Risk and uncertainty management

DECODING DECISION MODELING

Tiago Brasil
Lead Data Engineer

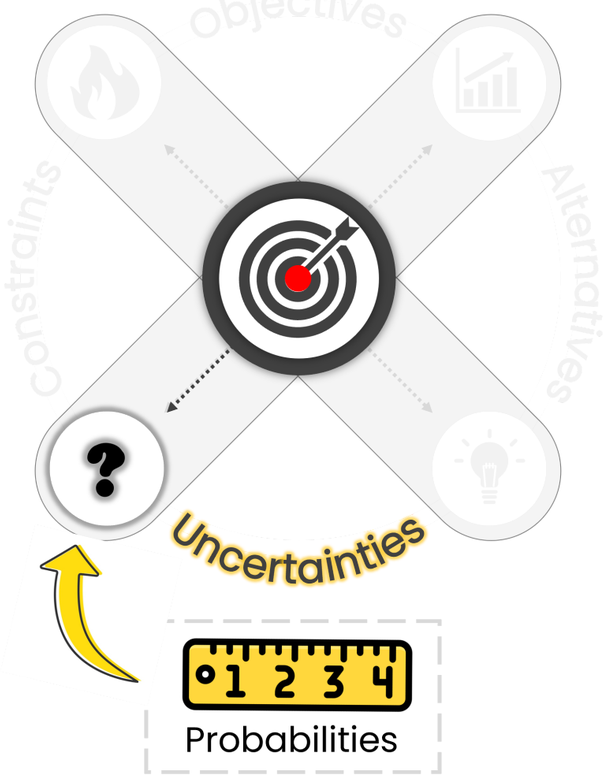
datacamp

Managing risks and uncertainties

Risk and uncertainty management enhance decision models by anticipating problems, minimizing impacts, and increasing the likelihood of achieving desired outcomes.

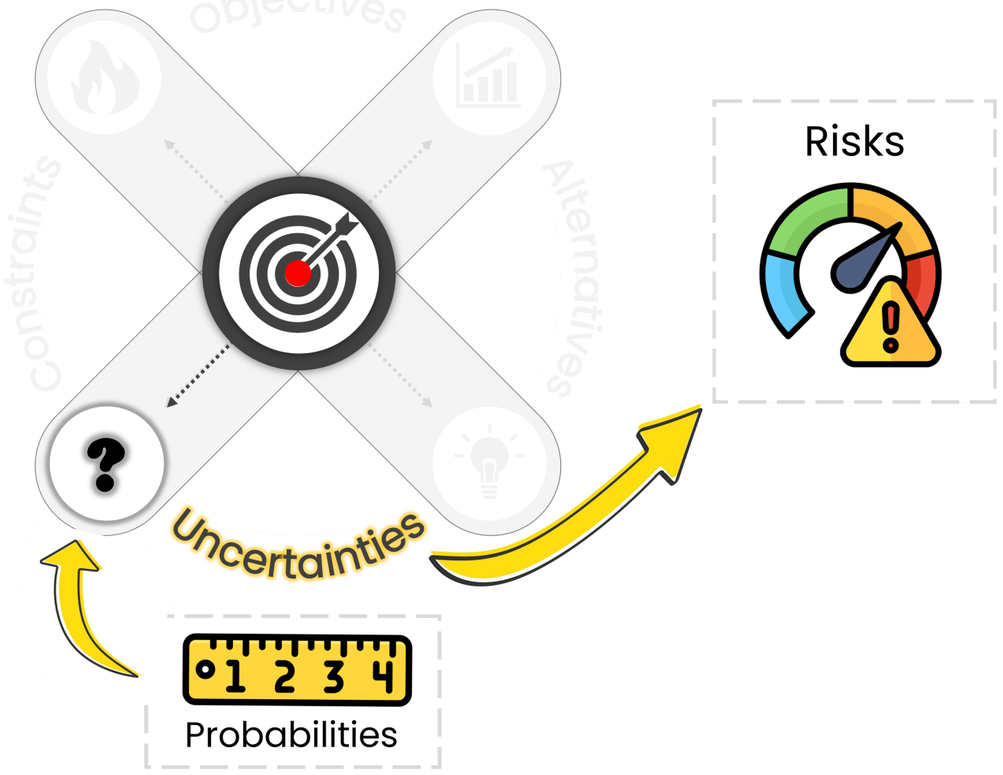
Managing risks and uncertainties

Risk and uncertainty management enhance decision models by anticipating problems, minimizing impacts, and increasing the likelihood of achieving desired outcomes.



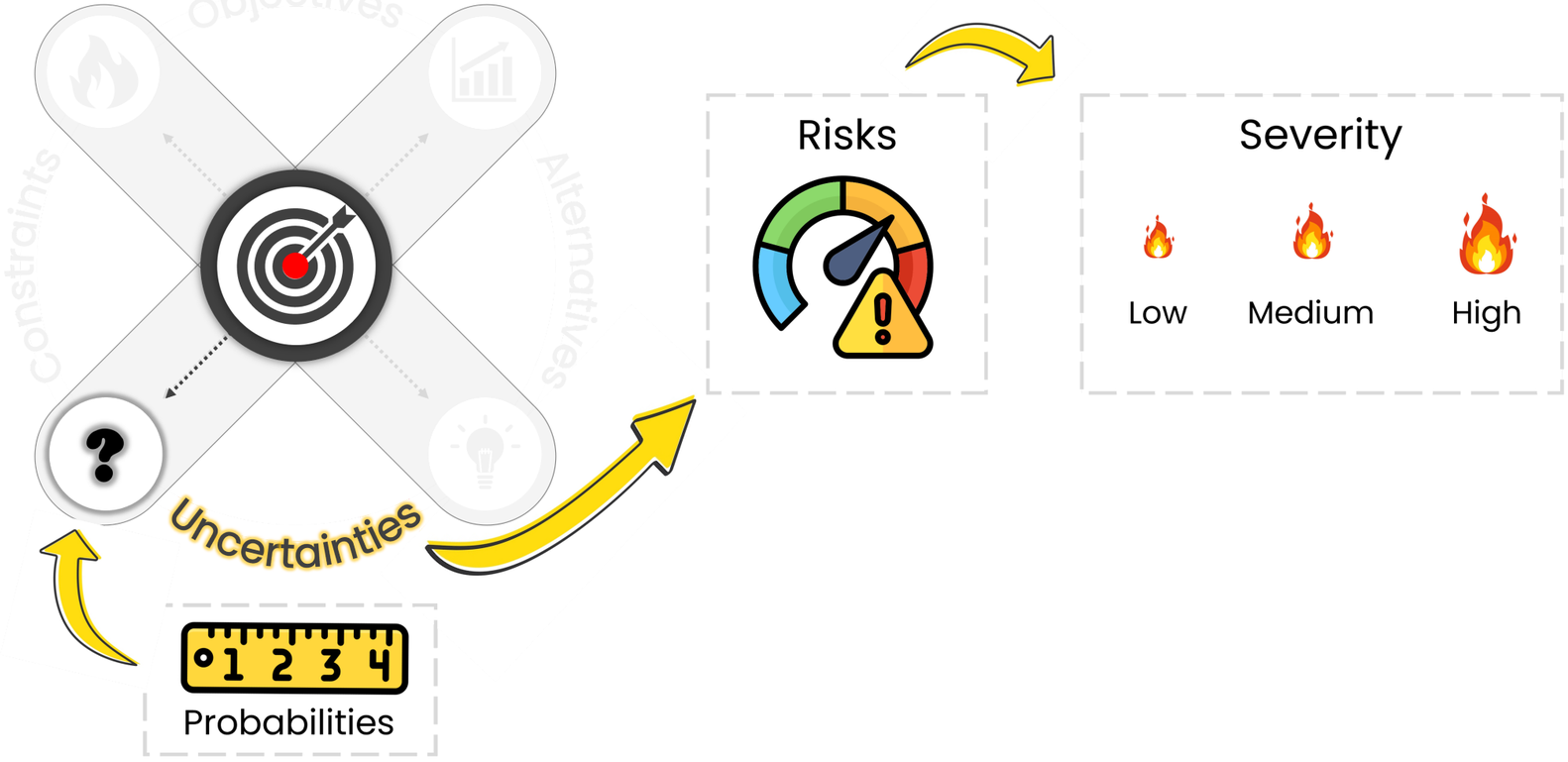
Managing risks and uncertainties

Risk and uncertainty management enhance decision models by anticipating problems, minimizing impacts, and increasing the likelihood of achieving desired outcomes.



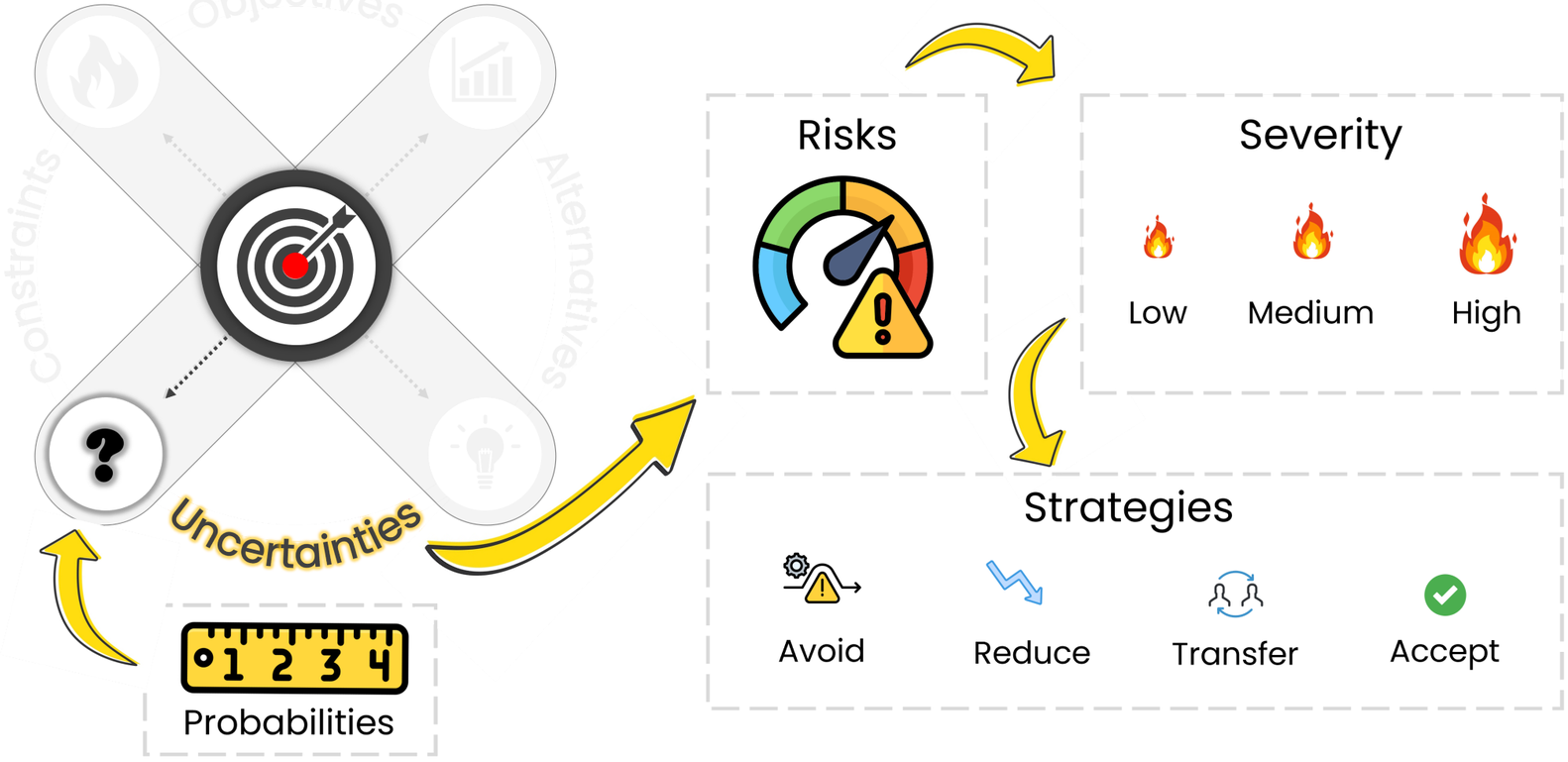
Managing risks and uncertainties

Risk and uncertainty management enhance decision models by anticipating problems, minimizing impacts, and increasing the likelihood of achieving desired outcomes.



Managing risks and uncertainties

Risk and uncertainty management enhance decision models by anticipating problems, minimizing impacts, and increasing the likelihood of achieving desired outcomes.



Risk assessment matrix

A risk assessment matrix is a tool for evaluating and prioritizing risks based on their likelihood of occurring and the severity of their impact.

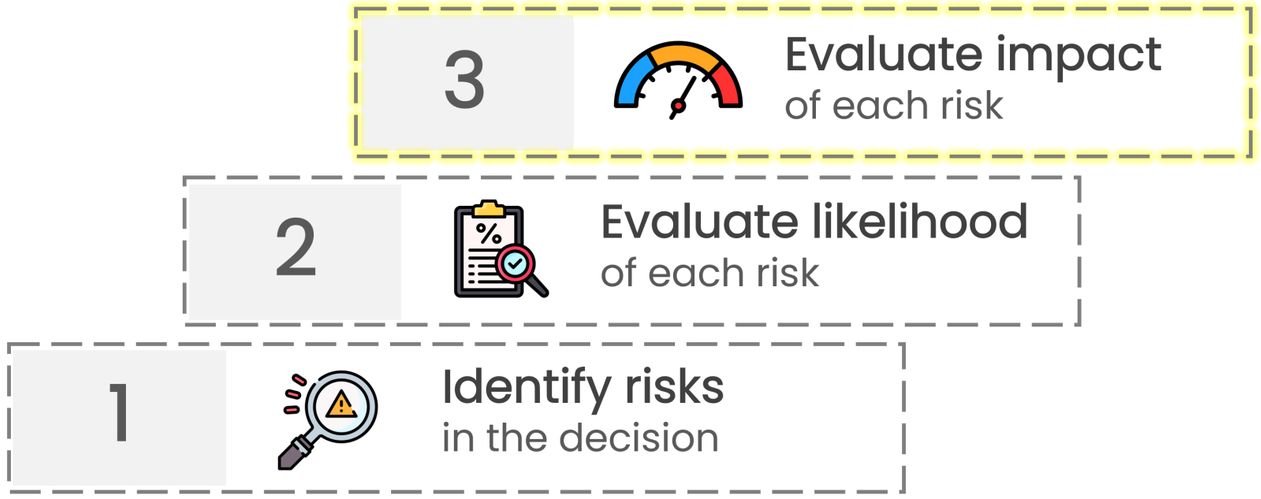
1  **Identify risks** in the decision

Risk assessment matrix

A risk assessment matrix is a tool for evaluating and prioritizing risks based on their likelihood of occurring and the severity of their impact.

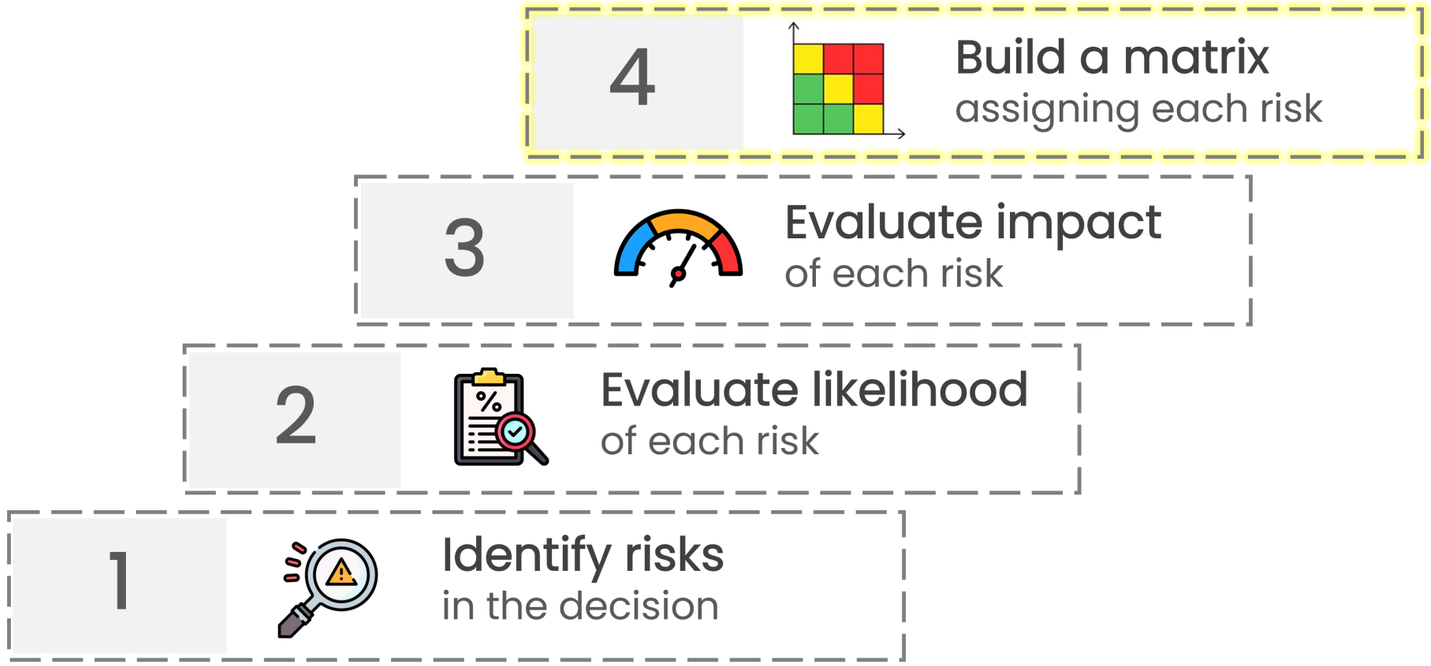
Risk assessment matrix

A risk assessment matrix is a tool for evaluating and prioritizing risks based on their likelihood of occurring and the severity of their impact.



