The Startup's Checklist for Effective AI/ML Implementation

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A Brief Introduction

Considering AI/ML? You Aren't Alone

Implementation of AI/ML: A Tough Nut to Crack

- Absence of Labelled Data

- No Availability of Data Pipeline

- Wrong Choice of Model & No Explainability
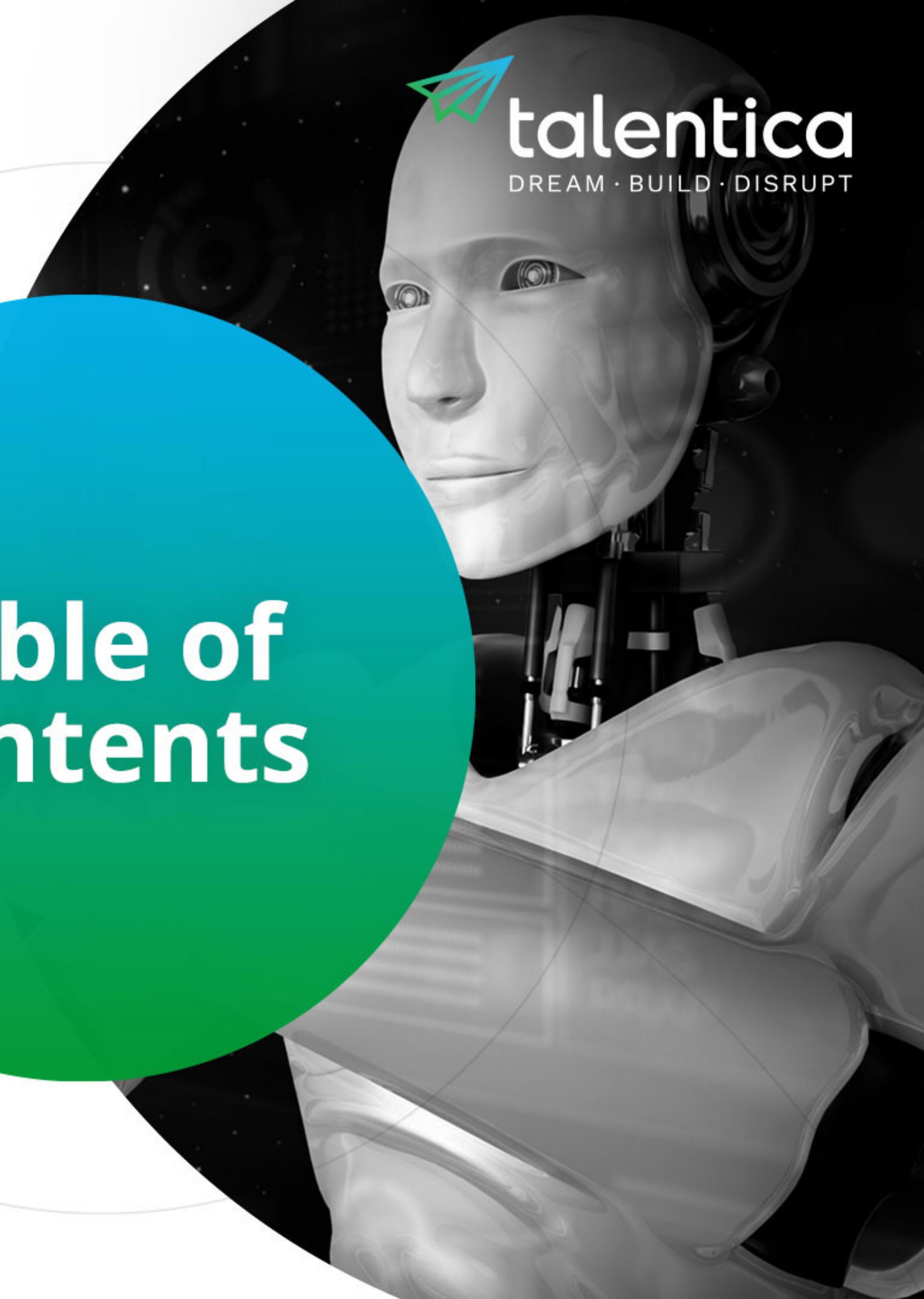
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Our AI/ML Technology Expertise

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A Brief Introduction

This comprehensive **checklist will help CXOs, Founders, and Technology Heads** to access their know-how and readiness with respect to AI/ML implementation. Prepared by analyzing pain points sieved from **our experience of implementing AI/ML solutions for 20+ Startups from the US,** this will serve as a tool for informed decision-making all the while saving time and costs involved.

