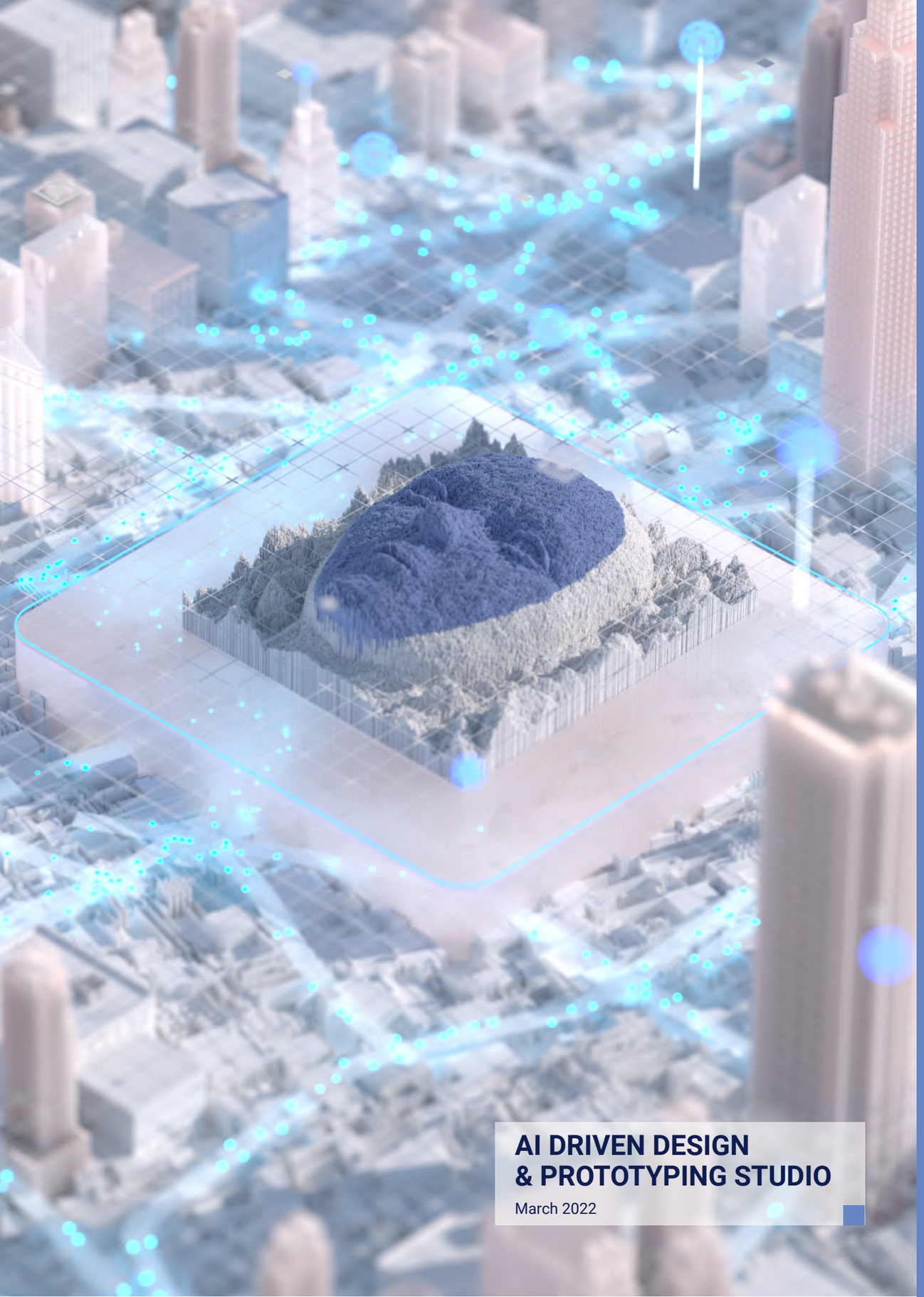
AI DRIVEN DESIGN & PROTOTYPING STUDIO

MARCH 2022



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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, the recent research study conducted by Gartner (“Top Strategic Technology Trends for 2021* “) shows that of the total number of AI initiatives that are raised, the 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.