Risk assessment matrix

A risk assessment matrix is a tool for evaluating and prioritizing risks based on their likelihood of occurring and the severity of their impact.



Risk assessment matrix

A risk assessment matrix is a tool for evaluating and prioritizing risks based on their likelihood of occurring and the severity of their impact.

Assessing risks in a product launch

Toothpaste+, a company primarily known for oral care products, decided to expand into the frozen food market by launching a beef lasagna product.

Assessing risks in a product launch

Toothpaste+, a company primarily known for oral care products, decided to expand into the frozen food market by launching a beef lasagna product.

Identify risks

Poor market acceptance

Limited “know-how”

Regulatory challenges

Assessing risks in a product launch

Toothpaste+, a company primarily known for oral care products, decided to expand into the frozen food market by launching a beef lasagna product.

Identify risks	Evaluate likelihood
Poor market acceptance	Very likely
Limited “know-how”	Likely
Regulatory challenges	Unlikely

Assessing risks in a product launch

Toothpaste+, a company primarily known for oral care products, decided to expand into the frozen food market by launching a beef lasagna product.

Identify risks

Poor market acceptance

Limited “know-how”

Regulatory challenges

Evaluate likelihood

Very likely

Likely

Unlikely

Evaluate impact

High

High

Medium

Assessing risks in a product launch

Toothpaste+, a company primarily known for oral care products, decided to expand into the frozen food market by launching a beef lasagna product.

Identify risks

- Poor market acceptance
- Limited “know-how”
- Regulatory challenges

Evaluate likelihood

- Very likely
- Likely
- Unlikely

Evaluate impact

- High
- High
- Medium

Build risk matrix

risk	likelihood	impact
1	Very likely	High
2	Likely	High
3	Unlikely	Medium

Assessing risks in a product launch

Risk	Likelihood	Impact
Poor market acceptance	Very likely	High
Limited “know-how”	Likely	High
Regulatory challenges	Unlikely	Medium

Likelihood	Impact		
	Low	Medium	High
Very likely			
Likely			
Unlikely			

Assessing risks in a product launch

Risk	Likelihood	Impact
Poor market acceptance	Very likely	High
Limited “know-how”	Likely	High
Regulatory challenges	Unlikely	Medium

Likelihood	Impact		
	Low	Medium	High
Very likely			
Likely			
Unlikely			

Assessing risks in a product launch

Risk	Likelihood	Impact
Poor market acceptance	Very likely	High
Limited “know-how”	Likely	High
Regulatory challenges	Unlikely	Medium

Likelihood		Impact		
		Low	Medium	High
	Very likely			Poor market acceptance
	Likely			Limited “know-how”
	Unlikely		Regulatory challenges	

Assessing risks in a product launch

Developing a strategy
for each prioritized risk

Priority	Risk	Strategy	Mitigating action

Assessing risks in a product launch

Developing a strategy
for each prioritized risk

Priority	Risk	Strategy	Mitigating action
1	Poor market acceptance	Avoid	• Consider using a **different brand.** • Launch a **small-scale test.** • Use **targeted advertising.**

Assessing risks in a product launch

Developing a strategy
for each prioritized risk

Priority	Risk	Strategy	Mitigating action
1	Poor market acceptance	Avoid	• Consider using a **different brand.** • Launch a **small-scale test.** • Use **targeted advertising.**
2	Limited "know-how"	Reduce	• **Conduct researches** on the frozen food industry. • Hire specialized **consultancy.**

Assessing risks in a product launch

Developing a strategy
for each prioritized risk

Priority	Risk	Strategy	Mitigating action
1	Poor market acceptance	Avoid	• Consider using a **different brand.** • Launch a **small-scale test.** • Use **targeted advertising.**
2	Limited "know-how"	Reduce	• **Conduct researches** on the frozen food industry. • Hire specialized **consultancy.**
3	Regulatory challenges	Accept	

Let's practice!

DECODING DECISION MODELING

Introduction to optimization

DECODING DECISION MODELING

Tiago Brasil
Lead Data Engineer

datacamp

Introduction

Optimization involves finding the best solution to a problem by choosing the most effective option from a set of possibilities.

- By **maximizing** or **minimizing** criteria such as:

Introduction

Optimization involves finding the best solution to a problem by choosing the most effective option from a set of possibilities.

- By **maximizing** or **minimizing** criteria such as:

cost

Introduction

Optimization involves finding the best solution to a problem by choosing the most effective option from a set of possibilities.

- By **maximizing** or **minimizing** criteria such as:

cost

time

Introduction

Optimization involves finding the best solution to a problem by choosing the most effective option from a set of possibilities.

- By **maximizing** or **minimizing** criteria such as:

cost

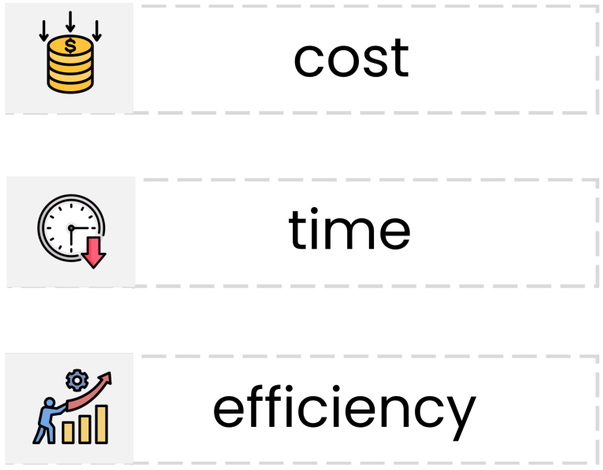
time

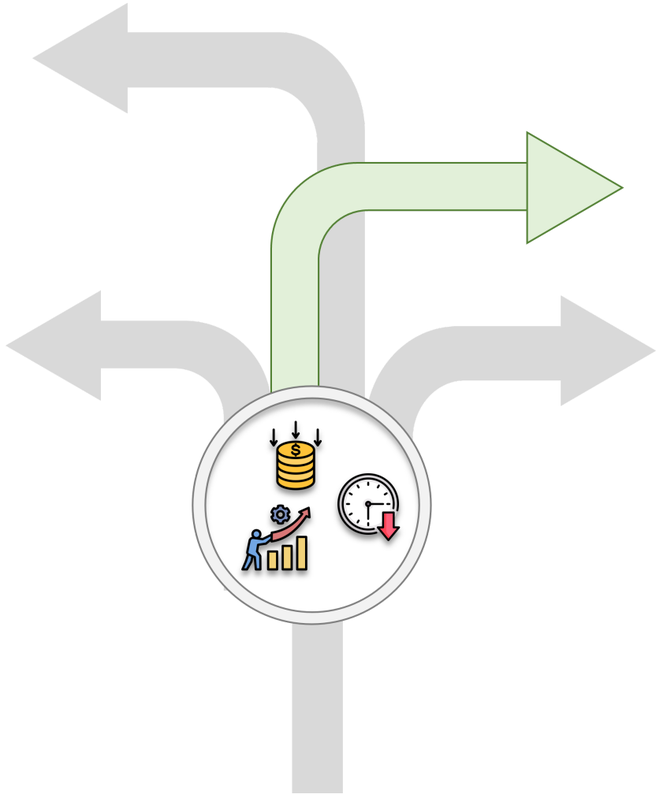
efficiency

Introduction

Optimization involves finding the best solution to a problem by choosing the most effective option from a set of possibilities.

- By **maximizing** or **minimizing** criteria such as:





Optimizing decisions

Optimizing decisions

Optimizing decisions

What is being optimized (e.g., cost, profit, time)

Alternatives

The **choices available** to optimize the objective

Optimizing decisions

What is being optimized (e.g., cost, profit, time)

Mandatory limitations or requirements

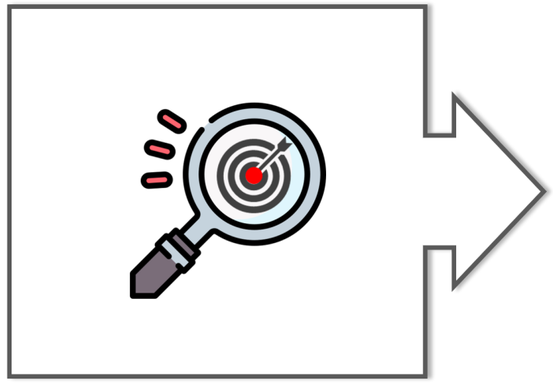
Constraints

The choices available to optimize the objective

The optimization journey

1st

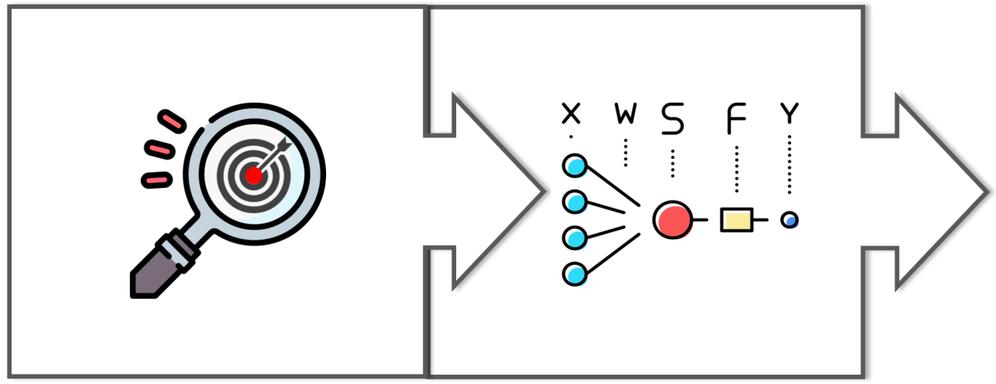
Identify the decision factors



The optimization journey

1st

Identify the decision factors



2nd

Build a mathematical model

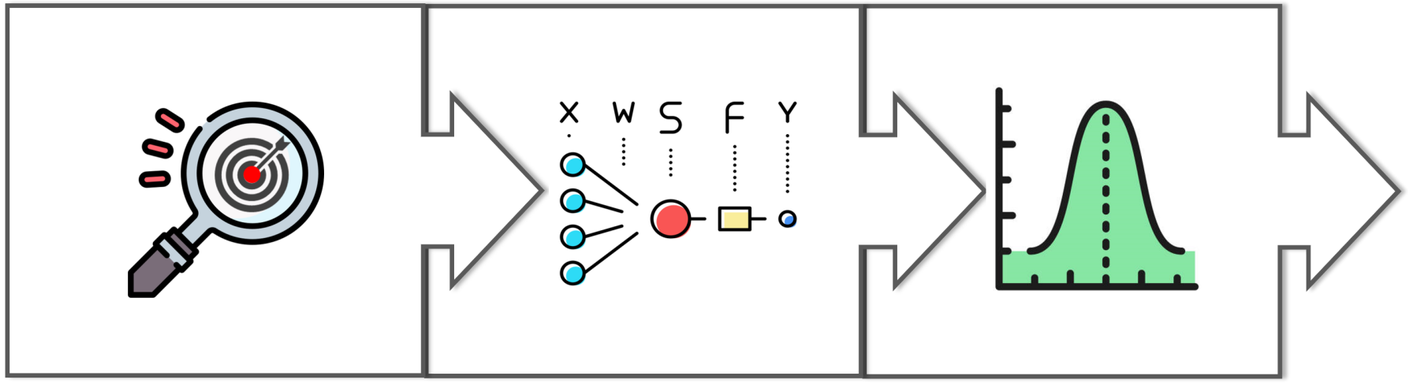
The optimization journey

1st

Identify the decision factors

3rd

Find the optimal solution



2nd

Build a mathematical model

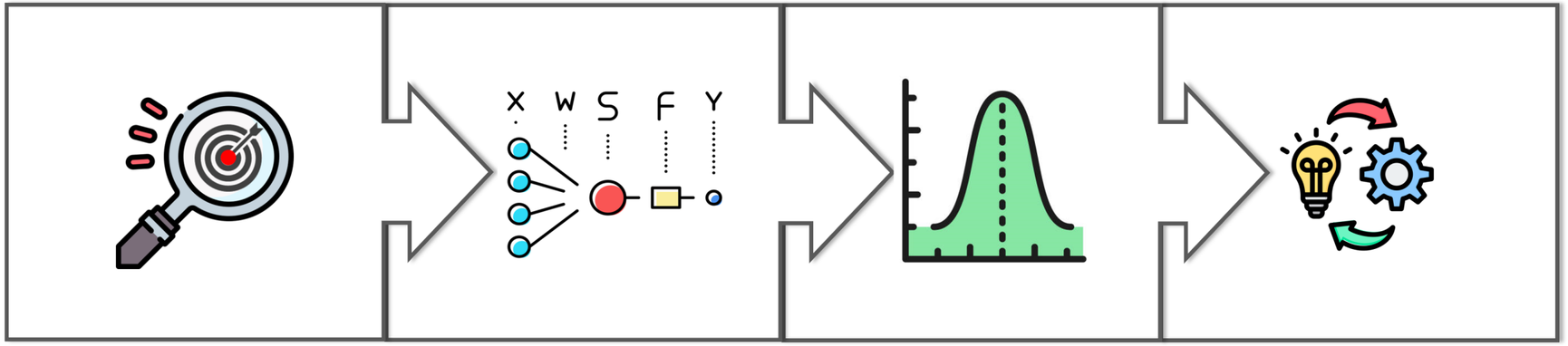
The optimization journey

1st
Identify the **decision factors**

2nd
Build a **mathematical model**

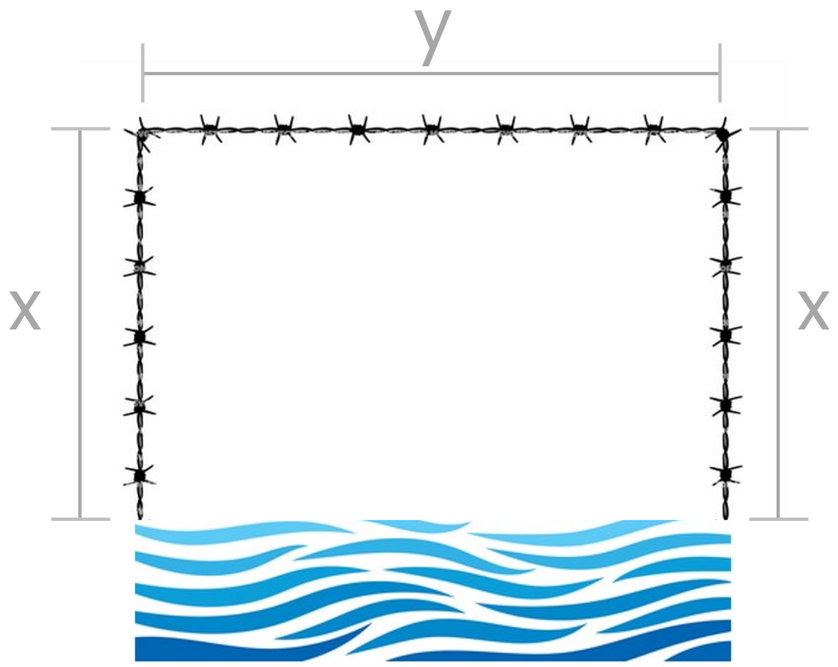
3rd
Find the **optimal solution**

4th
Implement and monitor the decision



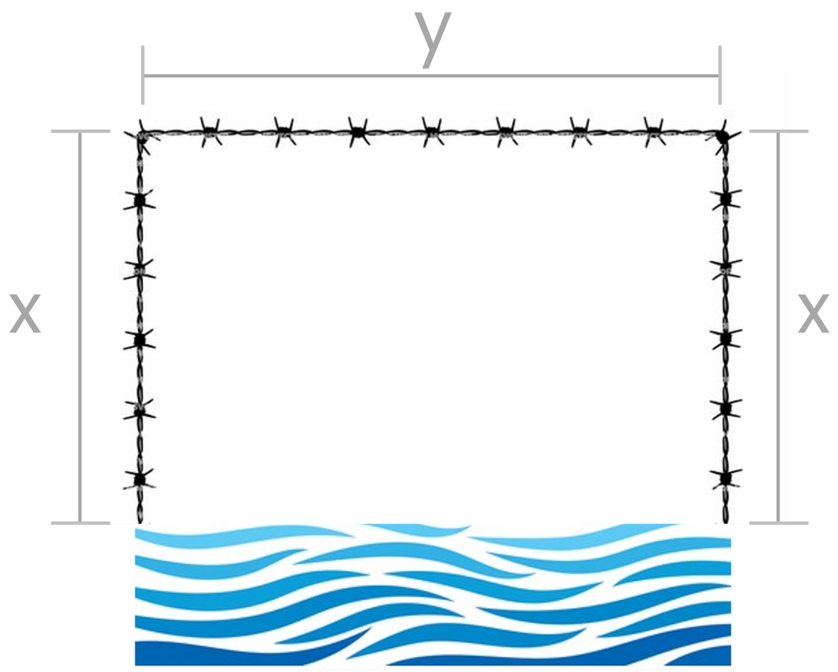
Optimizing a farmer's land

A farmer has a 1,000 ft fence to enclose a rectangular field, with one side bordering a river. Since the river side does not require a fence, the farmer only needs to fence the remaining three sides.