Considering AI/ML? You Aren't Alone

Startup founders are eyeing on Machine Learning, owing to massive advances in technology and future-defining AI/ML applications. The benefits of AI/ML include enabling automation, reducing costs, outgrowing competition, and becoming future-ready. AI/ML adoption plans for Startups like yours might have taken a backseat due the Covid-19. However, it's time to re-assess those apprehensions and look beyond.

Owing to cut-throat competition in the Startup ecosystem and tectonic shifts brought by the COVID-19 pandemic, massive investments in Artificial Intelligence are picking pace and Startups must draw upon this.

We've a few questions that will help you **decode your AI/ML readiness** in just a few minutes.
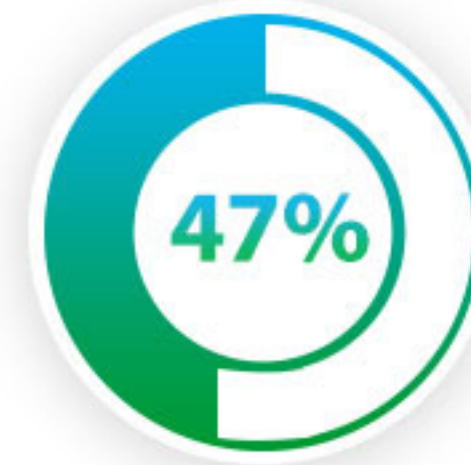
47% **of AI/ML investments were unchanged in pandemic**

30% **of organisations plan to increase AI/ML investments**

90% **indicate they plan to implement AI/ML in short-term**

Source: Gartner's Hype Cycle 2020, Survey by Cognilytica

AI & Machine Learning Brings Value

McKinsey published a report recently **"The State of AI in 2020"** that sheds light on the increasing AI/ML adoption by organizations as an effective value-generation tool. The report underlines two of the biggest advantages that adoption of AI/ML has offered the companies across industries:
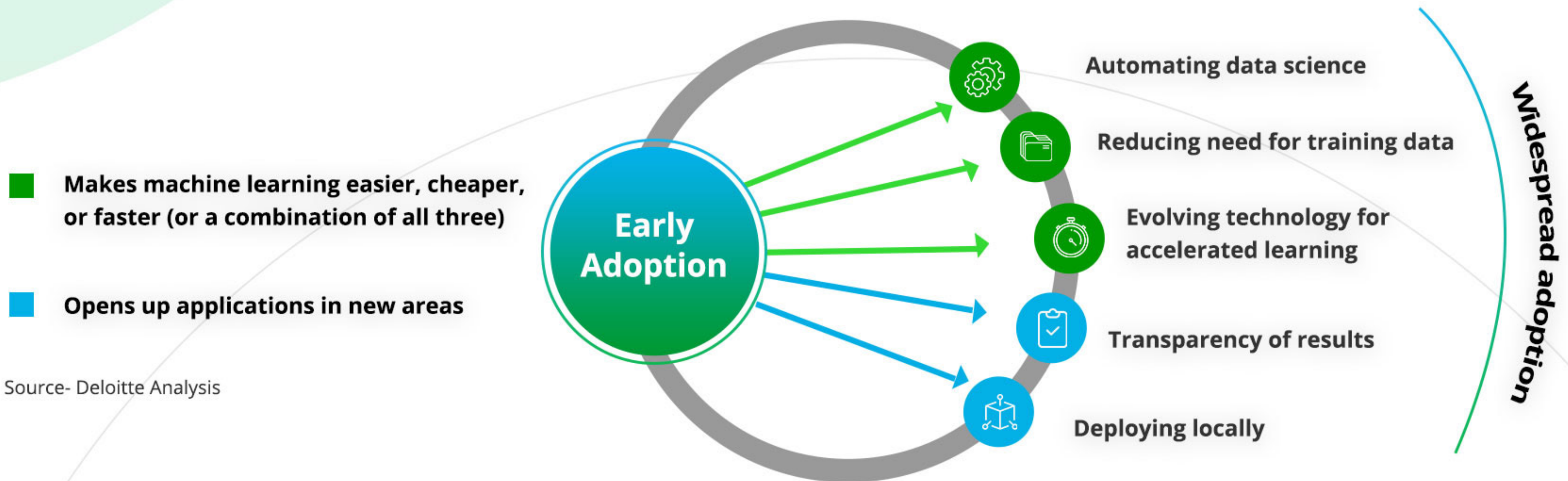
● **Increased Revenue**   ● **Reduced Costs**

