nature of the challenge they face will guide the selection of the **algorithm strategy**, which will have very important implications for the success and effects on the cost (both in time and money) of our AI initiative.

Are you going to take advantage of open-source libraries to train the models on your data?

Or do you need to develop an algorithm from scratch?

For this matter, we support organizations no matter what algorithm strategy they decide to bet on. For instance

- 
- Assess the pre-trained models served through **APIs** offered by AI vendors in search of a service that suits your needs.
 - Check for other **AI -as-a service products**, that fit your business need. This set of custom-designed algorithms for building IA models for specific tasks, supports uploading your data to the provider's platform and train their proprietary algorithms on your data.
 - Evaluate open source communities, looking into **open-source AI libraries** in search for algorithms that will serve best for the organization's purpose.
 - Consult if there is any **academic paper** describing a solution for your problem and **implemented on code**.
 - The teams of expert data scientists will have to **design the algorithm from scratch**.

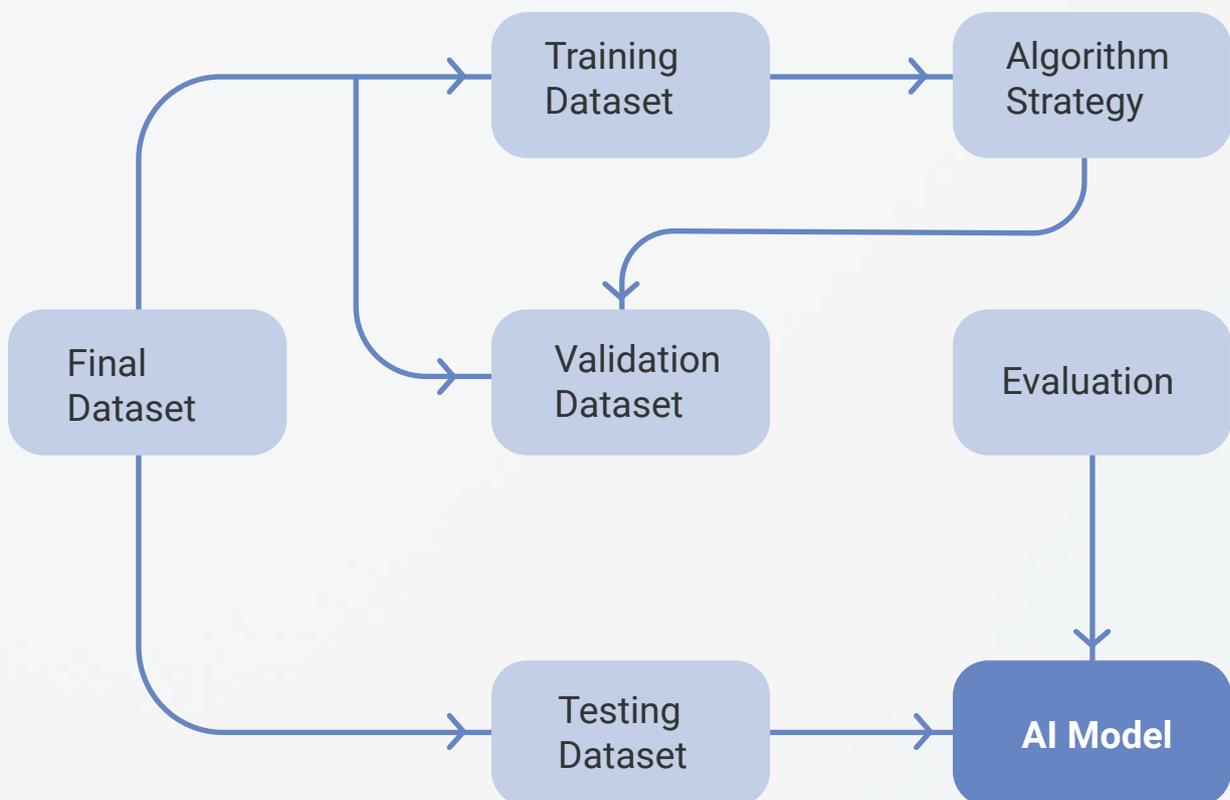
Creating the Solution

At this point, both the data strategy and a suited algorithm strategy have been deployed. Thus, data scientist can start building AI models capable of returning accurate predictions that help the organization tackle its business problem.