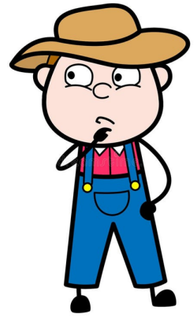


Optimizing a farmer's land

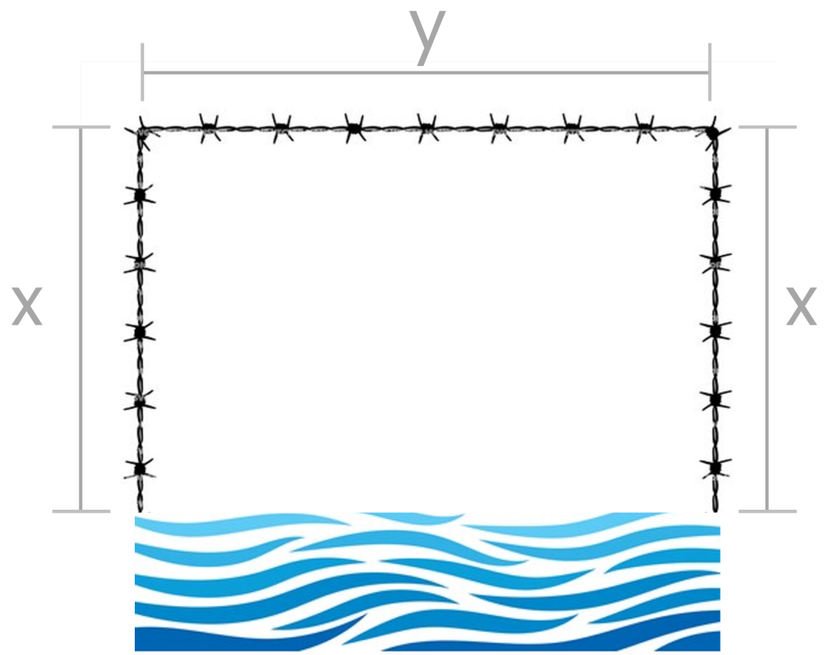
A farmer has a 1,000 ft fence to enclose a rectangular field, with one side bordering a river. Since the river side does not require a fence, he only needs to fence the remaining three sides.



What should be the dimensions of the fence to **maximize the area of the field?**



Identifying the decision factors

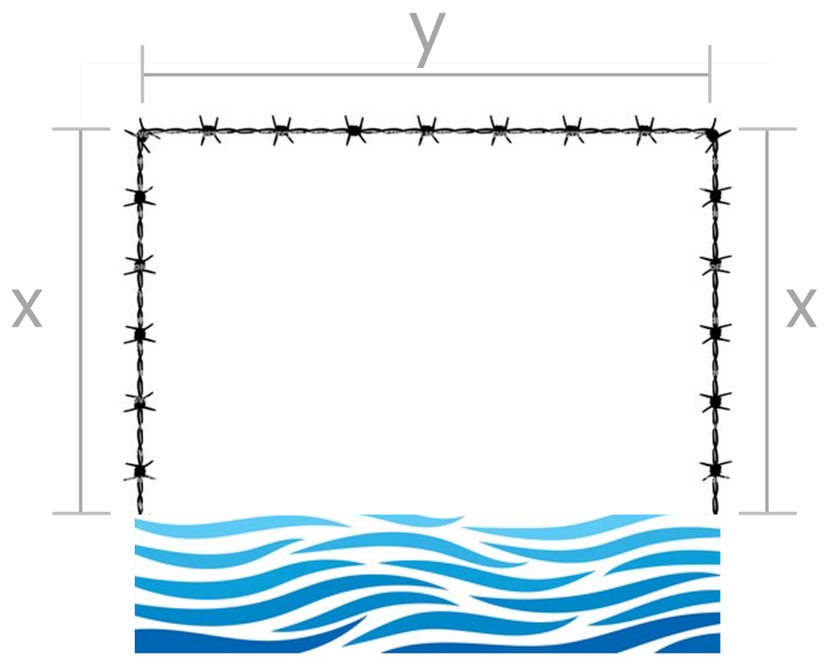


Objective

Maximize the area of the field

$$\text{Max } (A = xy)$$

Identifying the decision factors



Objective

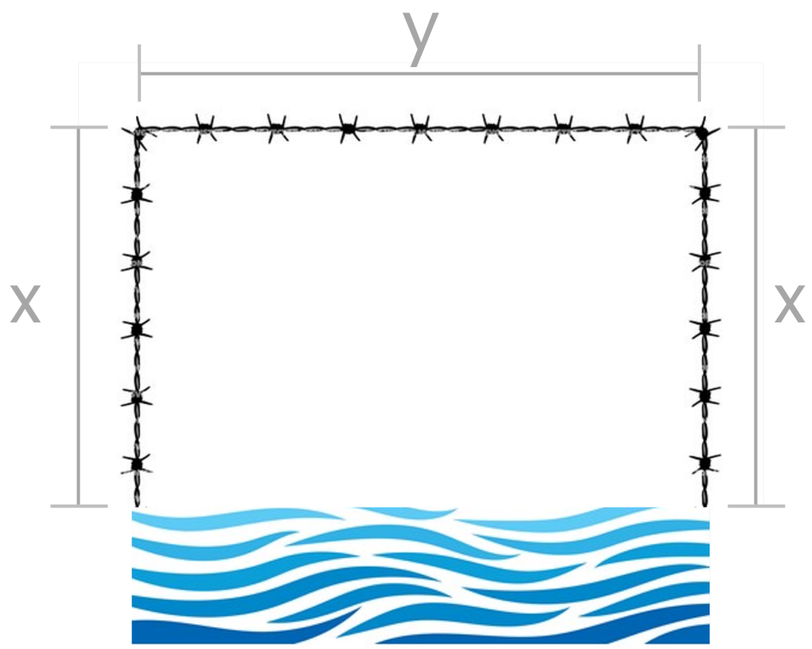
Maximize the area of the field

Max (A = xy)