	Increased Revenue		Reduced Costs	
	FY 2018	FY 2019	FY 2018	FY 2019
Strategy and Corporate Finance	8 / 24 / 27 — 59	13 / 24 / 36 — 73	50 — 24 / 11 / 15	32 — 20 / 3 / 9
Supply Chain Management	13 / 22 / 28 — 63	8 / 26 / 38 — 72	61 — 31 / 16 / 14	55 — 44 / 6 / 5
Manufacturing	14 / 13 / 34 — 61	10 / 18 / 43 — 71	64 — 37 / 14 / 13	50 — 28 / 16 / 6
Product and/or Service Department	19 / 21 / 31 — 71	16 / 19 / 30 — 65	29 — 13 / 10 / 6	21 — 12 / 7 / 2

Implementation of AI/ML: A Tough Nut to Crack

Our experience says that adopting an emerging tech like AI/ML isn't a cakewalk. Considering constraints that Startups face, they have to not only **pre-plan costs but also measure ROI gained with limited experience.**

We've also observed that defining business metrics and planning technical architecture early on are crucial in deciding your AI/ML project's success.

■ **Makes machine learning easier, cheaper, or faster (or a combination of all three)**

■ **Opens up applications in new areas**

Source- Deloitte Analysis

Early Adoption

Automating data science

Reducing need for training data

Evolving technology for accelerated learning

Transparency of results

Deploying locally

Widespread adoption

Major Implementation Challenges:

In last 2 years, we have served 20+ Startups by successfully implementing AI/ML solutions into production.

We have listed down some of the most prominent challenges faced by these Startups before coming to us.

Only 1 out of Every 10 AI/ML Models Make it into Production

87% — AI/ML projects never make it into production

13% — AI/ML projects are production-ready

Source: VentureBeat AI

Challenges Startups Face

Absence of Business-Specific Data

No Availability of Data Pipeline

Wrong Choice of Model & No Explainability

Lack of Access to Right Expertise

Let's deep dive into those challenges-

Absence of Labeled Data

AI/ML models are only as good as the data used to train them. For most Startups, the biggest challenge is obtaining substantial amount of labeled data related to the business problem in order to efficiently train the model.

Datasets that are generic in nature and not labeled can't serve the purpose of solving unique and complex problems that Startups focus on.
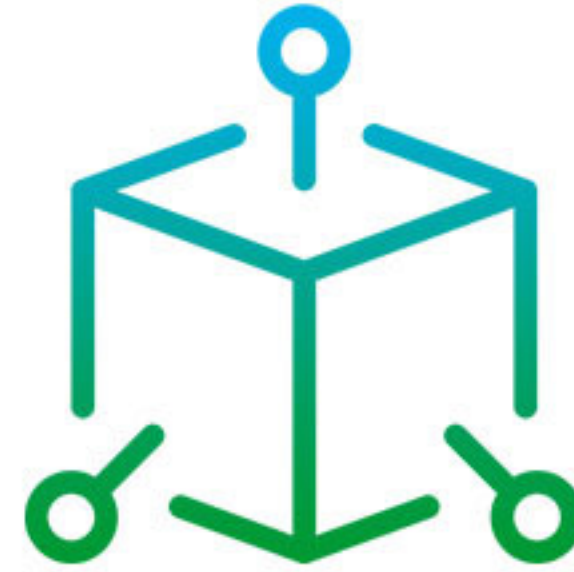
No Availability of Data Pipeline

Why is a data pipeline necessary? Most people assume that once a model goes into production, the job is done.

However, without a good data pipeline, you will not be able to measure performance of model in production, iteratively improve, re-train, and validate it before deployment.

Wrong Choice of Model

With neural network's spiraling popularity and their success in face and other recognition challenges, many Startups try to implement them to solve business problems.

In this case, the wrong choice of model calls for larger amounts of training data as compared to traditional AI/ML models, stalling a project indefinitely.

Let's deep dive into those challenges-

No Explainability

AI/ML explainability is a key requirement for Startups especially in Security, FinTech and healthcare domains due to regulatory requirements. If AI/ML is making decisions, the decision-making should be transparent and easy-to-understand. Otherwise, the model can't be 'trusted' to perform accurately and without bias.