Achieving an accurate AI model, that delivers business value, is the most critical goal of this designing process as you won't be able to attain your goals if the model is not trained and tested well to perform its best.

For that reason, whether you decide to “build-from-scratch-models”, we will provide you with our best-practices on ML model development, from feature engineering to hyperparameter optimization techniques; or whether you select pre-trained model accessible through an API or models from a fully-managed service provider, we will support you giving personalized assessment on all the customization possibilities.

AI LIFECYCLE



Emphasizing a Responsible Data & AI Governance

On the one hand, the Data Governance oversees the end-to-end data lifecycle to ensure the process of bringing data to data scientists is clear, repeatable, governed, and respectful with data quality standards, as well as, to protect it against unauthorized access, strengthen data traceability, and develop the proper means and policy for collecting, storing, and using personal information.

What is more, our Data Governance is aligned with the ethical guidelines set on the 10th Disposition from the New EU AI Regulation for Data and Data Governance to achieve (14) insightful high-quality datasets without bias or risks.

On the other hand, the AI Governance oversees the complete algorithm lifecycle as it cares for the end-to-end functional, operational, and technological methods, mechanisms and procedures necessary (MLOps) to guarantee agile and continuous innovation, as well as to generate, speed up and scale business value and market impact through AI-driven initiatives, unifying AI development and industrialization.

On top of that, our AI Governance Model relies on a strong body of trustworthy standards to help business areas tackle their challenges, mitigate the risks and foster a responsible AI following the 4 Ethical Principles set on the EU White Paper on AI to widespread transparent, explainable and non-discriminatory AI Solutions.

4 Ethical Principles set on the EU White Paper on AI (15):

Respect of Autonomy

Prevention of Harm

Fairness

Explicability

4 Key characteristics for Data & Data Governance to be spread across the organization:

Relevant

Inclusive

Suitable

Compliant



03 DESIGN & INNOVATION

AI-DRIVEN DESIGN

Service Experience

Robust models made by high-quality data and transparent algorithms can deliver accurate predictions, which need to be enveloped in functional applications that help stakeholders easily understand the value of AI-Driven initiatives and serve a consumer-centric user experience.

For that reason, on this stage of the methodology we create a **Design System**, which defines and designs the User Interface and the Visual System on which the AI model will interact, taking in consideration the overall user needs.

Based on the UX Research insights, our team of Interface and Visual Design works together in a 4-step process to ideate and create a viable interface solution:

Ideate: Together with the business development team, we deepen into the practical and functional solutions to address the User Interface and the AI.

Define: To systematize the UI Structure, we make an exhaustive definition of the Interaction Model, User flows, Information Architecture, Information Distribution, and data variations.



Design: We establish a representation of the interface visual values and brand identity, animations, transitions, and assets for the front-end development.

Validate: Stress-testing of the layout, copy and UI testing to identify the user comprehension of the flow and validity of the visual solution.

For this purpose, we offer a double landing approach. On the one hand, our data scientist will create a **backend interface**, which is the infrastructure required for the developed model to communicate back and forth with the prototype's interface (via API) and deploy it as a microservice.

On the other hand, our UX Developers will build a **frontend solution**, an interface through which end-users will communicate with the AI model.

You could benefit from our front-end interface as it could be embedded in any website, mobile app or specific device such as Augmented Reality or Virtual Reality applications, considering all specificities that may exist, so the AI prototype can deliver the value you expect from it.

After both interfaces are developed, two following testing procedures must be made to evaluate the functionality of the prototype based on:

- The effectiveness of the solution, according to what extent it meets the business KPI's and the functional requirements (**Functional Testing**)
- The success of the service, by gathering feedback from the user's sample experience as well as constraints and potential improvement areas (**UX testing**)

A Digital Service Example: Case study on Fashion Retail

Following NTT DATA's AI-Driven Design methodology you can create new value for your customer. For example avoiding having to wait for the fitting room while turning the store clerks into personal shoppers.