Alternatives

x and y

Identifying the decision factors



Objective

Maximize the area of the field

$$\text{Max } (A = xy)$$

Alternatives

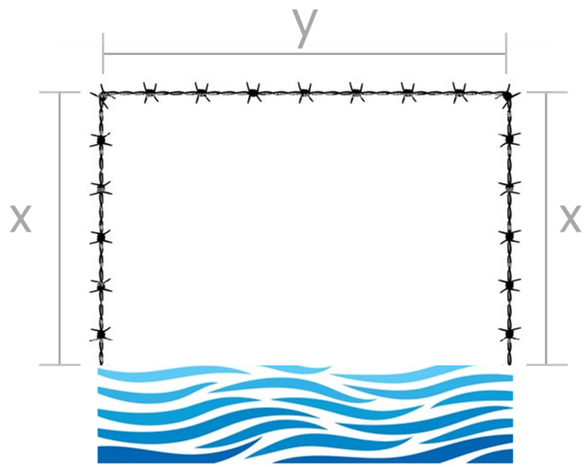
x and y

Constraints

There is 1000 ft of fence

$$2x + y = 1000$$

Building a mathematical model



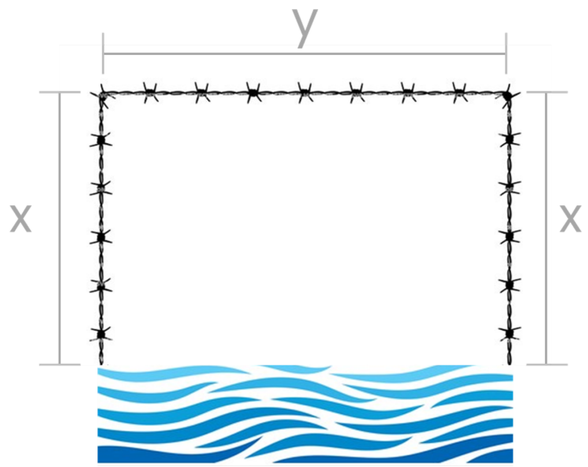
Objective function

$$A = xy$$

Constrains function

$$2x + y = 1000$$

Building a mathematical model



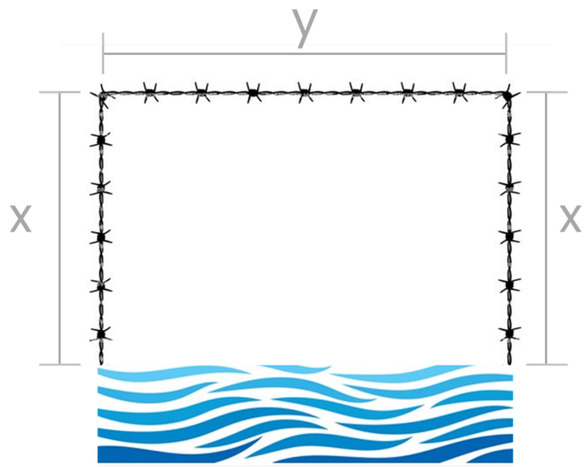
Objective function

$$A = xy$$

Constrains function

$$2x + y = 1000 \rightarrow y = 1000 - 2x$$

Building a mathematical model



Objective function

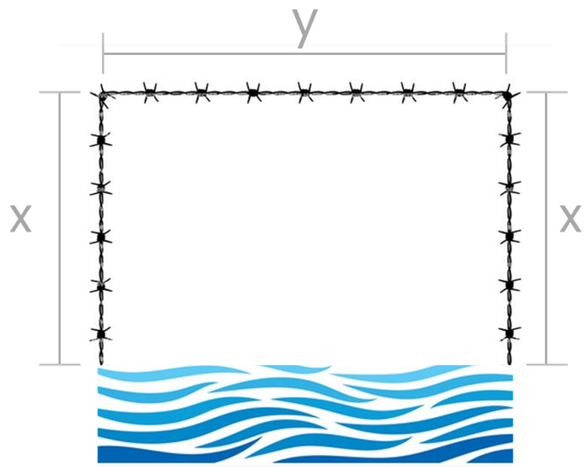
$$A = xy$$

Constrains function

$$2x + y = 1000$$

$$y = 1000 - 2x$$

Building a mathematical model



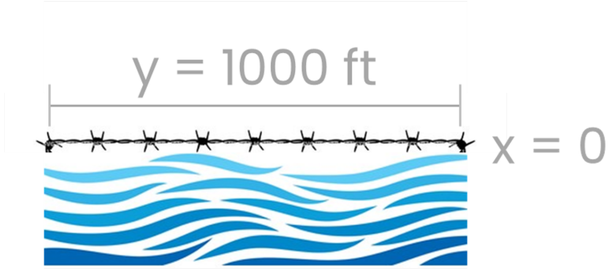
Objective function

$A = xy$ → $A = x(1000 - 2x)$

Constrains function

$2x + y = 1000$ → $y = 1000 - 2x$

Building a mathematical model

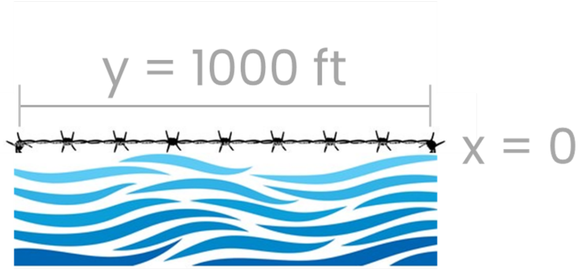


Maximum y and minimum x

x = 0

y = 1000

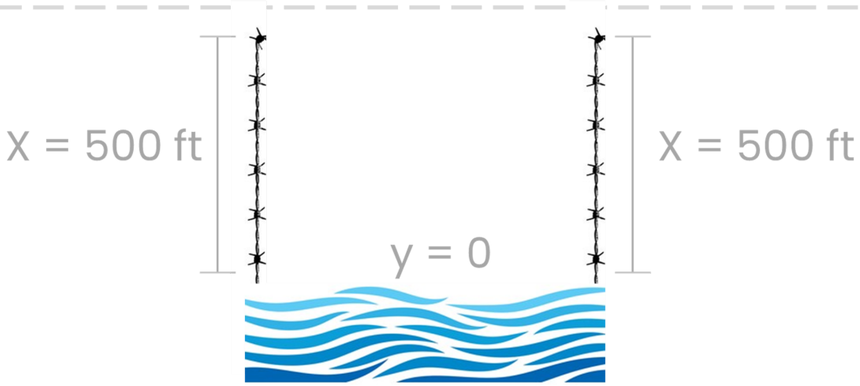
Building a mathematical model



Maximum y and minimum x

x = 0

y = 1000

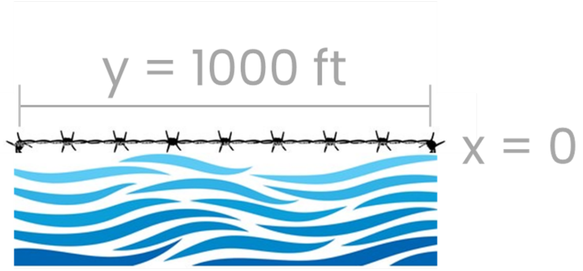


Maximum x and minimum y

x = 500

y = 0

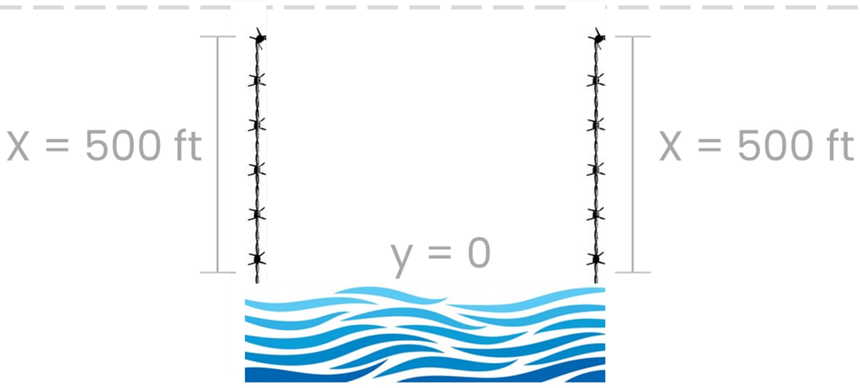
Building a mathematical model



Maximum y and minimum x

$x = 0$

$y = 1000$



Maximum x and minimum y

$x = 500$

$y = 0$

Mathematical model

$A = x(1000 - 2x)$ and $0 \leqslant x \leqslant 500$

Finding the optimal solution

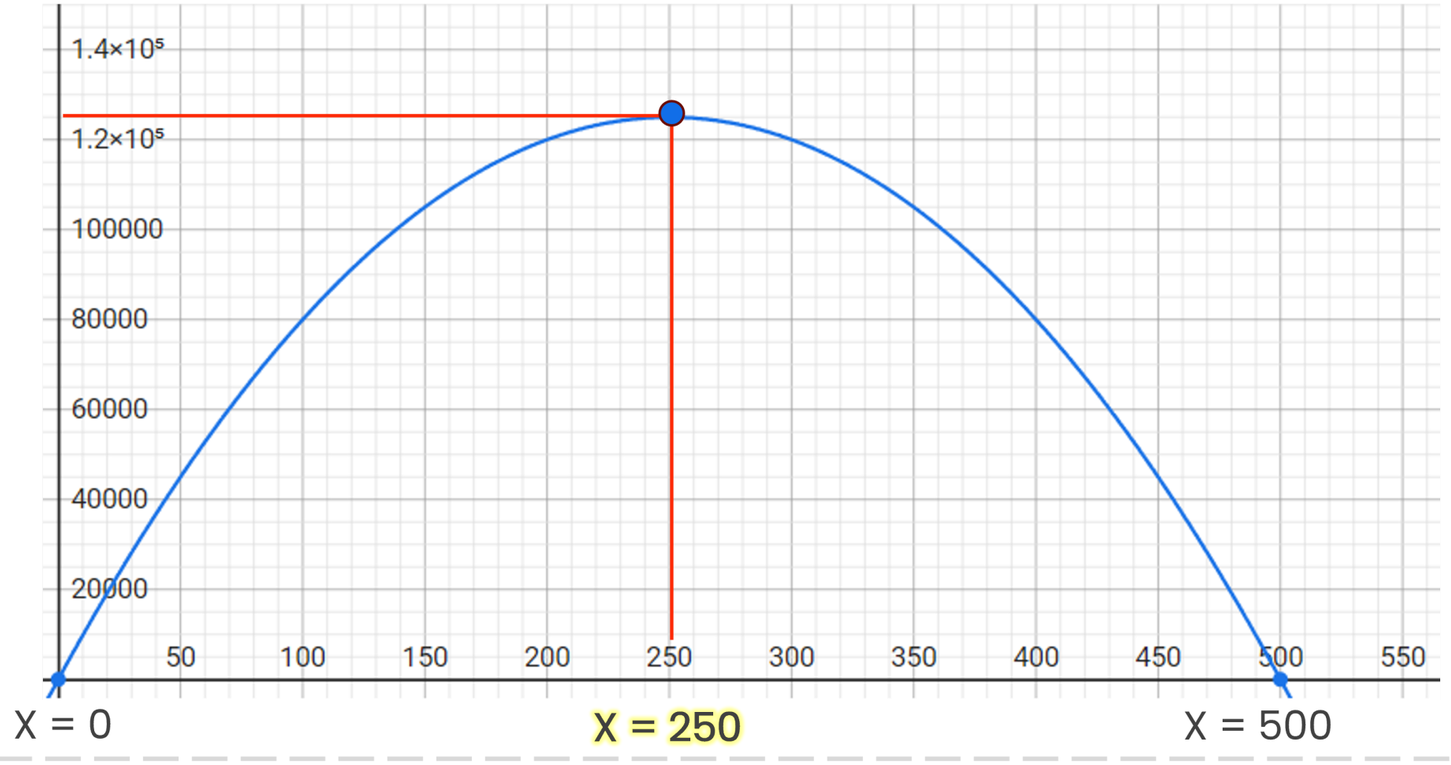
Mathematical model

$A = x(1000 - 2x)$ and $0 \leqslant x \leqslant 500$

Finding the optimal solution

Mathematical model

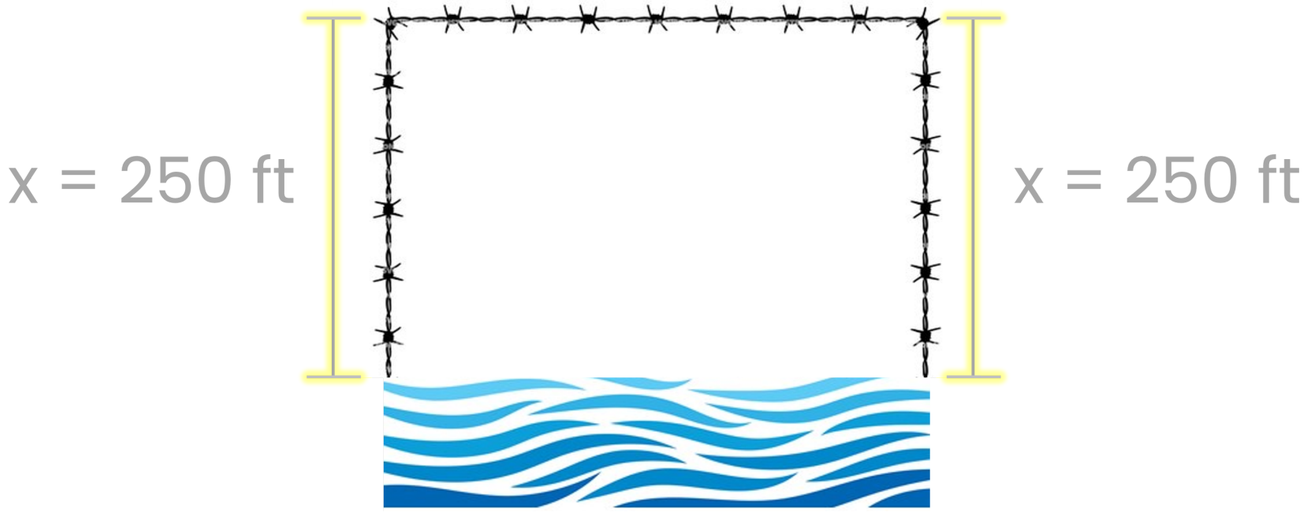
$A = x(1000 - 2x)$ and $0 \leqslant x \leqslant 500$



Finding the optimal solution

Maximize the area of the field

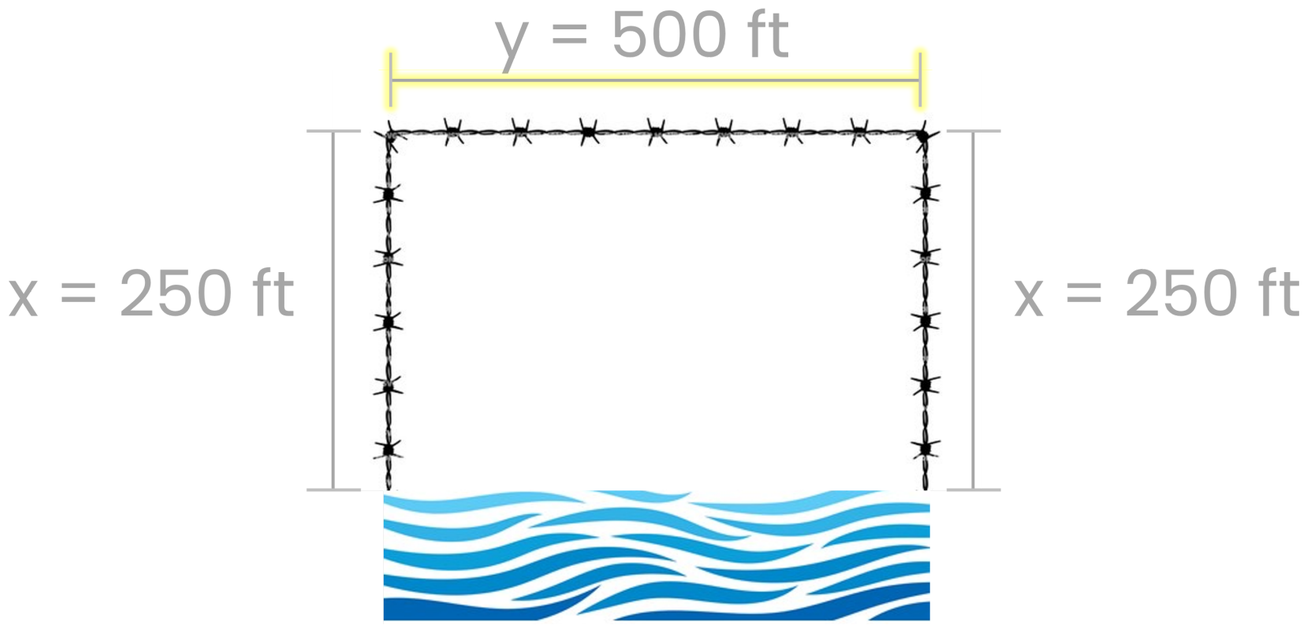
Optimal x = 250 ft



Finding the optimal solution

Maximize the area of the field

Optimal x = 250 ft



Let's practice!

DECODING DECISION MODELING

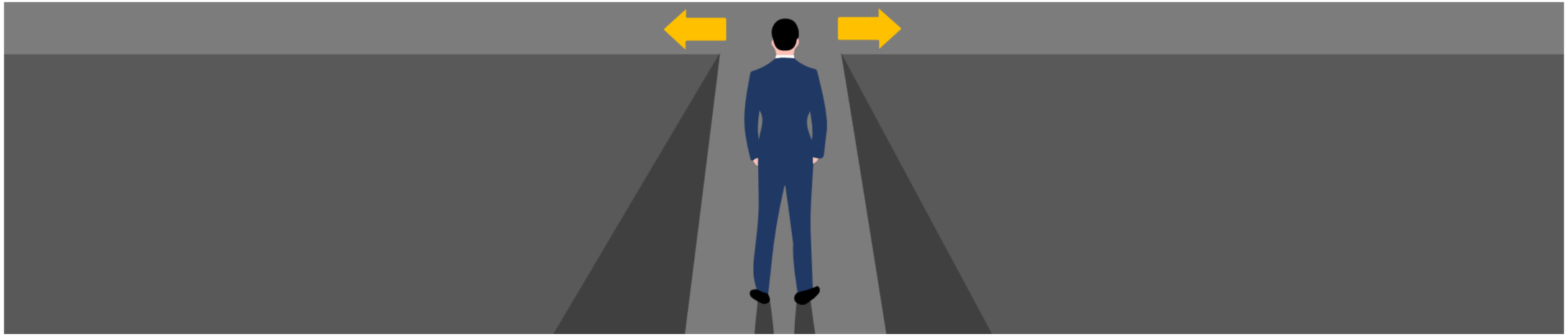
Enterprise decision-making

DECODING DECISION MODELING

Tiago Brasil
Lead Data Engineer

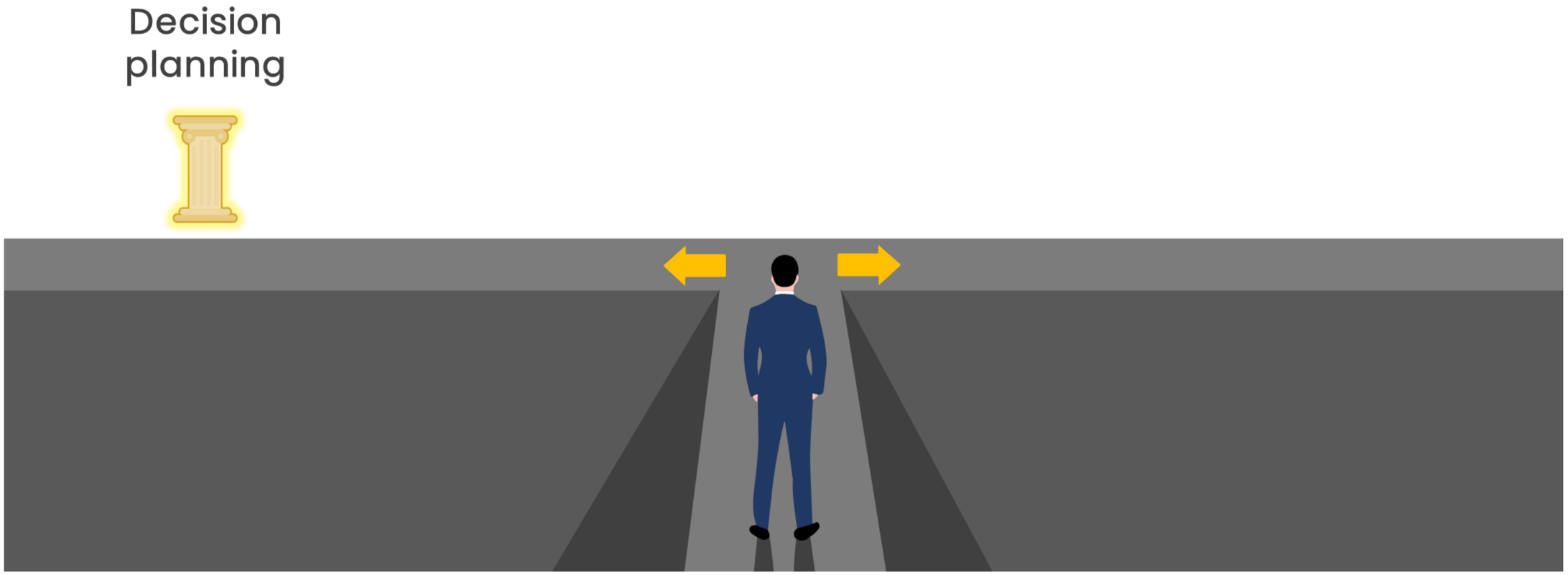
Enterprise decision-making

In the dynamic and complex world of business, **the ability to make strategic decisions is crucial for achieving organizational goals** and maintaining a competitive edge.



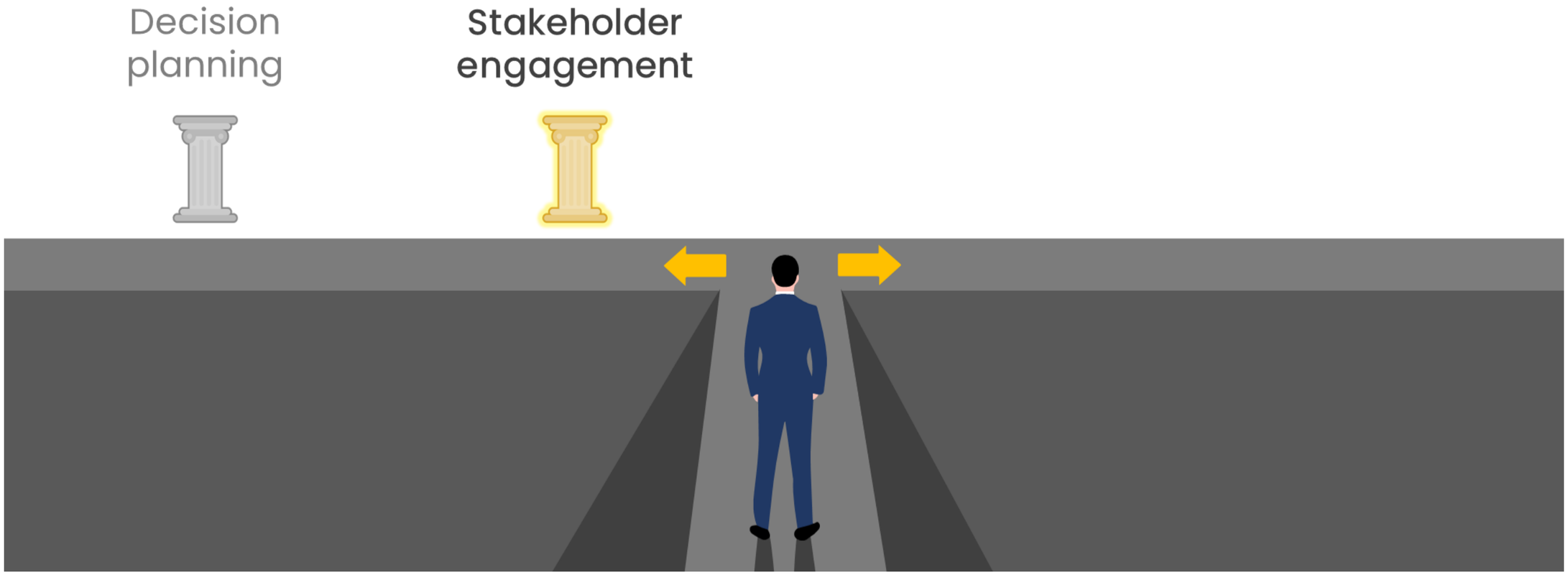
Enterprise decision-making

In the dynamic and complex world of business, **the ability to make strategic decisions is crucial for achieving organizational goals** and maintaining a competitive edge.



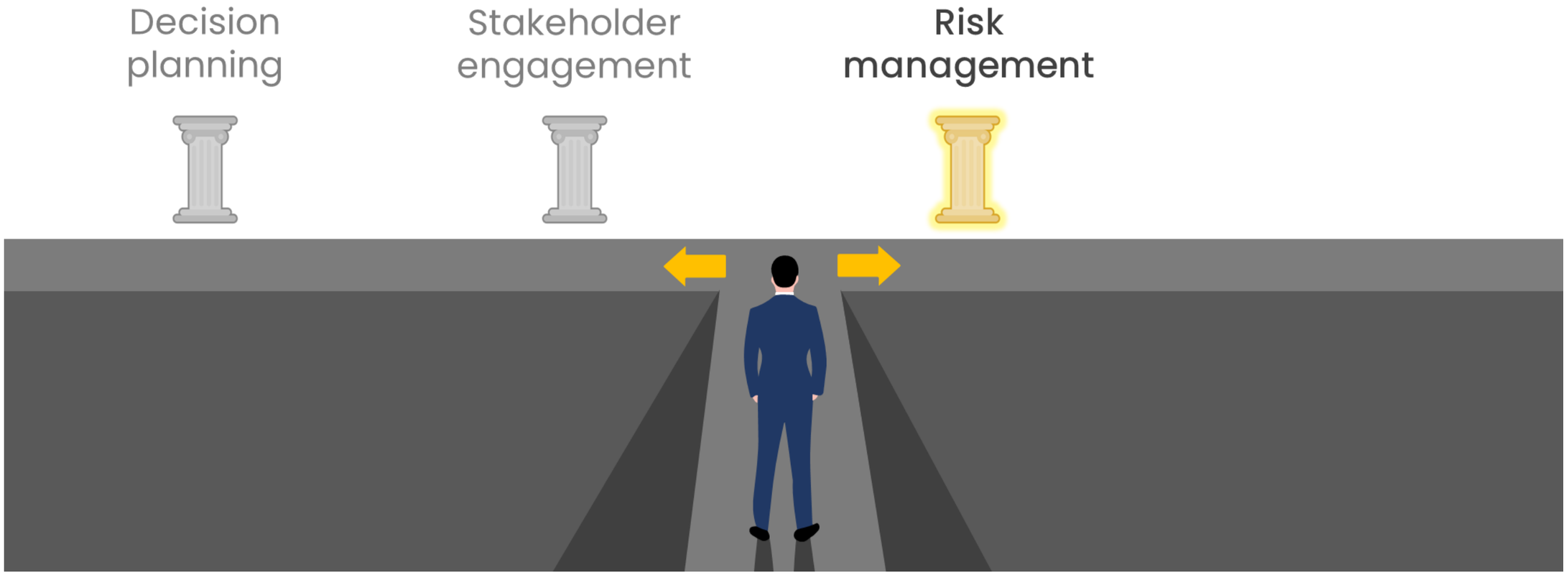
Enterprise decision-making

In the dynamic and complex world of business, **the ability to make strategic decisions is crucial for achieving organizational goals** and maintaining a competitive edge.