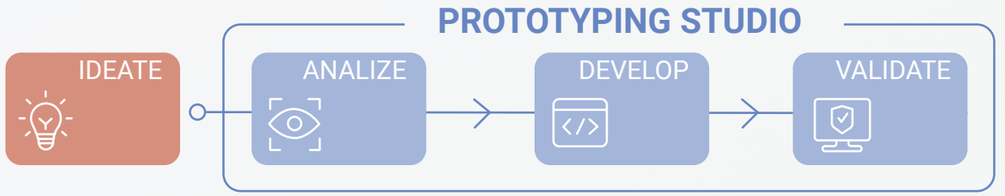
“The AI Lab acts as an innovation center, facilitating rapid experimentation with AI prototypes AI. The first step towards the creation of Intelligent Digital Services.”

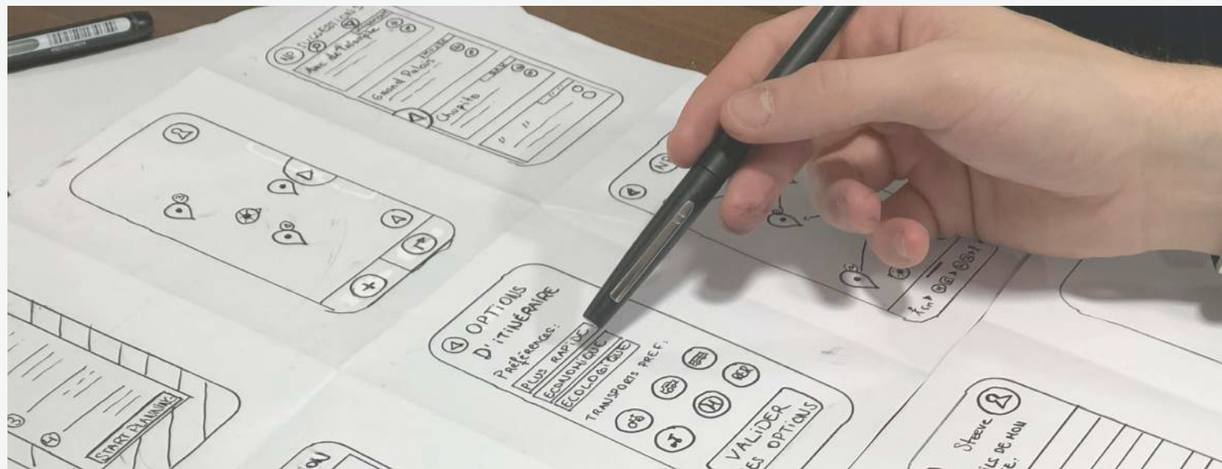
Thus, What are the main challenges the organization faces with their AI projects? According to the report, technical managers and leaders struggle to productize and scale AI projects because they lack the environment and the tools to create and manage a rapid testing and fast production of AI prototypes.

So Where 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 and 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’s 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, take advatage from their most innovative solutions and up-to-date capabilities.
- **Orchestratating** 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 on 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 of 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 **reduce costs and drive innovation** across the whole organization.

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 Intelligence 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 intelligence 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 larges 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:

- **Relevant**
- **Trustworthy**
- **Adaptable**
- **Convenient**

Relevant: The solutions know the users, offer them a hyper-personalized experience and are 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 the user, making them feel that they can trust it. 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 Service makes some of the leg work, by offering the máximum 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 portfofio 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 Intelligence services.