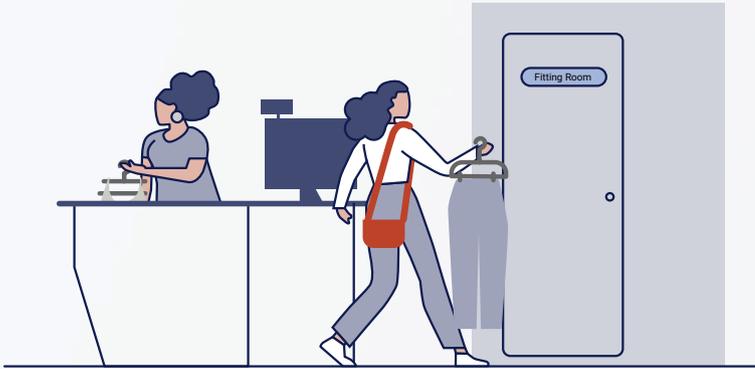


A customer enters the shop and selects some clothes to try on but the fitting rooms are all full. The store offers the client the possibility of keep shopping while waiting for the fitting room.

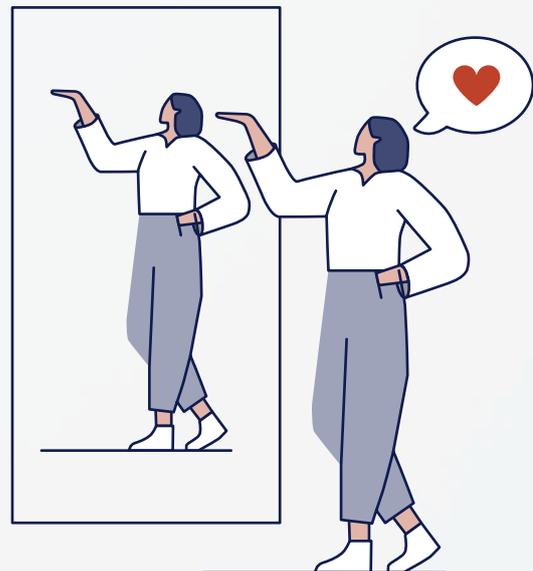
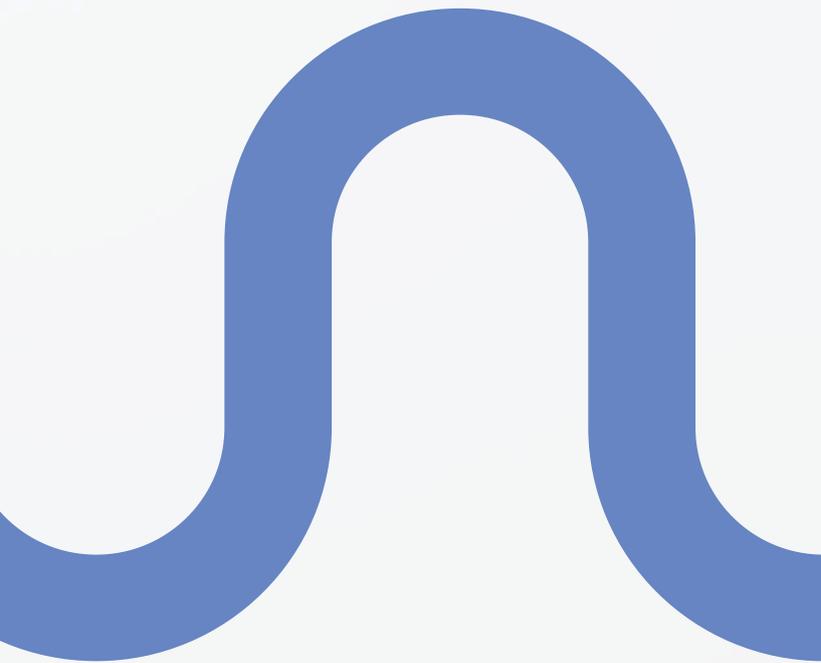
The client only needs to decide how to receive the alert (e-Mail, SMS or app notification). Then an anonymous profile will be created and all their selected clothes will be scanned (RFID, barcode, QR) and added to their profile. Now the store knows the preferences of the customer in terms of style, size, colours, etc. And the customer can keep browsing new clothes to try on.