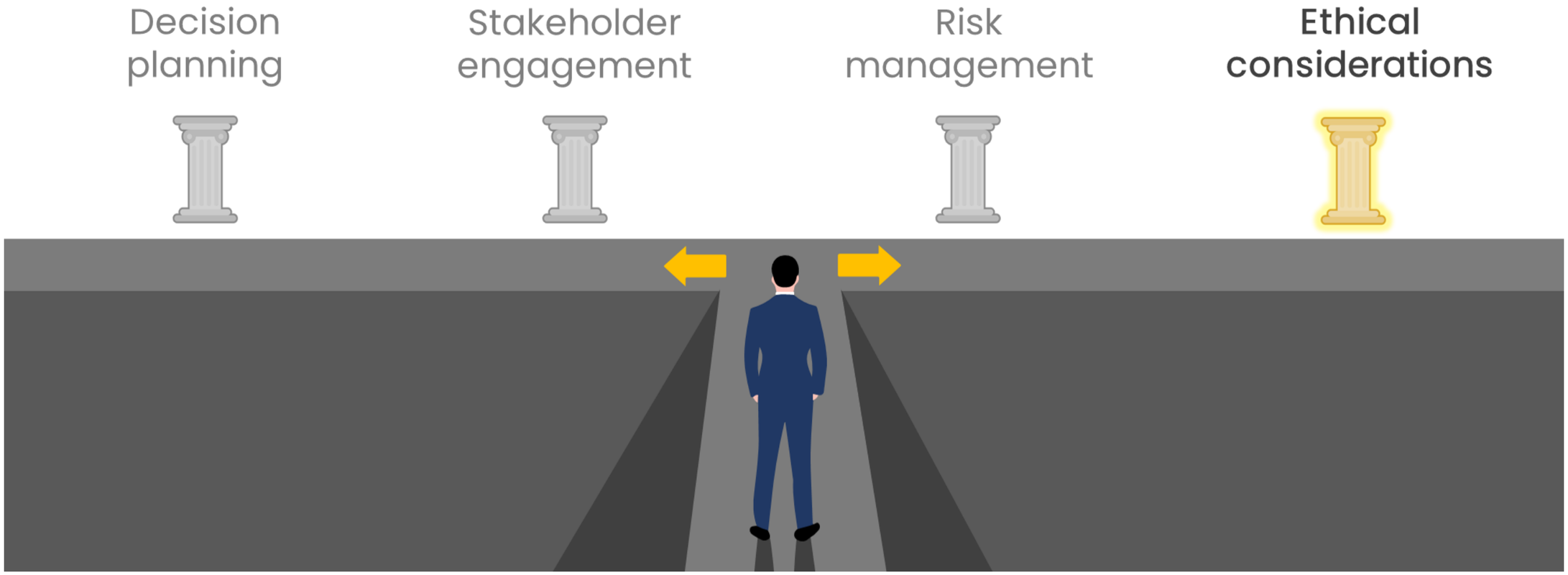
Enterprise decision-making

In the dynamic and complex world of business, **the ability to make strategic decisions is crucial for achieving organizational goals** and maintaining a competitive edge.



Enterprise decision-making

In the dynamic and complex world of business, **the ability to make strategic decisions is crucial for achieving organizational goals** and maintaining a competitive edge.



Planning the decision

In an enterprise environment, decision planning is particularly important because of the scale and complexity of the decisions involved.

Define **decision factors**

Planning the decision

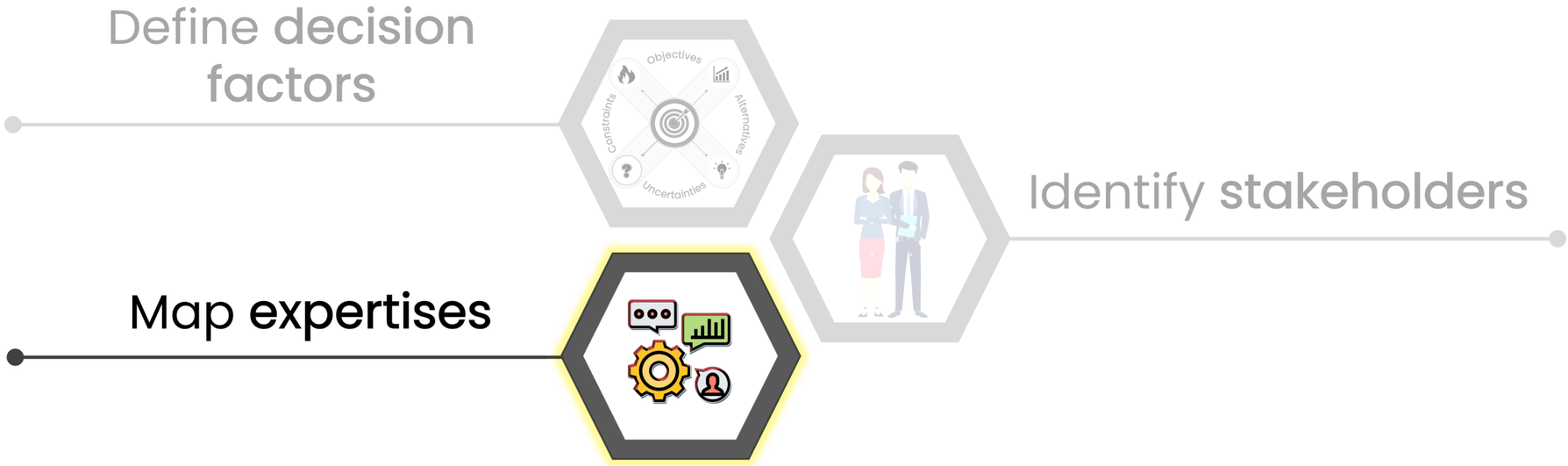
In an enterprise environment, decision planning is particularly important because of the scale and complexity of the decisions involved.

Define decision factors

Identify **stakeholders**

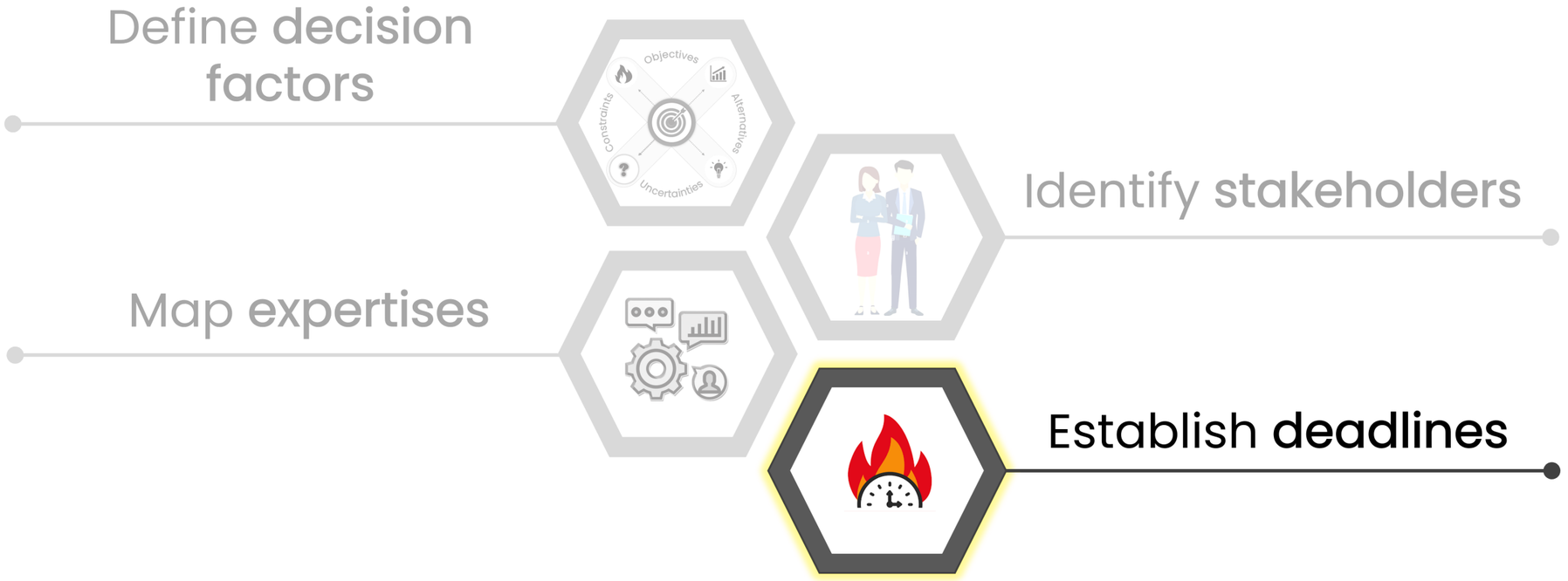
Planning the decision

In an enterprise environment, decision planning is particularly important because of the scale and complexity of the decisions involved.



Planning the decision

In an enterprise environment, decision planning is particularly important because of the scale and complexity of the decisions involved.



Planning the decision

In an enterprise environment, decision planning is particularly important because of the scale and complexity of the decisions involved.

Engaging the stakeholders

Engaging stakeholders is essential for gaining support and ensuring transparency. This involvement fosters trust, promotes collaboration, and enhances the likelihood of success.

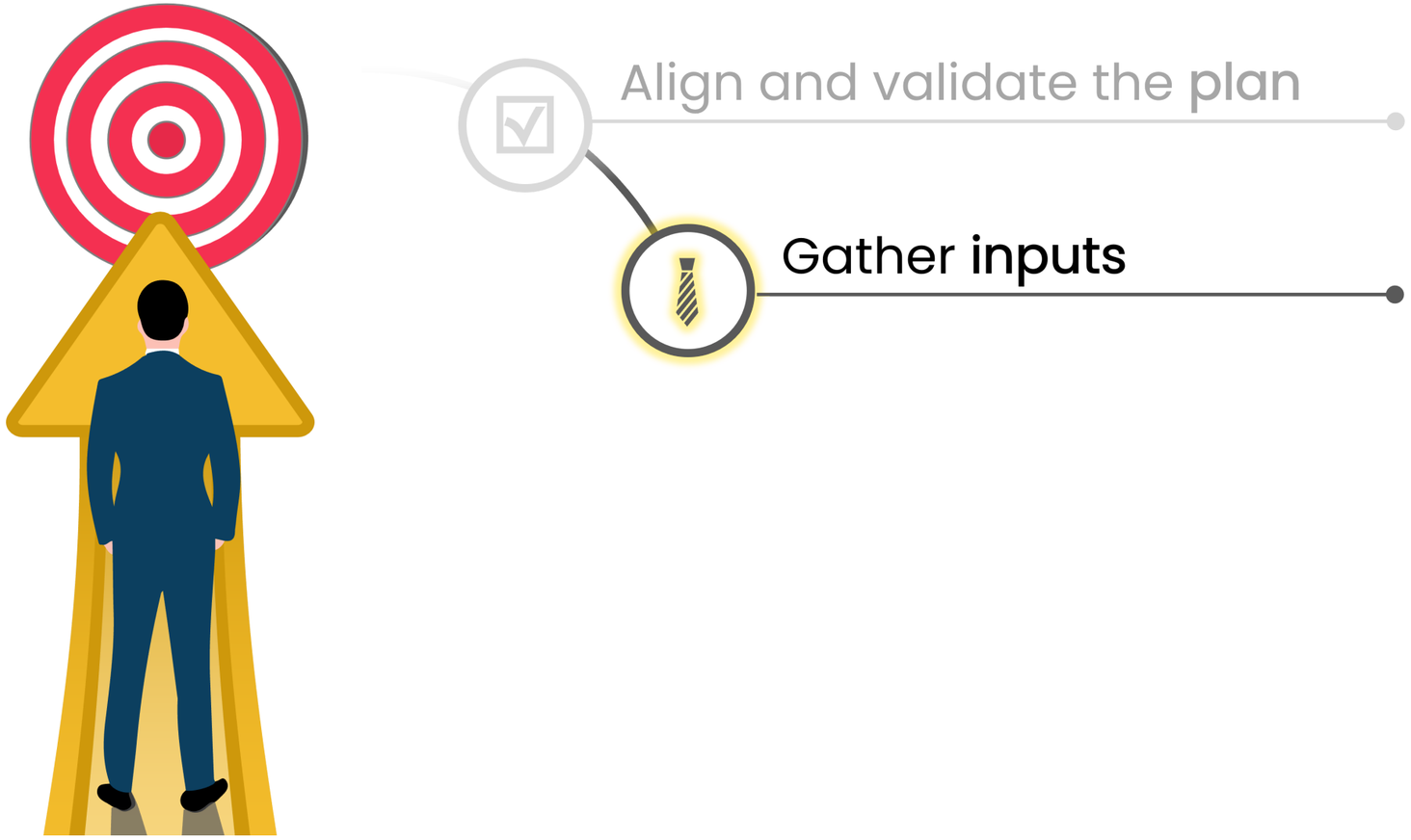
Engaging the stakeholders

Engaging stakeholders is essential for gaining support and ensuring transparency. This involvement fosters trust, promotes collaboration, and enhances the likelihood of success.

Align and validate the **plan**

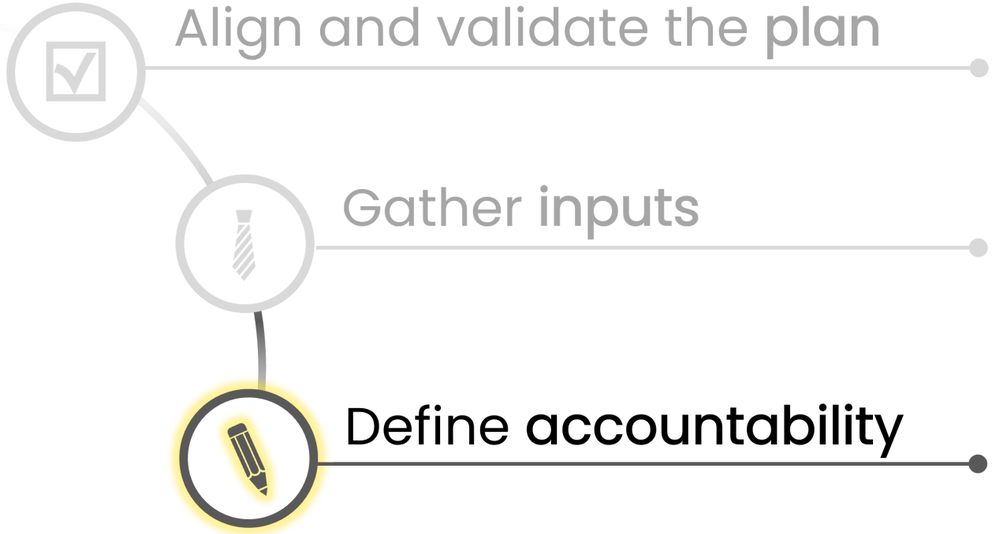
Engaging the stakeholders

Engaging stakeholders is essential for gaining support and ensuring transparency. This involvement fosters trust, promotes collaboration, and enhances the likelihood of success.



Engaging the stakeholders

Engaging stakeholders is essential for gaining support and ensuring transparency. This involvement fosters trust, promotes collaboration, and enhances the likelihood of success.



Engaging the stakeholders

Engaging stakeholders is essential for gaining support and ensuring transparency. This involvement fosters trust, promotes collaboration, and enhances the likelihood of success.