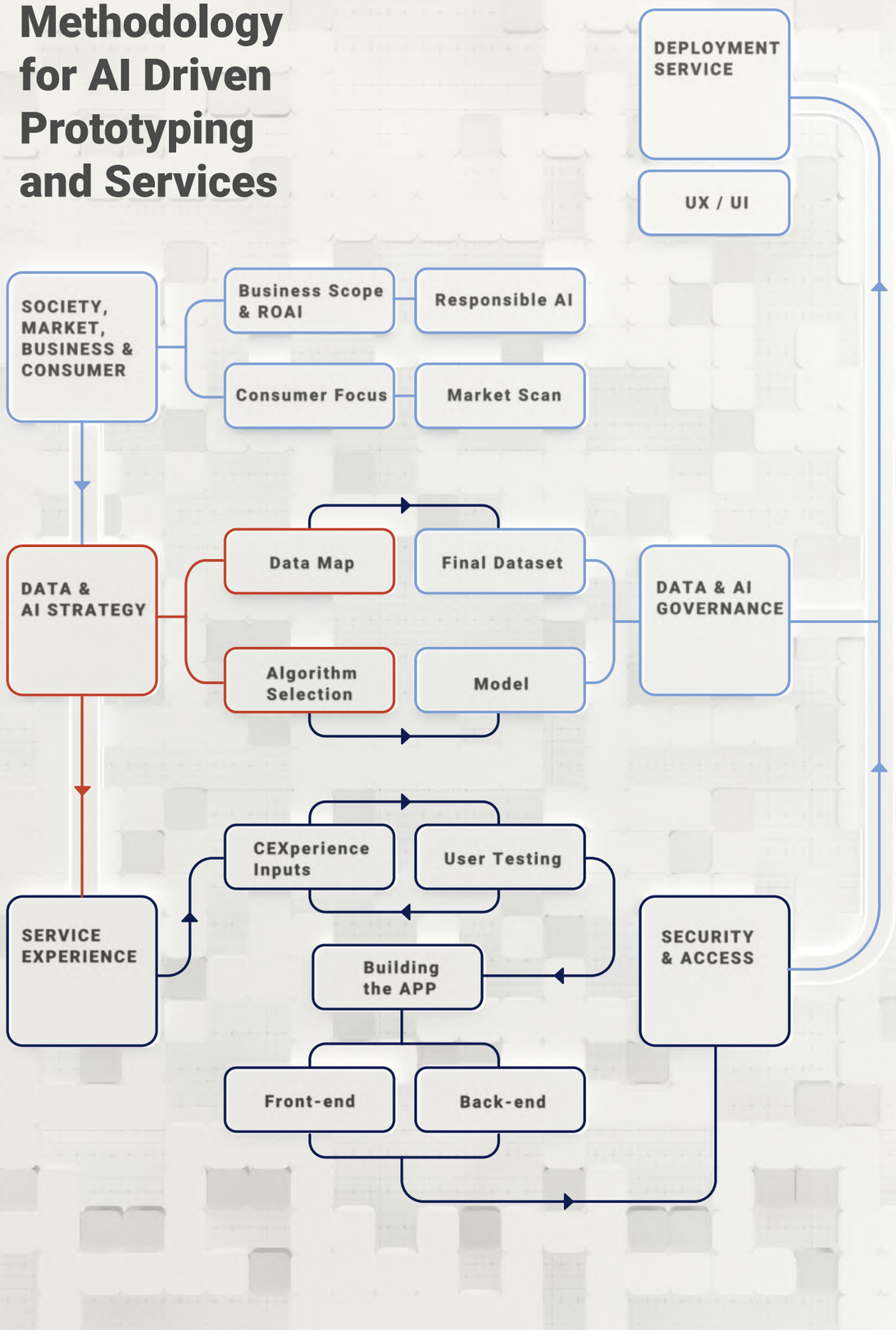
AI Driven Design also integrates multidisciplinary teams where specialized profiles collaborate in the different phases of the solution combining business expertise with the highest technical excellence.