Without proper explainability, the model's relevance decreases where risk elements occur or root causes of a given problem come to the picture.
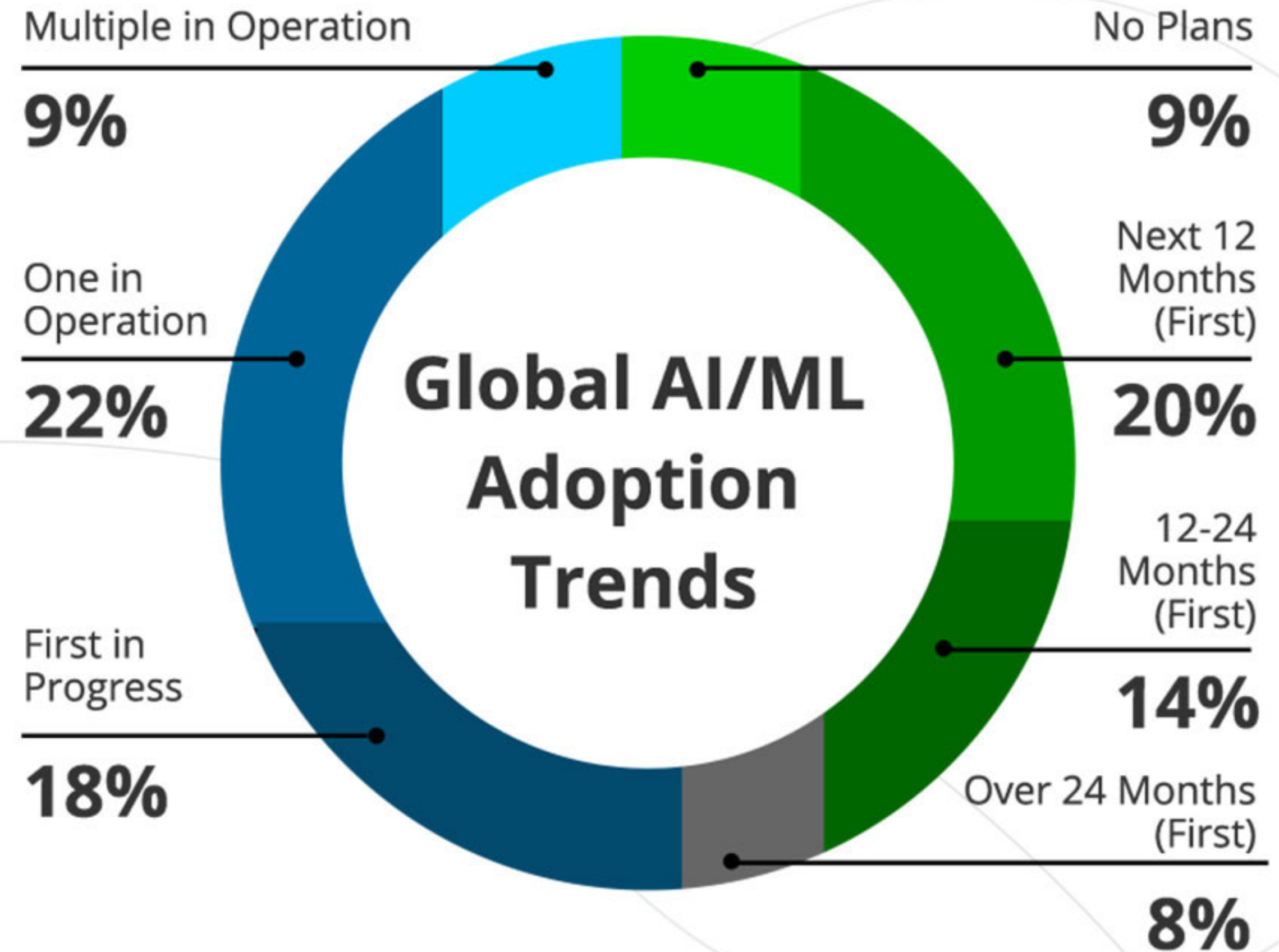
Lack of Access to Right Expertise

Most data scientists are not good at implementing an incremental engineering solution while product engineers face challenges in understanding mathematical models.

Pairing a data scientist with a product engineer can help avoid such challenges and production failures. However, hiring experienced talent in adequate numbers, that too at reasonable cost, is a challenge.

Is Your Startup Ready for AI/ML?

Adopting AI/ML just to outperform your competitors, without possessing the required expertise and understanding, doesn't make any difference. To make a long story short, every Startup needs to check if it is ready for AI & Machine Learning. But, how can you do that? This is where experience comes into picture.