- Align and validate the plan
- Gather inputs
- Define accountability
- Set a **communication routine**

Managing enterprise risks

When making decisions in an enterprise, there are **specific risk management considerations that need to be addressed due to the complexity and impact of these decisions.**

Managing enterprise risks

When making decisions in an enterprise, there are **specific risk management considerations that need to be addressed due to the complexity and impact of these decisions.**

Managing enterprise risks

When making decisions in an enterprise, there are **specific risk management considerations that need to be addressed due to the complexity and impact of these decisions.**

Top 3 risks in a business decision

Managing enterprise risks

When making decisions in an enterprise, there are **specific risk management considerations that need to be addressed due to the complexity and impact of these decisions.**

Top 3 risks in a business decision

Managing enterprise risks

When making decisions in an enterprise, there are **specific risk management considerations that need to be addressed due to the complexity and impact of these decisions.**

Top 3 risks in a business decision

- Unmapped impacted areas
- Lack of accountability

Managing enterprise risks

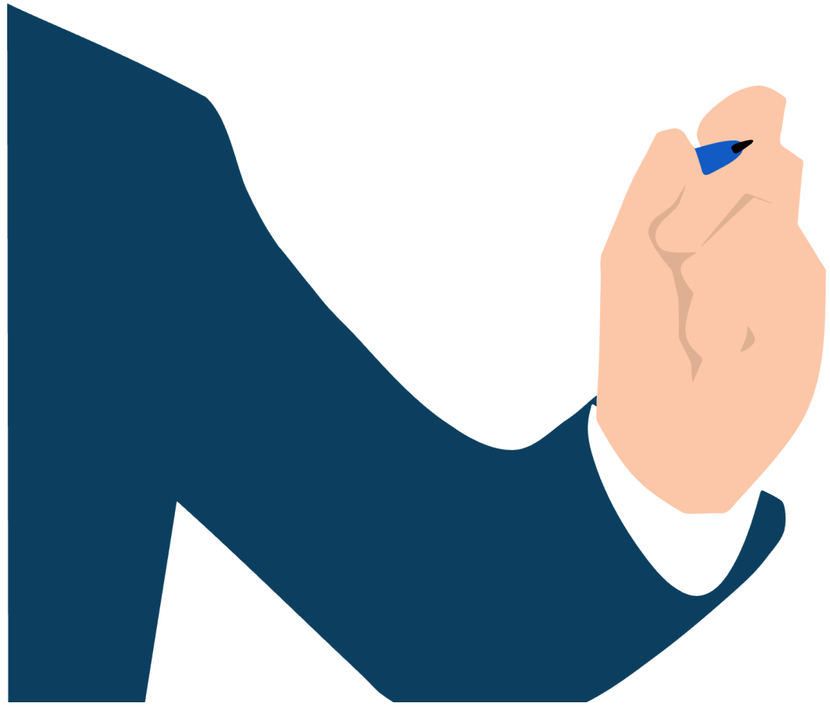
When making decisions in an enterprise, there are **specific risk management considerations that need to be addressed due to the complexity and impact of these decisions.**

Top 3 risks in a business decision

- Unmapped impacted areas
- Lack of accountability
- Lack of sustainability

Ethical considerations

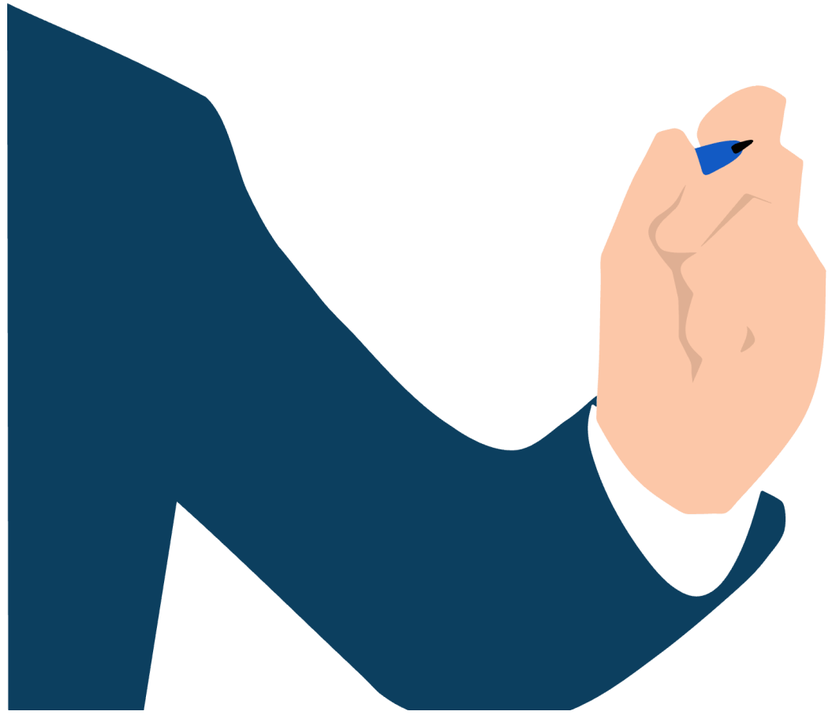
By incorporating ethical principles, organizations can make decisions that promote a **positive reputation and long-term relationships with customers, employees, investors, and the community.**



- Transparency

Ethical considerations

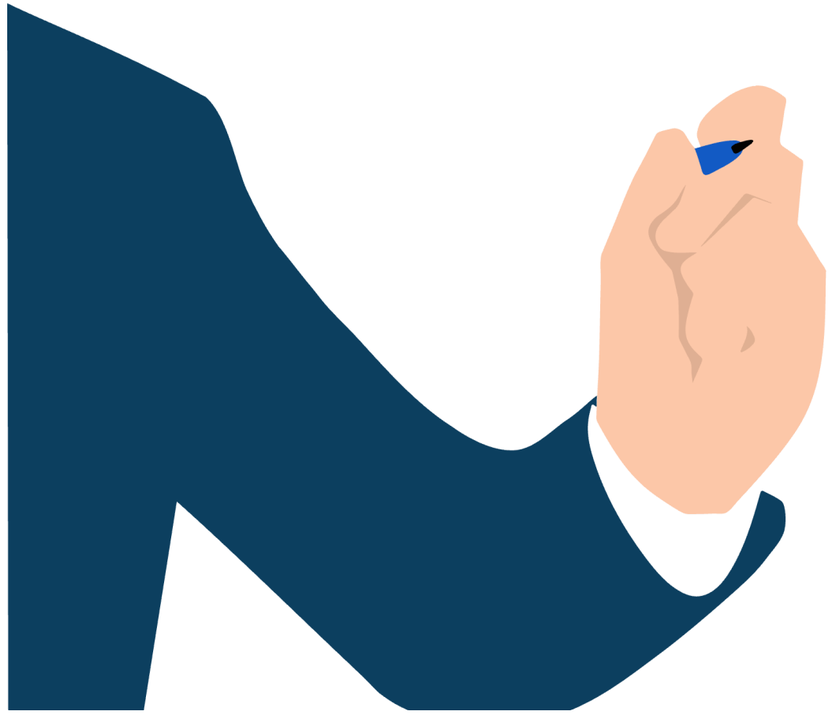
By incorporating ethical principles, organizations can make decisions that promote a **positive reputation and long-term relationships with customers, employees, investors, and the community.**



- [ ] Transparency
- [x] Accountability

Ethical considerations

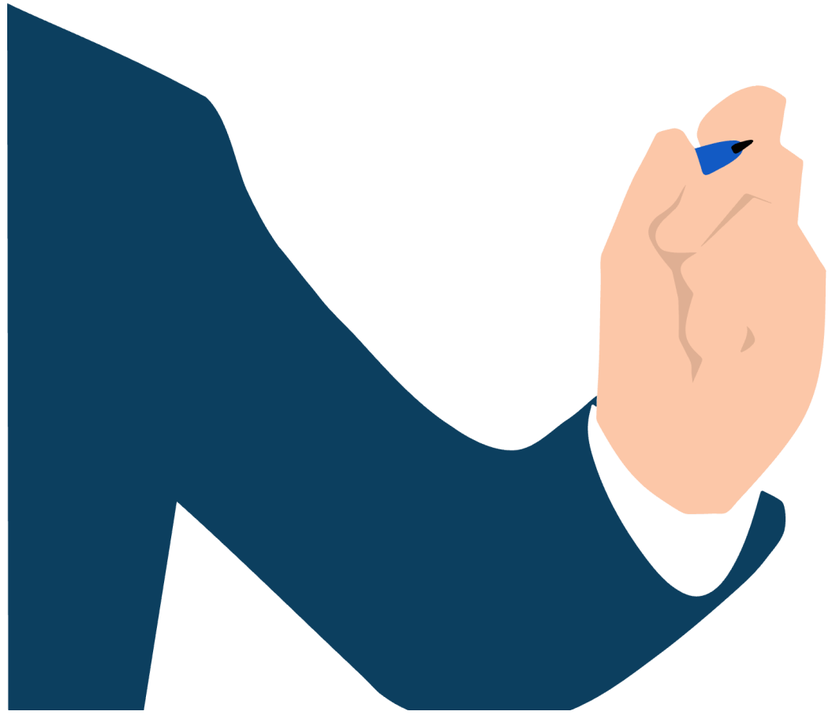
By incorporating ethical principles, organizations can make decisions that promote a **positive reputation and long-term relationships with customers, employees, investors, and the community.**



- [ ] Transparency
- [ ] Accountability
- [x] Integrity

Ethical considerations

By incorporating ethical principles, organizations can make decisions that promote a **positive reputation and long-term relationships with customers, employees, investors, and the community.**



- [ ] Transparency
- [ ] Accountability
- [ ] Integrity
- [x] Compliance with laws

Let's practice!

DECODING DECISION MODELING

Autonomous Decision-making

DECODING DECISION MODELING

Tiago Brasil
Lead Data Engineer

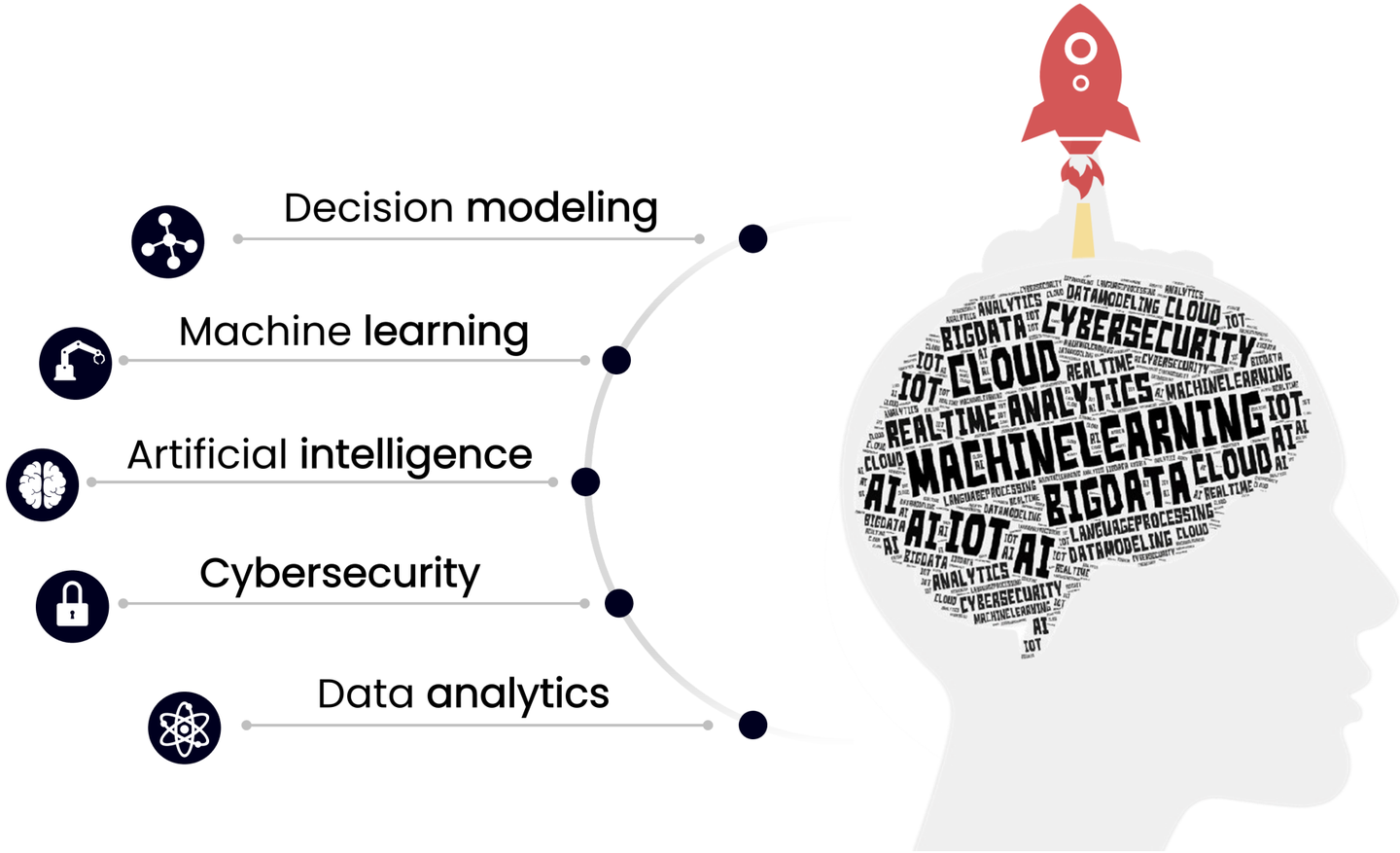
datacamp

Introduction

The development of autonomous decision-making systems became feasible given the significant advances in technical domains such as:

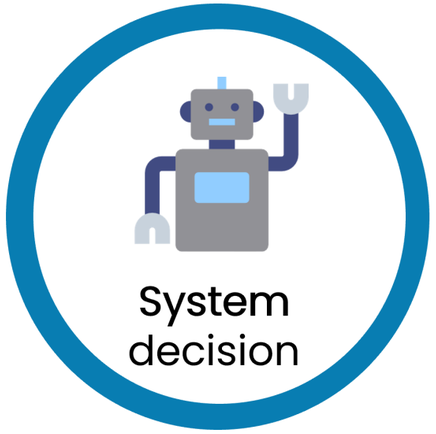
Introduction

The development of autonomous decision-making systems became feasible given the significant advances in technical domains such as:



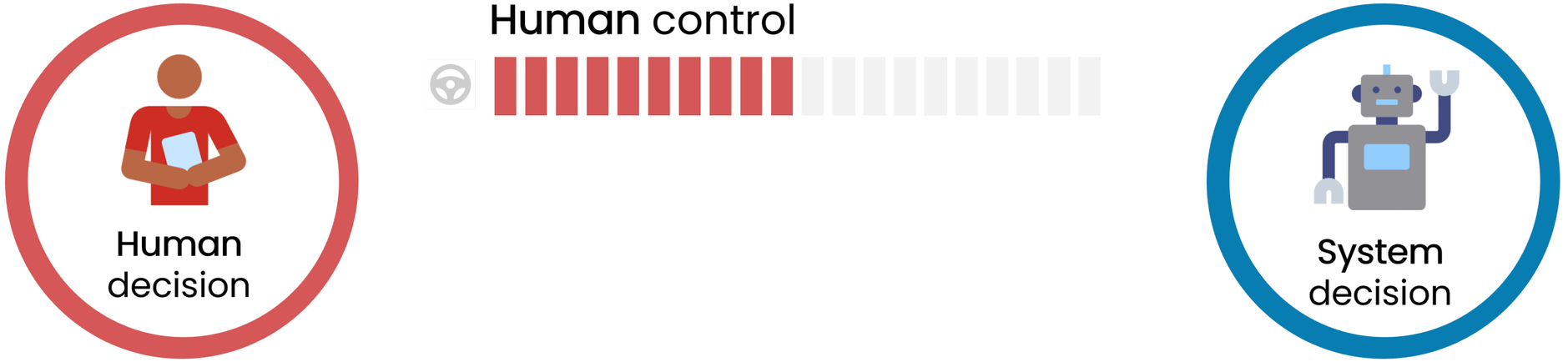
Autonomous decision-making systems

Autonomous decision-making systems are advanced technological systems capable of **making decisions with minimal or no human intervention.**



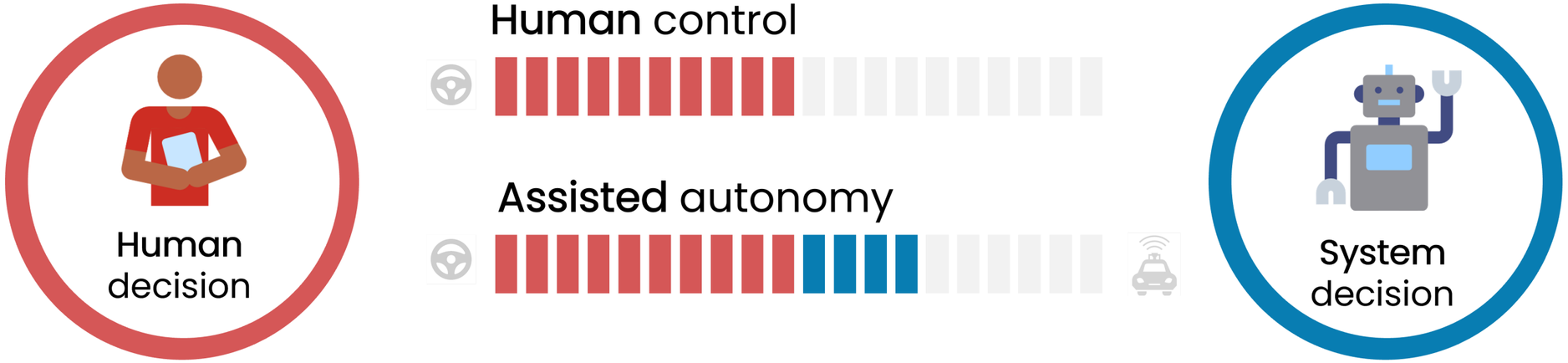
Autonomous decision-making systems

Autonomous decision-making systems are advanced technological systems capable of **making decisions with minimal or no human intervention.**