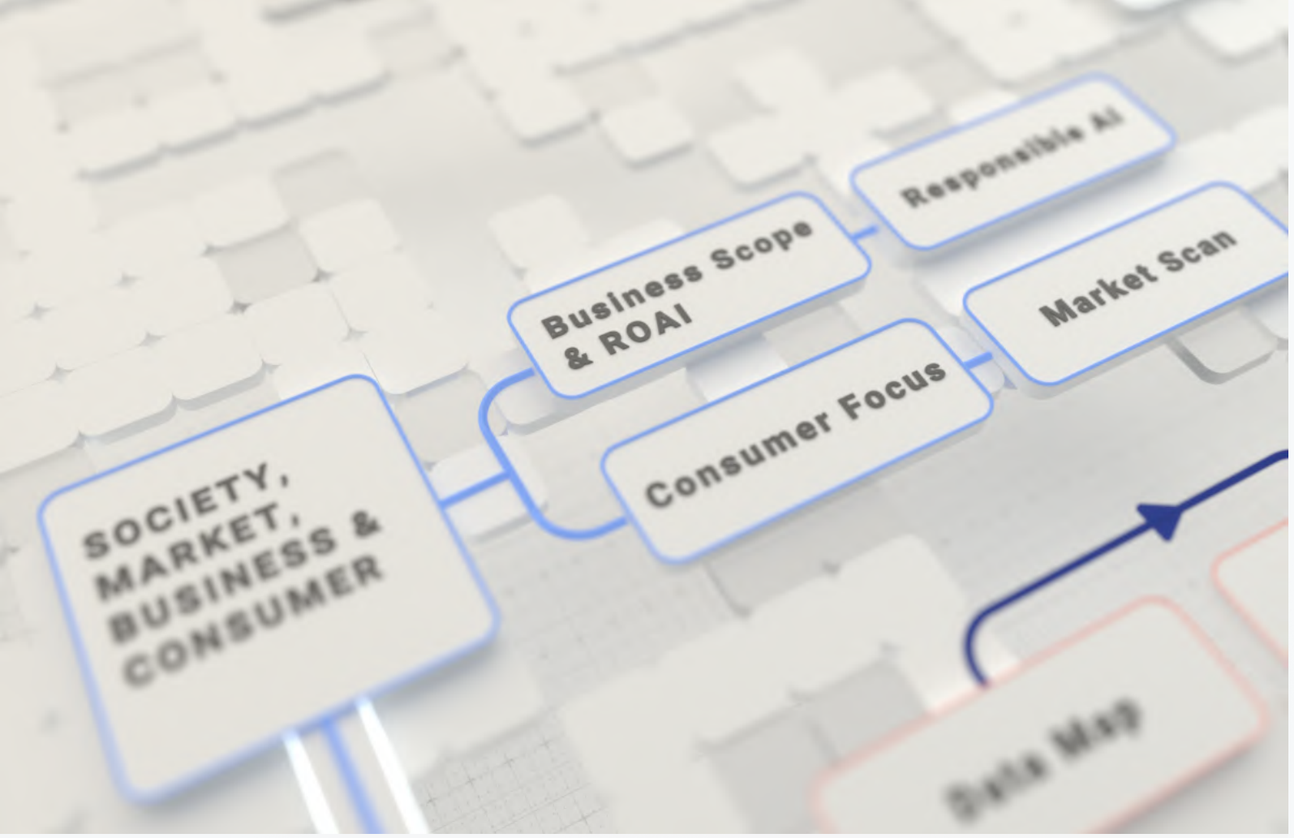
In this way, a rapid development of solutions is achieved and allows to accelerate the cycle of iterations reaching higher quality levels.

“From prototyping to Digital Intelligence 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, their implementation and the consumption experience of intelligent digital services, creating an agile and multidisciplinary collaboration model.

Methodology for AI Driven Prototyping and Services





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 in 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.

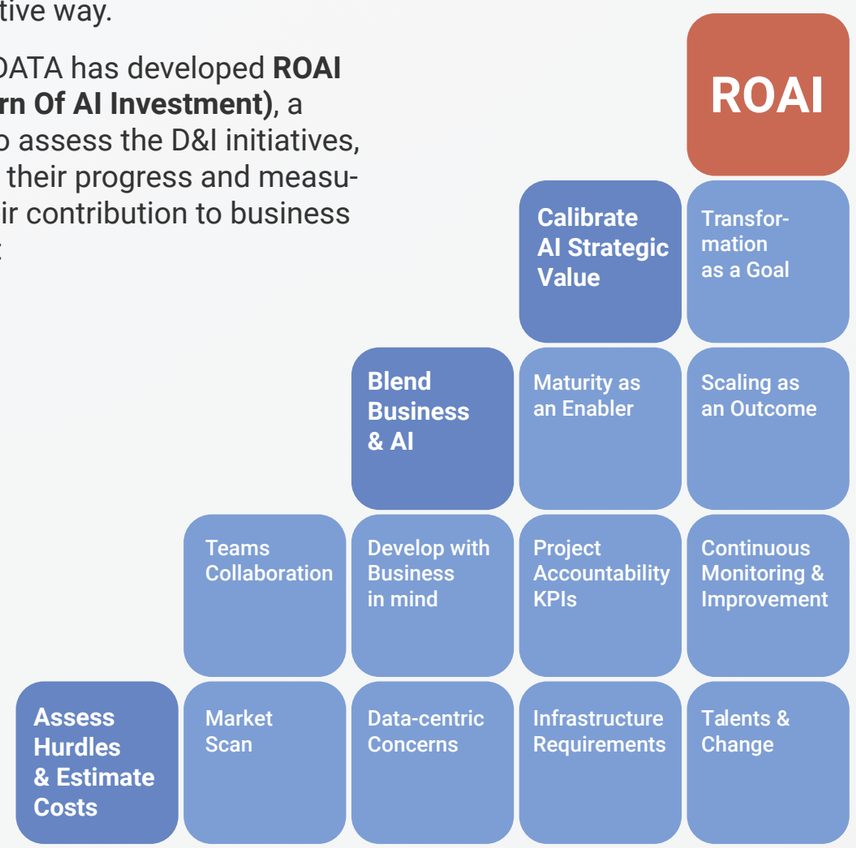
Ensuring viability and profitability of the initiatives