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Global AI/ML Adoption Trends

Multiple in Operation
9%

No Plans
9%

One in Operation
22%

Next 12 Months (First)
20%

First in Progress
18%

12-24 Months (First)
14%

Over 24 Months (First)
8%

Source: Global AI Adoption Trends Forecast 2020 by Cognilytica

The AI/ML Readiness Checklist
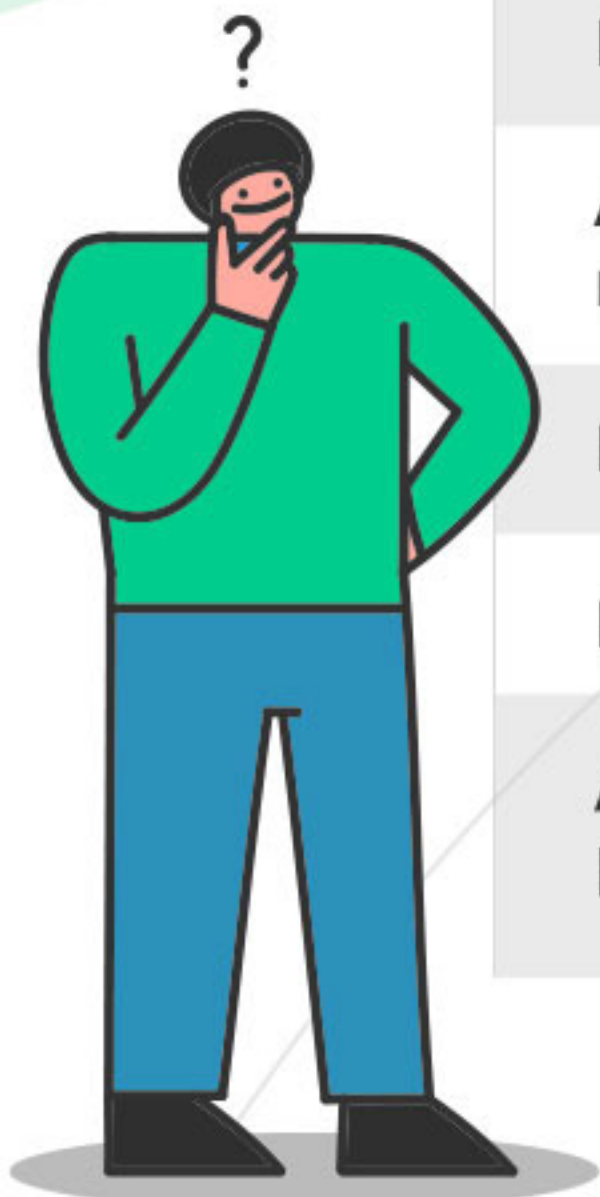
Do you have a clear vision?	Answer	
Are you sure about which real-life challenge you wish to solve with AI/ML?	Yes	No
Are you adopting AI/ML at an early product development stage?	Yes	No
Do you have a fixed timeframe for completion of this project?	Yes	No
Do you have a product feature roadmap in mind starting from the MVP to final product?	Yes	No
Are you clear about what to expect after implementing AI/ML in your product: revenue boost, user satisfaction?	Yes	No
How confident are you regarding the success of your AI/ML project?	Yes	No
Have you foreseen how the end product will look post AI/ML implementation?	Yes	No
Are you aware that implementing AI/ML on an MVP vs a full-fledged product will have different requirements/challenges?	Yes	No