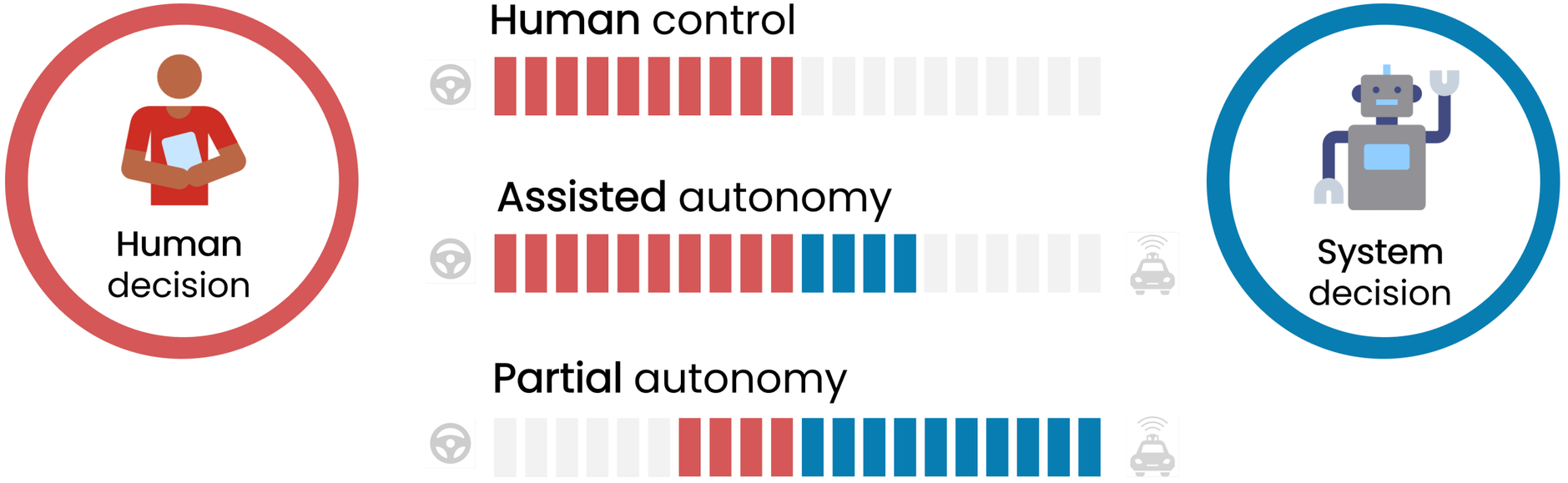
Autonomous decision-making systems

Autonomous decision-making systems are advanced technological systems capable of **making decisions with minimal or no human intervention.**



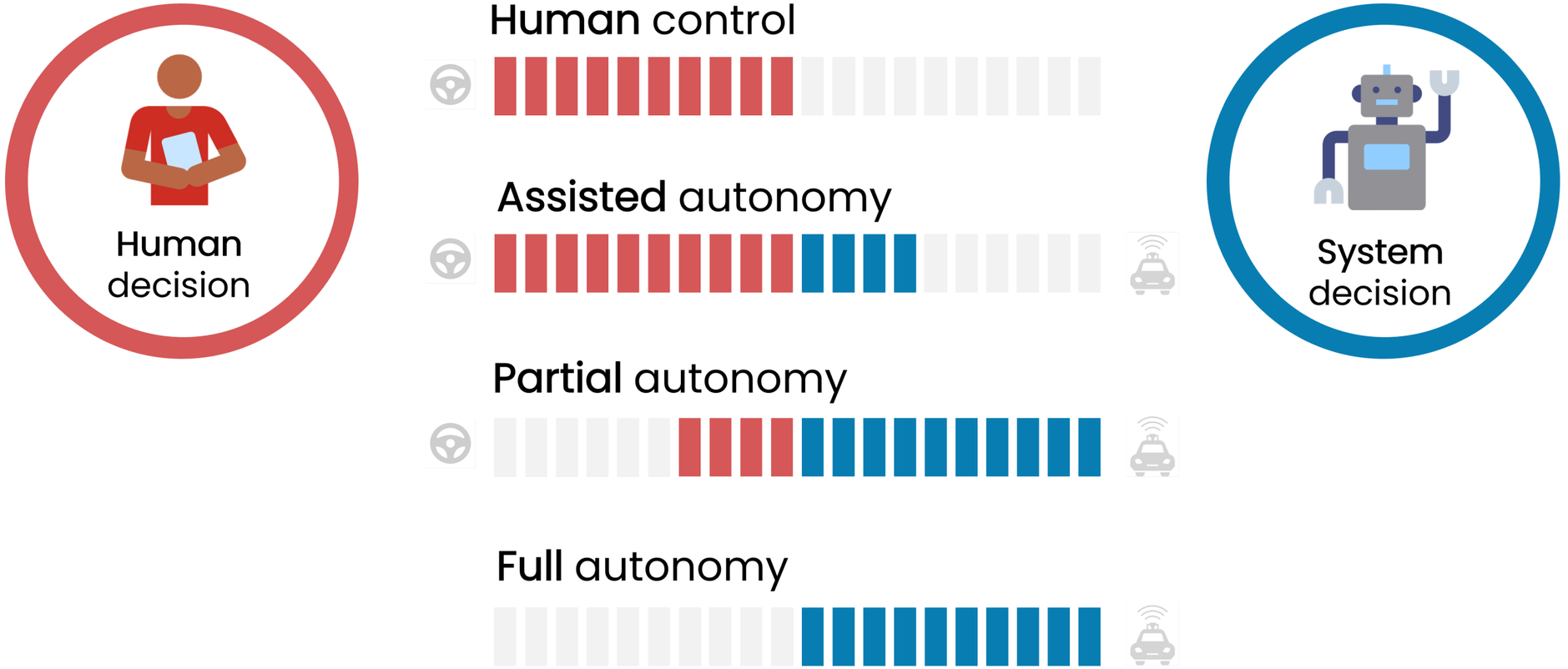
Autonomous decision-making systems

Autonomous decision-making systems are advanced technological systems capable of **making decisions with minimal or no human intervention.**



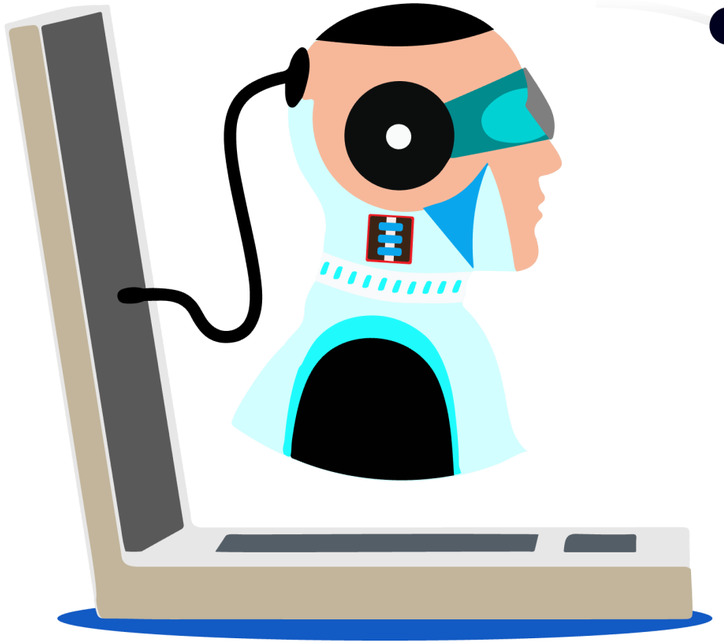
Autonomous decision-making systems

Autonomous decision-making systems are advanced technological systems capable of **making decisions with minimal or no human intervention.**



Benefits of autonomous decision-making

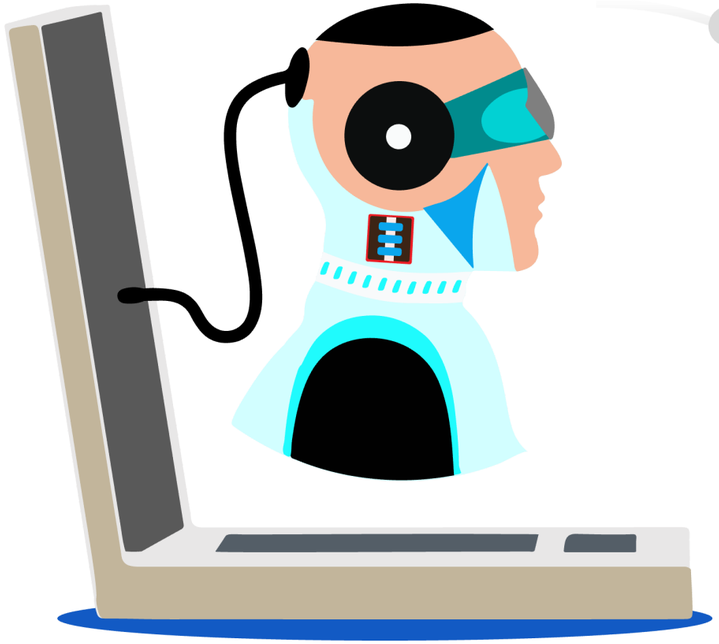
The use of autonomous decision-making systems in various industries is becoming very popular due to its significant benefits and competitive advantages.



Increase efficiency

Benefits of autonomous decision-making

The use of autonomous decision-making systems in various industries is becoming very popular due to its significant benefits and competitive advantages.

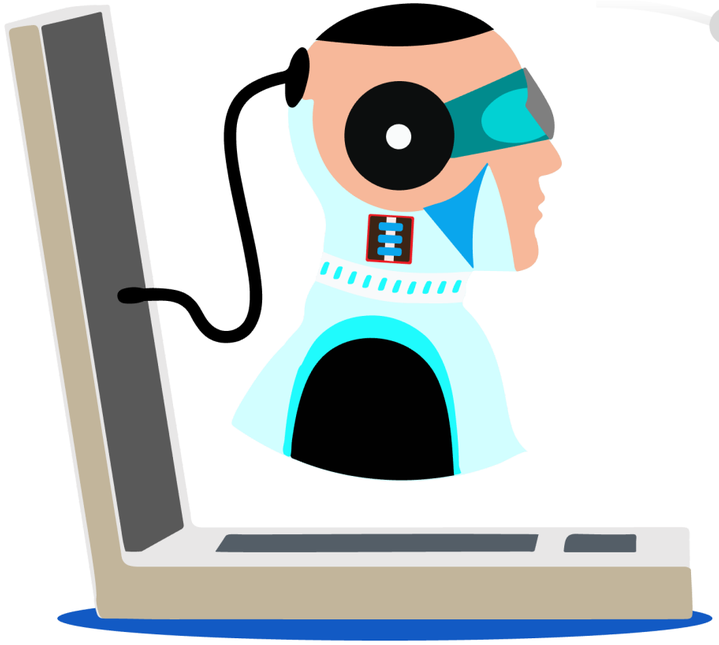


Increase efficiency

Save costs

Benefits of autonomous decision-making

The use of autonomous decision-making systems in various industries is becoming very popular due to its significant benefits and competitive advantages.



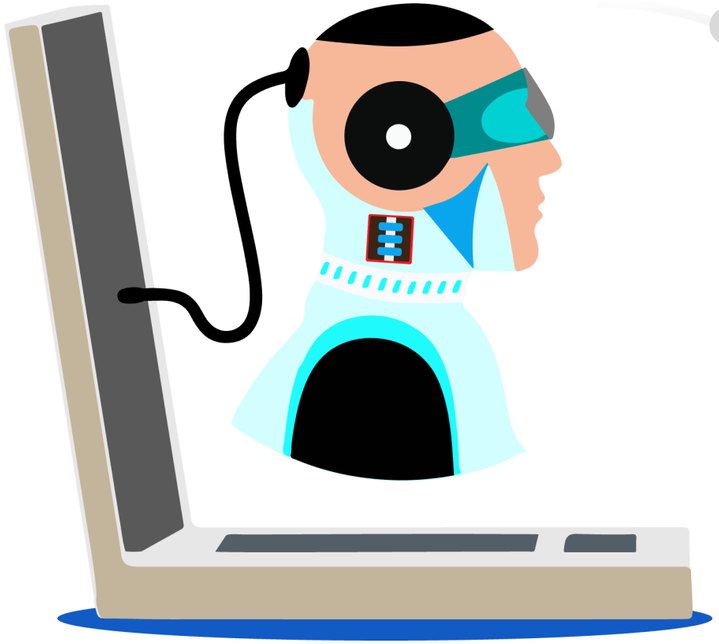
Increase efficiency

Save costs

Improve accuracy

Benefits of autonomous decision-making

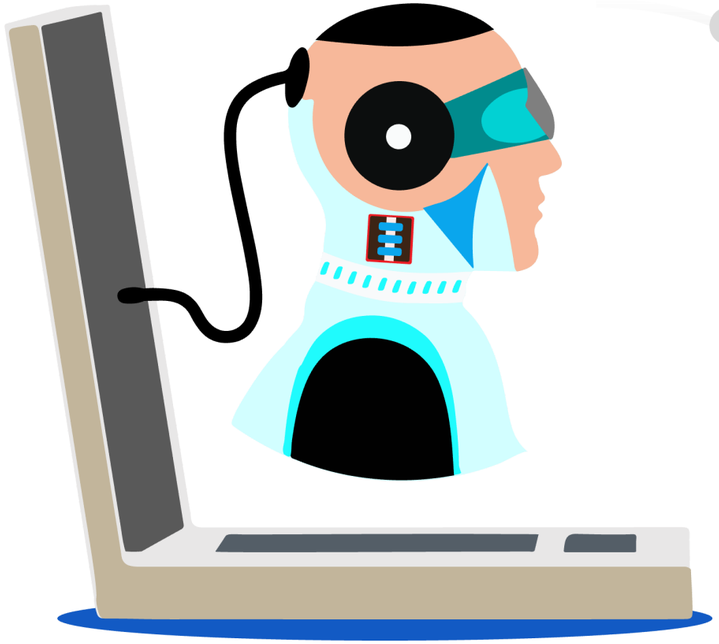
The use of autonomous decision-making systems in various industries is becoming very popular due to its significant benefits and competitive advantages.



- Increase efficiency
- Save costs
- Improve accuracy
- Achieve consistency

Benefits of autonomous decision-making

The use of autonomous decision-making systems in various industries is becoming very popular due to its significant benefits and competitive advantages.



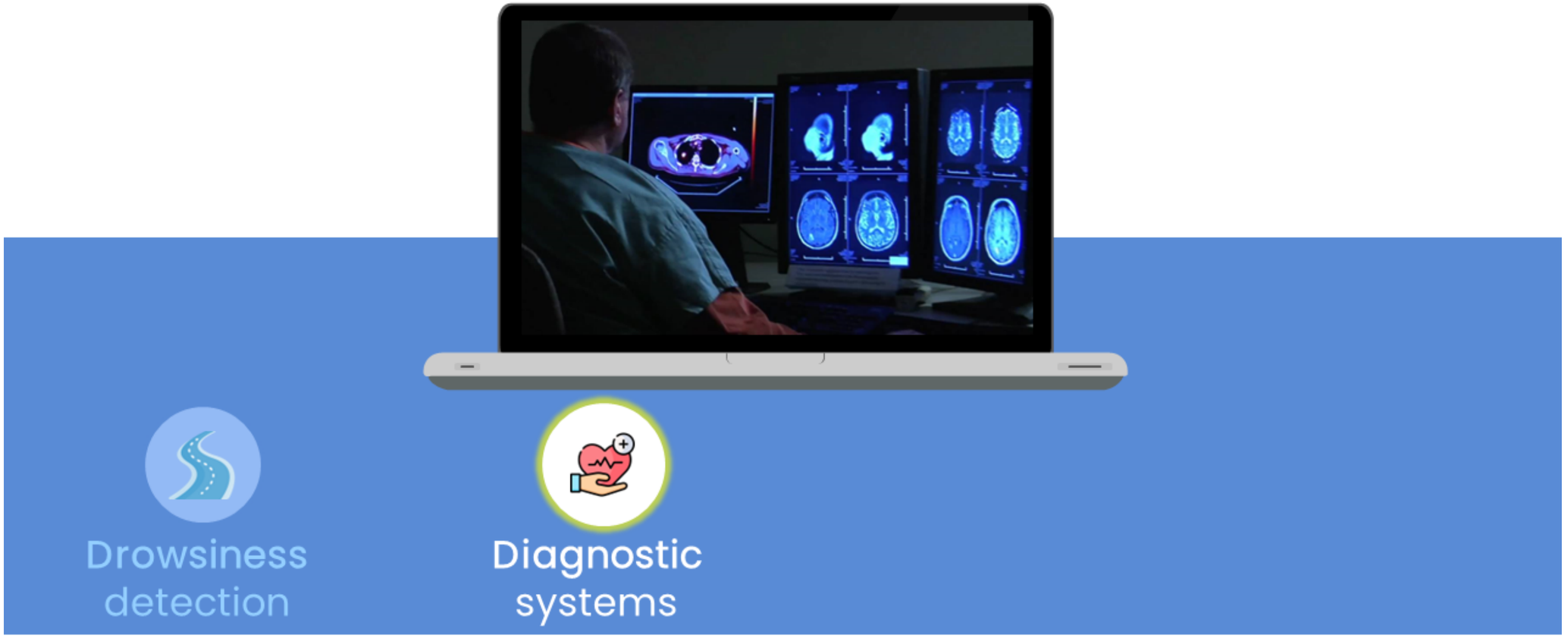
- Increase efficiency
- Save costs
- Improve accuracy
- Achieve consistency
- Improve safety

Examples and use-cases

Automotive manufacturers implement drowsiness detection systems to monitor and alert the driver if signs of fatigue are detected.