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. Organization need to ensure that their D&I initiatives are capable achieving a complete return on investment and to 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
Intagible outome: Sometimes, AI effects are hard-to-grasp and its outcomes are vague, intangible or spread across various departments.
Unforseen hurdles: At the same time, technical difficulties and hurdles may arise at any stage of the developing & deployment process.

These limitations make even more important to 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 fulfillment 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, traclk 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 that allow the organization to advance in its technological maturity, enabling an innovation capable of harnessing the full power of data.

How does it fit in the business?

Having an ongoing collaboration and a continuous validation is key to blend the business and the D&I initiatives. Value-driven AI can be attai- ned 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 align- ment with business needs.
- Monitoring business performance of AI models in real time, having a clear picture of the busi- ness 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 with 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 bechnmarks since thr adoption of AI Strategy

Customer engagement

Measurable improvement proxies:
-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

Aumented intelligence initiatives: KPIs as revenue per employee.

Customer satisfaction-increasing initiatives

Measurable improvement proxies:
- 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

Finantial 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, 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 ensu re 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 Responsibility 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 aproach

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

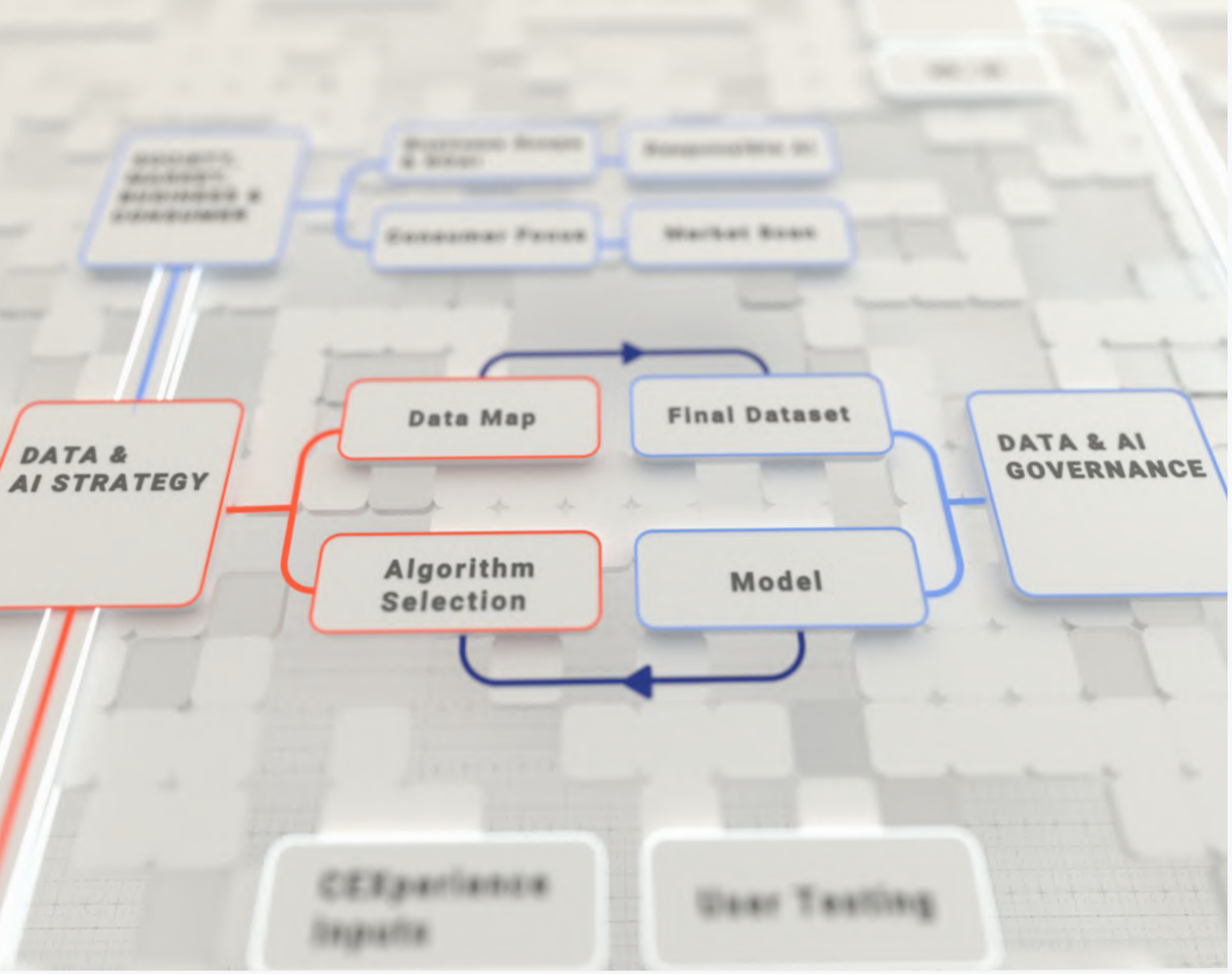
Knowing the market

Once the real needs are known, it will be 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 solves 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 Intelligence services can provide differential value to customers so the organization can create a real impact in the market.



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:

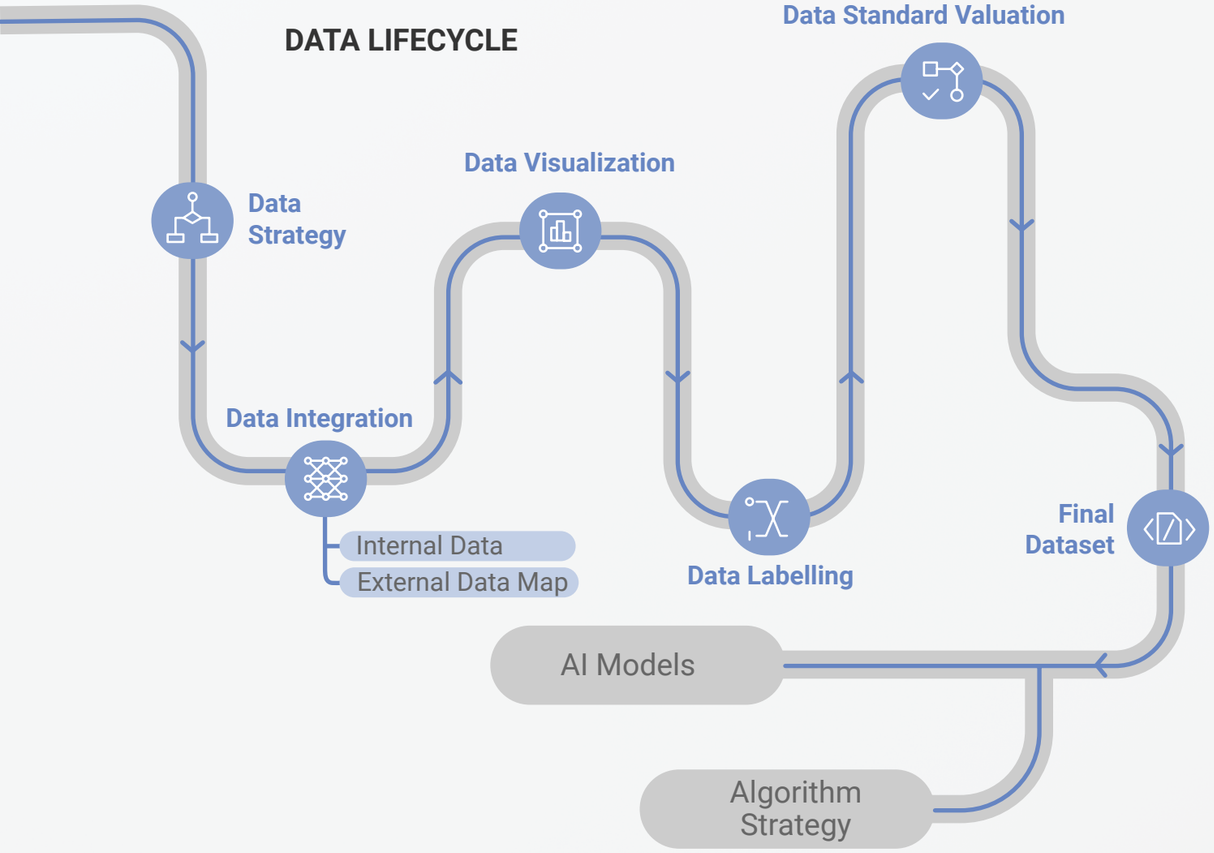
- Divides the project into a set of tactical steps, identifying the areas where the data is needed
- Addresses which is the data needed (quantitative or qualitative or both, scope, sample number, features..)
- Selects which sources of information are the best suited for obtaining the required data, checking 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?