When the fitting room is available the customer receives the alert and to try the clothes, new additional clothes are scanned and added to the client's profile and the solution even suggest an outfit with them.



If the customer needs help, the store clerks are now empowered with all the data from the customer and can act like a Personal Shopper, guiding and giving personalized advice.



This Digital Smart Service helps to reduce one of the main pain points of physical shopping while creating personalized experience. It allows to improve the sales conversion rate as well as the cross-selling. This process also allows to identify which items have a high percentage of discard, managing to identify potential improvements for those models.

A Digital Service Example: Case study on Logistics

Companies are looking for new ways to monitor the distribution process and supply of goods to each of the sale points. Bringing together the latest technologies in geolocation, route management and real-time traffic monitoring, NTT DATA has created a unique system and dashboard for real-time management of groceries store fleets.

Start in the warehouse

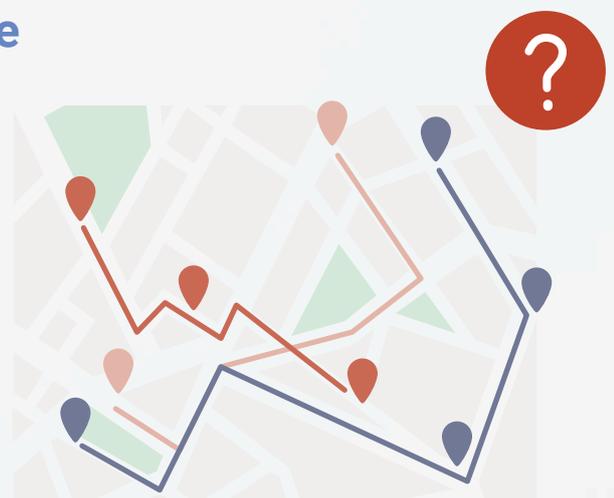


Extraction Layer

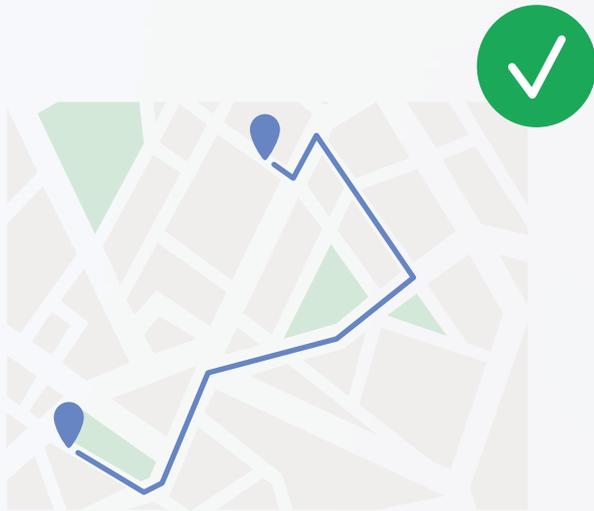
A microservices layer provides the output of technologies to calculate the optimal route for delivery of goods and monitors vehicles leaving the warehouse.

Analyze the data in real time

A pipeline processes the user's data and requests. By creating an ad hoc predictive model, the ideal route is analyzed in real-time, taking into account all points of the itinerary and all possible events on the road (road constructions, heavy traffic roads...).