The AI/ML Readiness Checklist

Do you have clarity on required time/investments?	Answer	
Are you aware about the cost factors involved?	Yes	No
Are you aware about the implementation timeline and have resources to do so?	Yes	No
Do you have resources & time to invest in AI/ML model research?	Yes	No
Do you have the required infrastructure to serve AI/ML models?	Yes	No
Do you have the right data strategy?	**Answer**	
Do you have a data-driven culture?	Yes	No
Do you need labeled data, and if that's the case, do you have it?	Yes	No
Do you have AI/ML data pipeline right from model generation to validation?	Yes	No
Do you have the required type of data for model building & training?	Yes	No
Do you have a reasonable quantity of data to implement AI/ML?	Yes	No
If your product is customer-facing, do you have a user feedback system to improve/validate your model?	Yes	No
If you have no data or limited data, do you have a well-tested data generation strategy and domain experts for doing it?	Yes	No
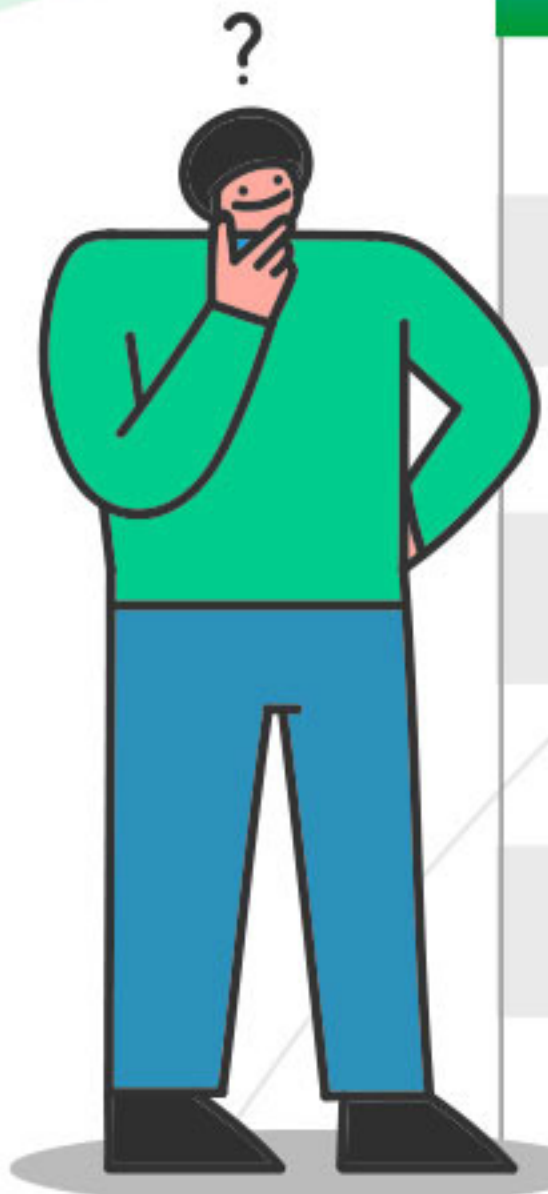
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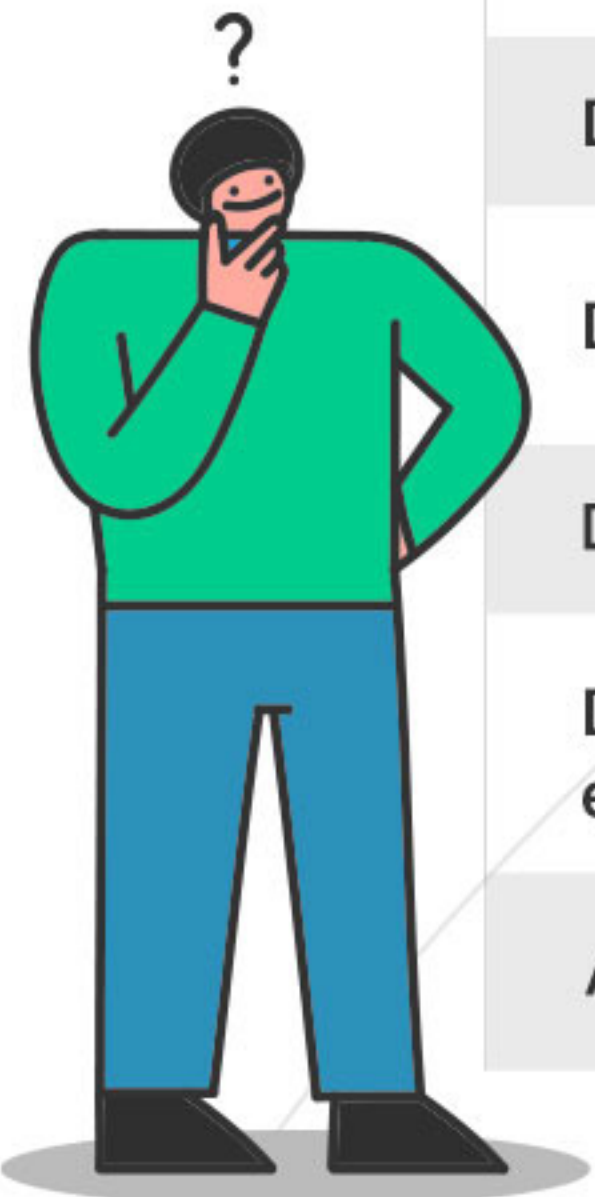
Do you have the right people/expertise?	Answer	
Do you have resources and people with domain know-how to roll out a full-fledged AI/ML project on time?	Yes	No
Do you have a team with end-to-end AI/ML implementation experience for Startups?	Yes	No
Are you planning to train your existing team with AI/ML know-how to engage them in end-to-end implementation?	Yes	No
Do you have a product feature roadmap in mind starting from the MVP to final product?	Yes	No
Do you have both experienced Data Scientists and ML software engineers in your in-house team?	Yes	No
Do you have a dedicated AI/ML team who can iteratively improve the AI/ML model?	Yes	No
Do you have data scientists who can develop AI/ML models while keeping an eye on engineering aspects?	Yes	No
Are you focusing on research papers and patents that can also market your product?	Yes	No