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?

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.

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**

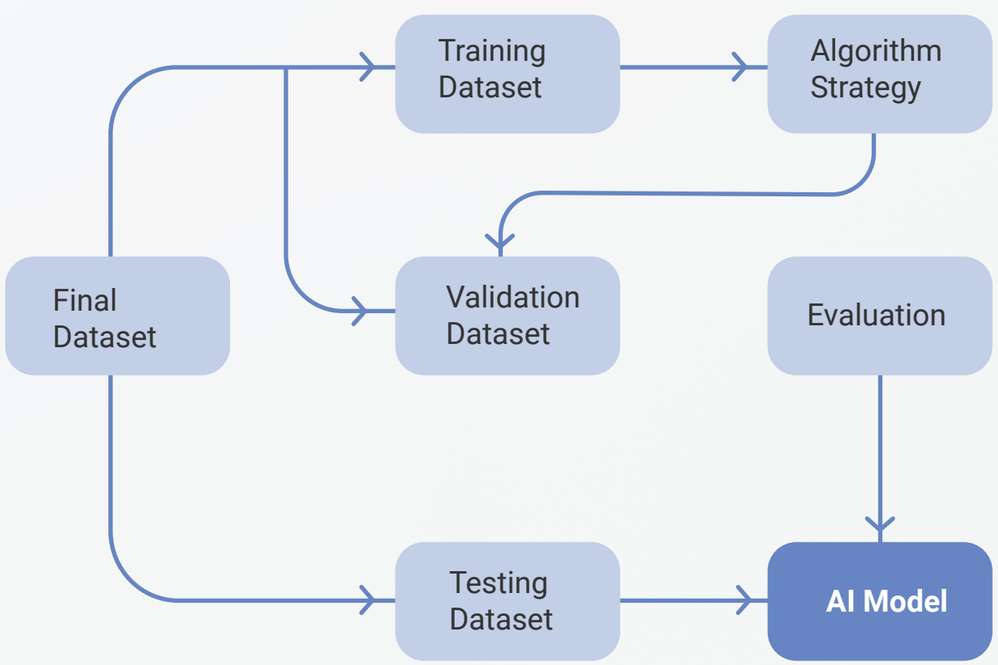
Creating the Solution

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 desinging process as you won't be able to attain our goals if the model is not trainned and tested well to perform its best.

For that reason, whether you decide to "build-from-scrath-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 suppot 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 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 for a Trustworthy AI to be spread across the organization:

- 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

AI DRIVEN DESIGN & PROTOTYPING STUDIO

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 iniciatives 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 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 on the User Interface and the AI.

Define: To systematize the UI Structure, we made 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 requiered 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 our AI model.

You could benefit form out fontend 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 your 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)**

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