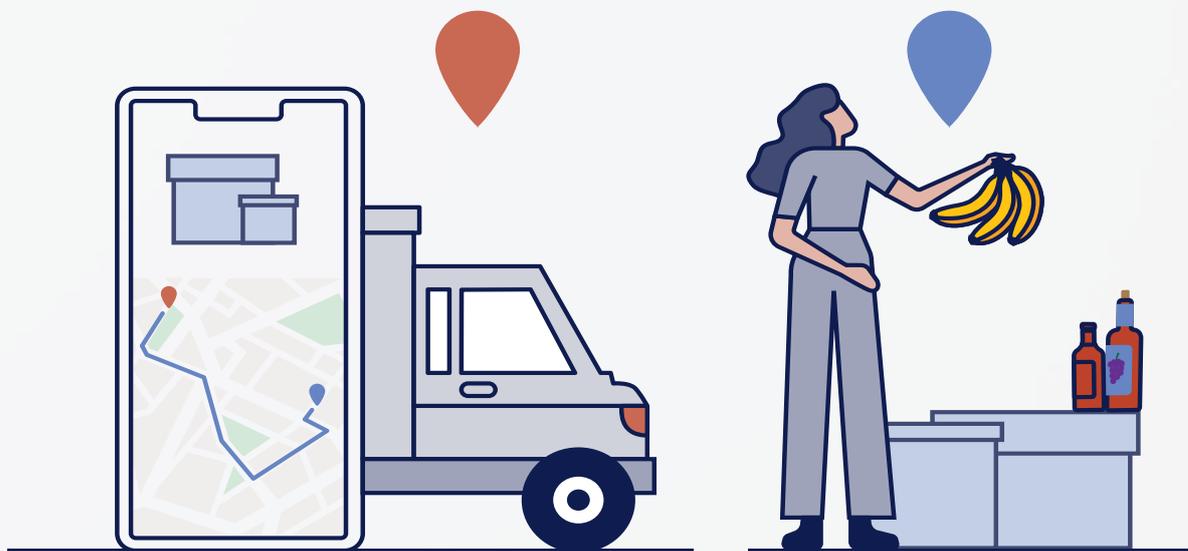
Process Layer



Custom ML Models Layer

Select the best route

With the same application, the delivery manager will be able to select the best route almost automatically and make the necessary arrangements. The entire fleet can be monitored in real time.



Storing & BI Layer

Take advantage of the data

The grocery store manager will be able to consume the information in real-time or exploit the raw information through the Business Intelligence Engine.

An improved process and a better service

This Digital Intelligent Service generates efficiencies across the logistics processes and reduce costs thanks to a better knowledge of the fleet status, an optimal use of resources and a reduction of incidents due to traffic conditions. The grocery stores will receive the goods in the estimated time.

CONCLUSIONS

The New Digital era has come, and organizations are seeking to create new disruptive business models and develop AI products and services that are tailor-made to the specific needs and lifestyles of their customers.

However, this process can be complex and costly for those who do not know where to start or do not have a structured plan to guide future steps.

Thus, now it is time to accelerate the process of seamlessly embedding D&I capabilities into your organization. That is why, NTT DATA is providing a guide that looks forward to supporting you get a:

A better understanding of the market maneuvers in which you operate, the surrounding environment, and the trends that shape it.

Identify the best D&I initiatives that suit your organizational needs and back you in achieving the business' goals.

Enhance the rapid development of AI prototypes with high and cost-efficient ROI, and scale them into Digital Intelligent Services that will help you lead the market.

A Guide to Start

DEFINING THE SUCCESSFUL AI TRANSFORMATION

- ① **Understand that the market is evolving, and you need to start by leveraging D&I to maximize business opportunities.**
- ② **Gear yourself with our technical and business experts that provide trust and reliability all along the way.**
- ③ **Let us guide you, and witness the benefits of harnessing D&I's capabilities to create unique Digital Intelligent Services.**

NTT DATA on AI-Driven Service

NTT DATA, was recently named a Challenger by Gartner 2021 for Data and Analytics Service Providers Worldwide.

The company shares the Innovation DNA as part of NTT Group, accelerates open ecosystems and contributes to fostering the creation of disruptive AI products and solutions across the organizations.

As a Trusted Global Innovator, our values come from the consistent belief to shape the future society with clients and courage to change the world with innovative digital technologies.



+50 Countries
in which
NTT DATA
operates

6th Largest
company
in the IT
sector*

8.721 Professionals in Data &
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