Recommendations for You

Vision

If you've scored less in quadrant 1, your vision of adopting AI/ML isn't very clear yet.

- An expert opinion or consultation would be the best way to go forward. Visualizing the end product and what problem will it solve can lead to a clear product roadmap with least resource wastage.

- A quick PoC that doesn't last for more than 2 months would be worth the trial to bring confidence. It's advisable to not be aggressive at this stage, as AI/ML problems take a toll in terms of parameter tuning, resource optimization, and performance.

- Extensive experience of AI/ML professionals can help you gain insights into the end-product and its execution pipeline.

- It is very important to define AI/ML business metrics that enable iterative model improvement.

Resources

If you've scored less in quadrant 2, you're not very confident because of either budget or time constraints.

- AI/ML requires considerable share of time and investments, in terms of expertise, infrastructure, and quality assurance. And when the problem requires Deep Learning or Big Data, the cost further soars up. Hence, it's advisable to seek expert help and chalk out a viable plan to allocate a medium-to-large budget.

- Talking about time, it starts with a PoC and involves multiple rounds of model improvements. Also, an initial set of failures remains inevitable before seeing the actual results, as AI/ML is in the evolving stage. Seasoned AI/ML experts can bring you a clear picture of this and also help in optimizing time.

- Understand the business problem at hand. If a problem has been solved to some extent, the amount of research involved would be less. However, if the problem is very specific, it requires time for research before the engineering part.

Recommendations for You

Data Strategy

If you've scored less in quadrant 3, you might lack a strong data strategy.

- Good data in appropriate quantity is the backbone of AI/ML implementation. AI/ML problems work in a "the more, the better" model, with data being the key success element. Experts who understand this prequisite can help you create data generation mechanisms to build a healthy pipeline.

- Analyze if your AI/ML problem requires labeled data. In case it does, then the 'time-to-market' largely depends on a lot of it. Experts in AI/ML can help you retrieve this data before the modelling is started.

- You need right domain experts to arrange data pipeline for iterative model validation till deployment.

- If you have a customer-facing product, make sure you create a user feedback system to iteratively improve user-experience.

Expertise

If you've scored less in quadrant 4, you maybe keen on implementing AI/ML but lack the right expertise.

- AI/ML is not a single person affair. It requires a supporting infrastructure comprising of cloud services, data pipeline, mechanical turk, QA and UI teams, etc. Therefore, AI/ML experts can help you with proper resource planning in advance.

- AI/ML is not just about using libraries, training, and prediction. It requires a deep understanding of underlying mathematics, parameter tuning, and model evaluation. For this, Startups need to on-board experienced team of data scientists to bring required optimization in AI/ML implementation.

- AI/ML needs to have an engineering mindset for looking at multiple fronts and optimizing performance in terms of resource utilization, metrics, etc. The key is to have developers and experts who also understand the engineering aspects of AI/ML implementation, which leaves no room for breakdowns.

Now that you've an idea of how to go about AI/ML adoption for your Startup, **let's understand how to do it the expert way.**

Successful AI/ML Implementation:

For Startups, adopting AI/ML is becoming a necessity. Startups have their own unique set of requirements & challenges regarding AI/ML implementation. Some points to be kept in mind:

- Starting at an **early stage** can significantly reduce costs and tech risks.

- An **iterative approach** can help create a scalable, market-ready product.

- Founders & Co-Founders must have **clear understanding of the real-life challenge** they want to solve.

- There should be a fixed timeframe to complete the project, a proper product roadmap, and a clear picture of **how the end product will look like.**

- Successful AI implementation requires a good data pipeline. In case there is no data or limited data, there should be a **data generation strategy** involving domain experts.

- Creating **production-ready ML Models** needs both experienced Data Scientists & AI/ML developers in a single team. AI/ML models developed without keeping an eye on engineering aspects are likely to fail.

The AI/ML readiness checklist provides a brief set of factors to consider. **If you can confidently answer 'Yes' to most of the questions, you can go for an in-house team. Otherwise, you can opt for a tech vendor with the experience of handling multiple end-to-end AI/ML implementations for Startups.** Such vendors can easily fill in the technical gaps & bring necessary experience to avoid pitfalls.
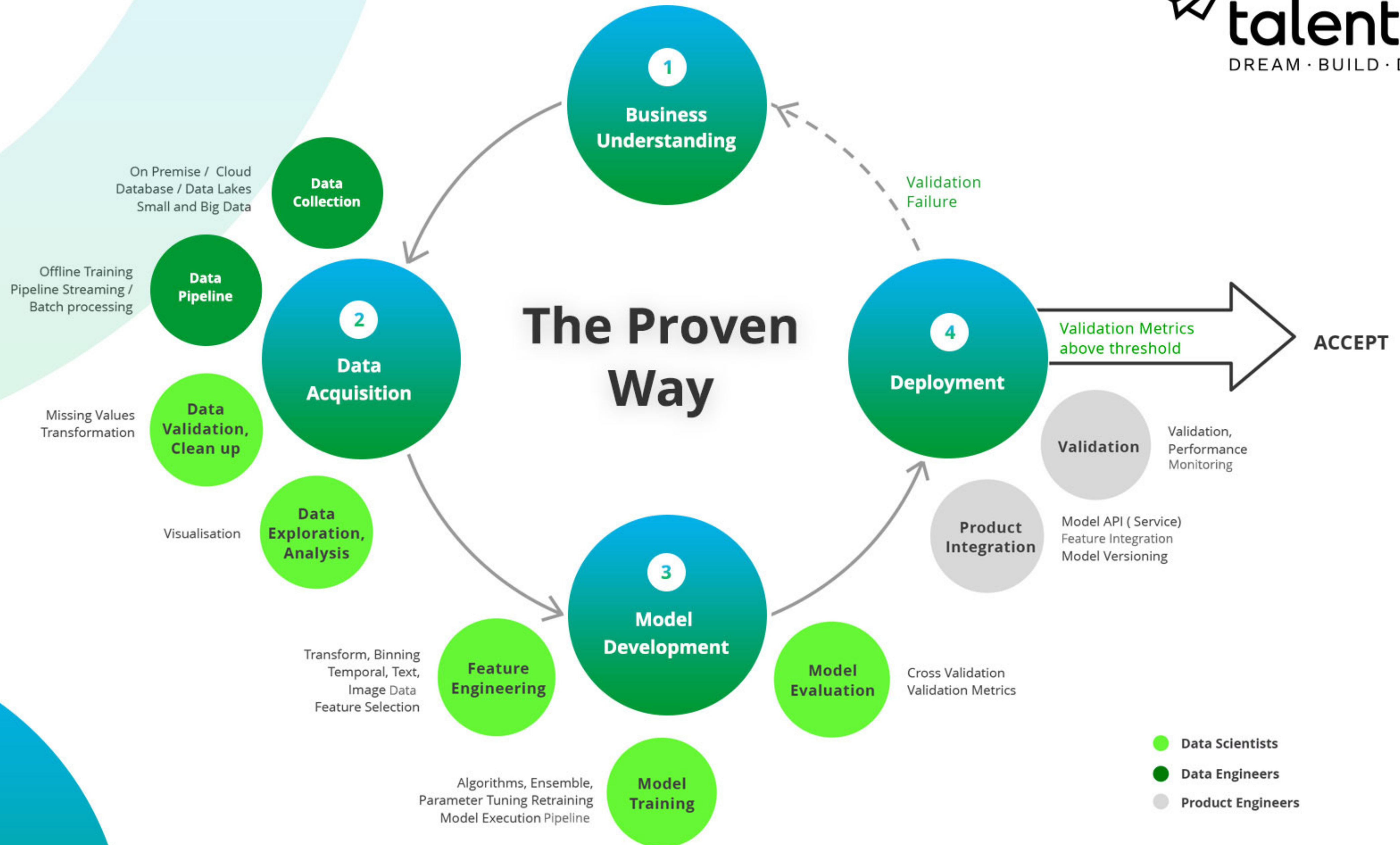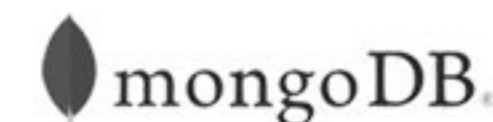
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