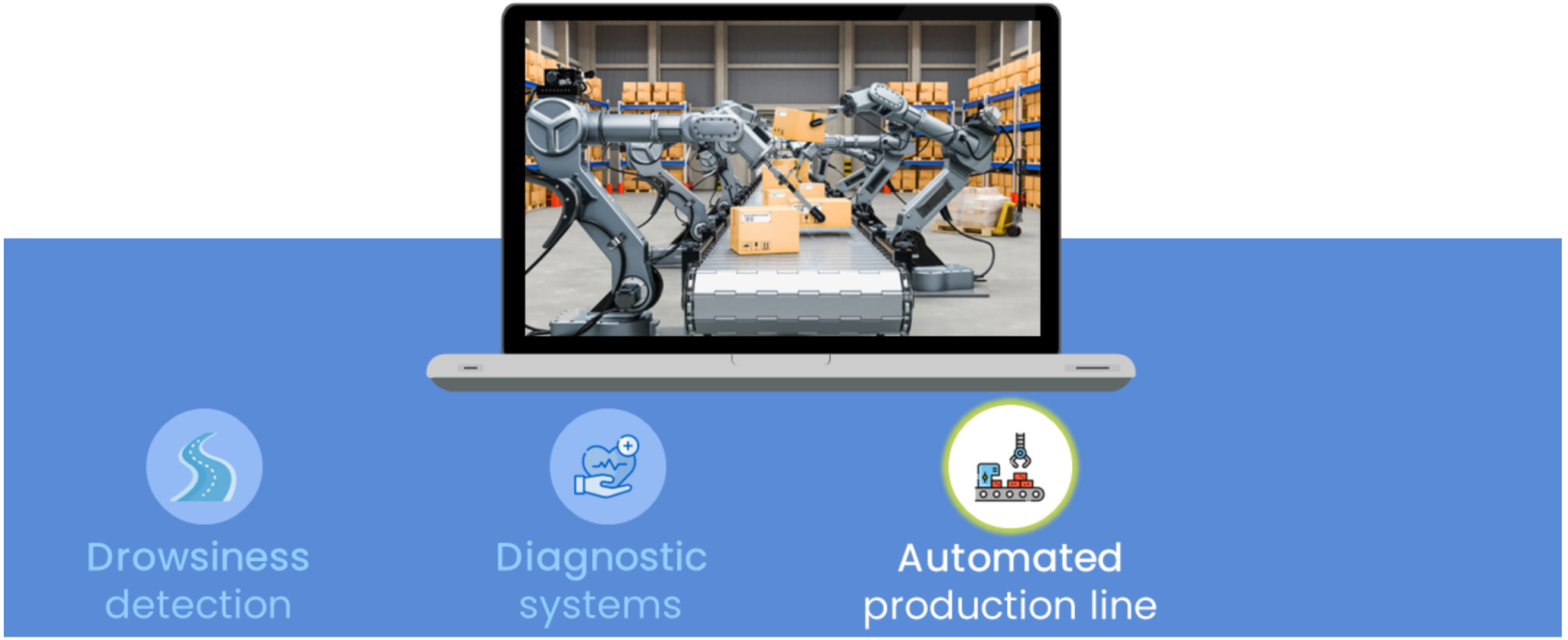
Examples and use-cases

Medical applications analyze images and patient data, assisting doctors in diagnosing conditions more accurately and quickly.



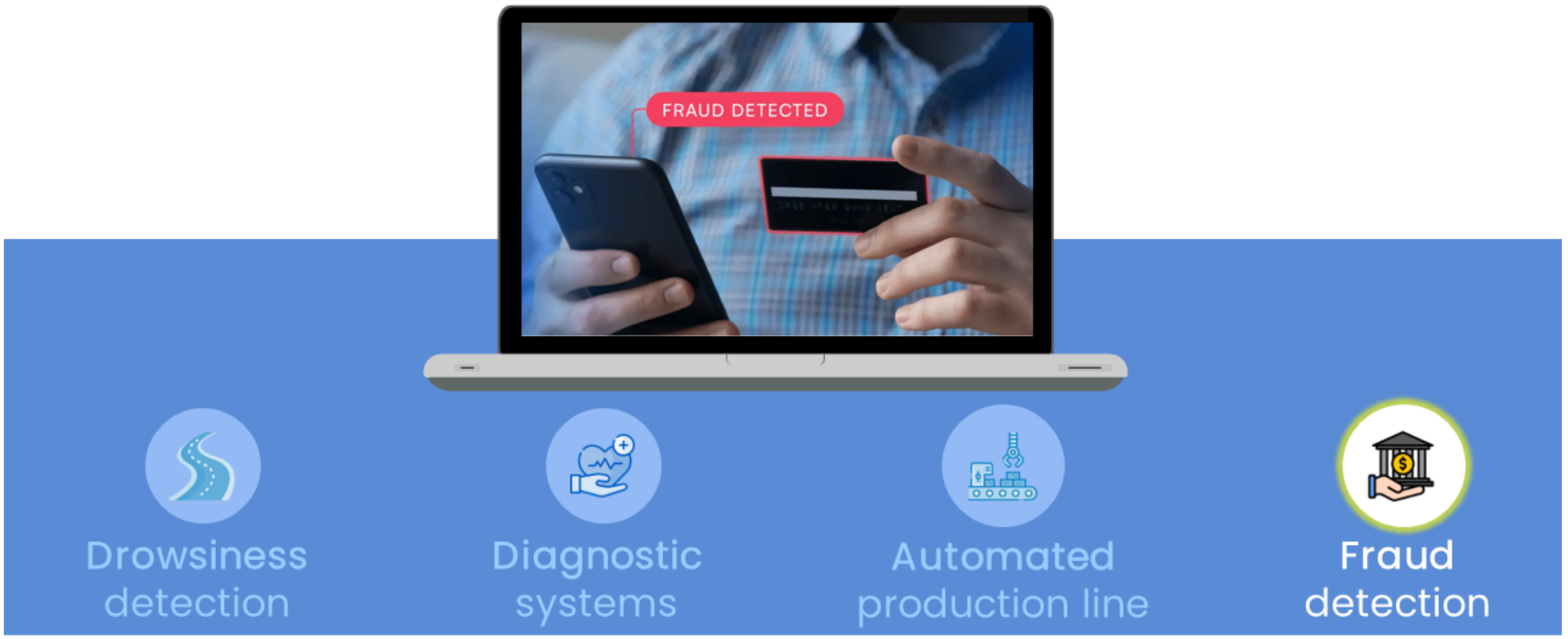
Examples and use-cases

Factories use autonomous robots to perform repetitive tasks, ensuring consistency and minimizing downtime in the production line.



Examples and use-cases

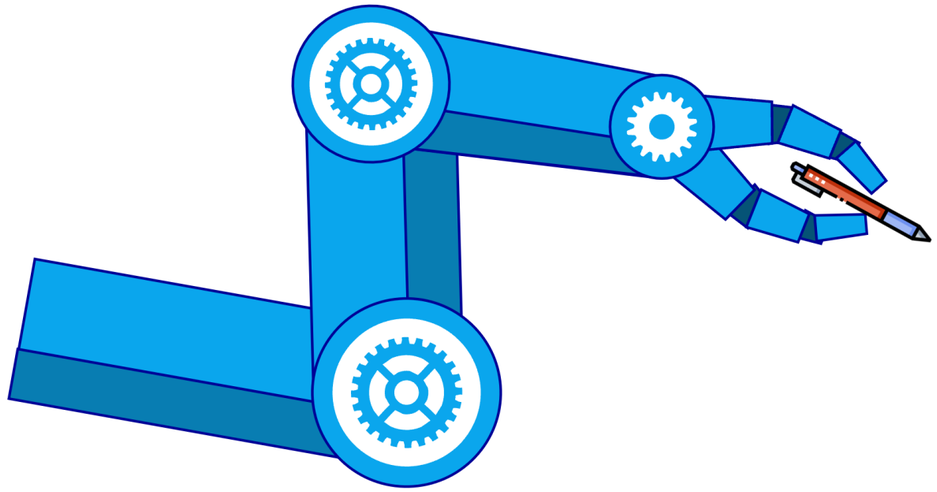
Financial institutions employ systems to detect fraudulent transactions in real-time, protecting customers and reducing financial losses.



Ethical considerations

The rise of autonomous decision-making applications raises essential ethical considerations.

Addressing these issues builds trust, ensures fairness, and protects user rights.

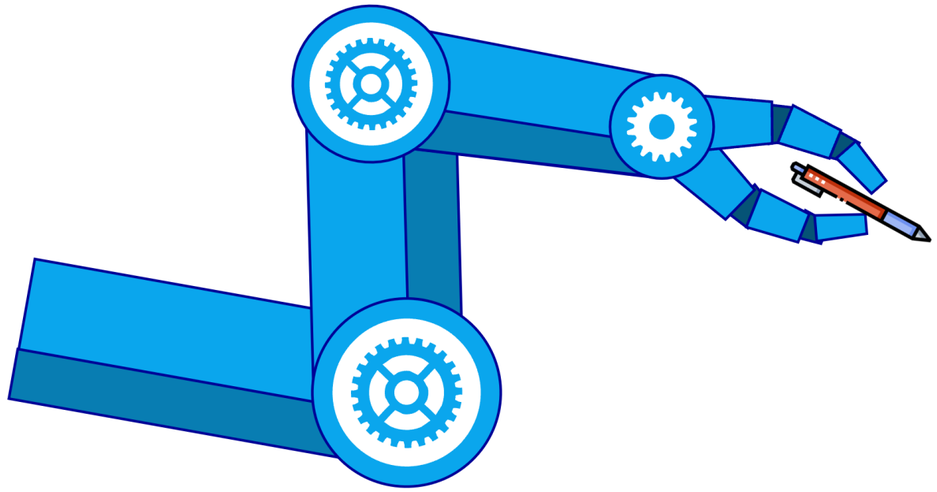


- [x] Transparency

Ethical considerations

The rise of autonomous decision-making applications raises essential ethical considerations.

Addressing these issues builds trust, ensures fairness, and protects user rights.

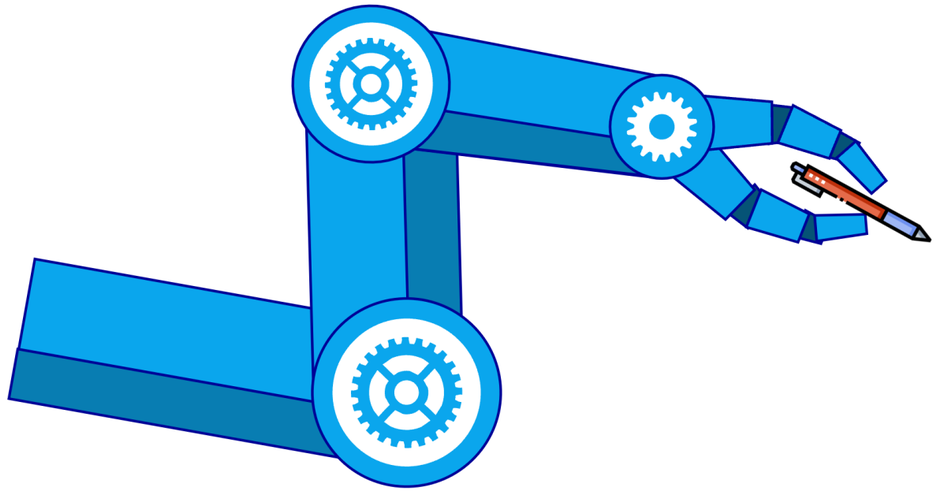


- [ ] Transparency
- [x] Accountability

Ethical considerations

The rise of autonomous decision-making applications raises essential ethical considerations.

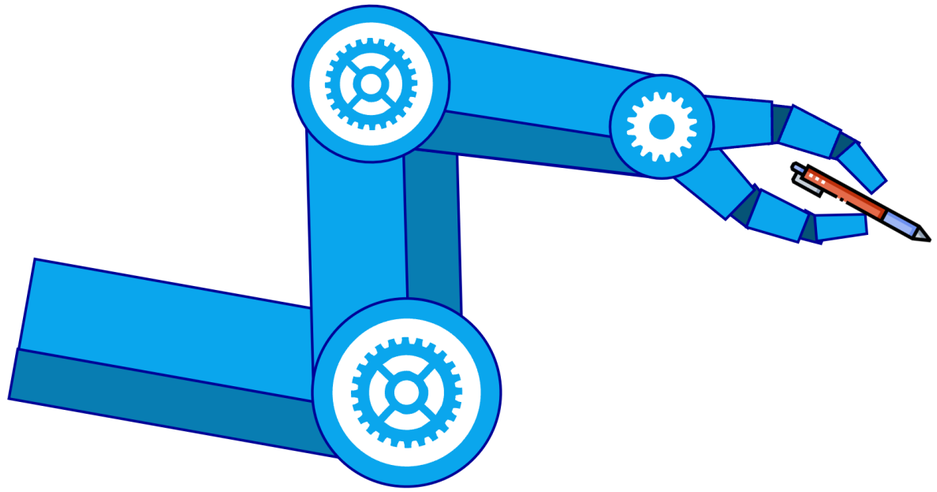
Addressing these issues builds trust, ensures fairness, and protects user rights.



- [ ] Transparency
- [ ] Accountability
- [x] Bias and fairness

Ethical considerations

The rise of autonomous decision-making applications raises essential ethical considerations. Addressing these issues builds trust, ensures fairness, and protects user rights.



- [ ] Transparency
- [ ] Accountability
- [ ] Bias and fairness
- [x] Data protection

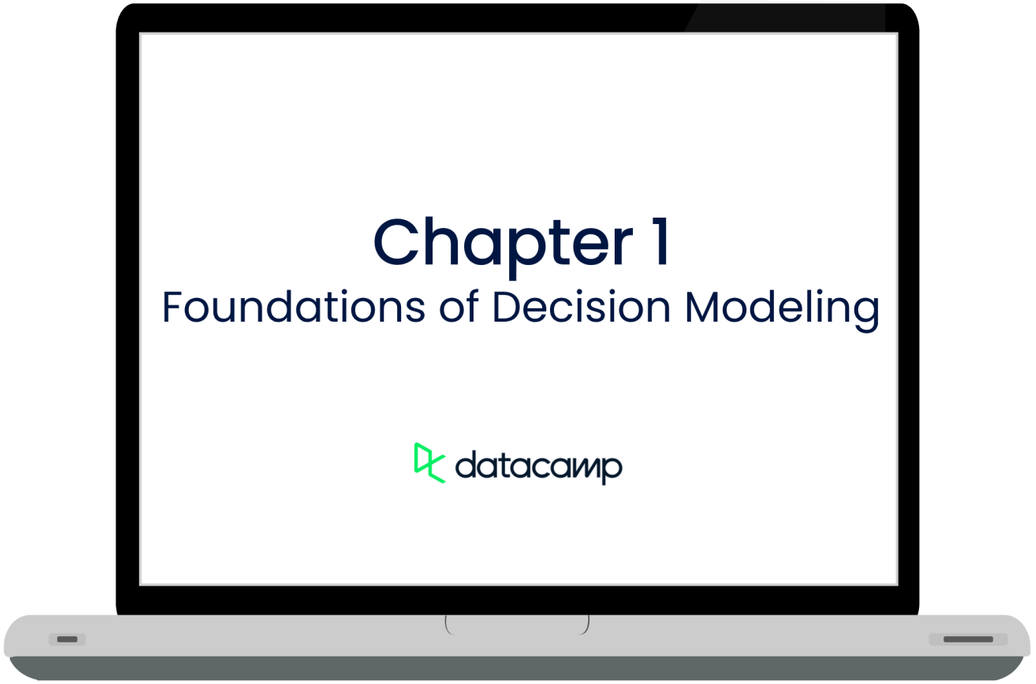
Let's practice!

DECODING DECISION MODELING

Congratulations!

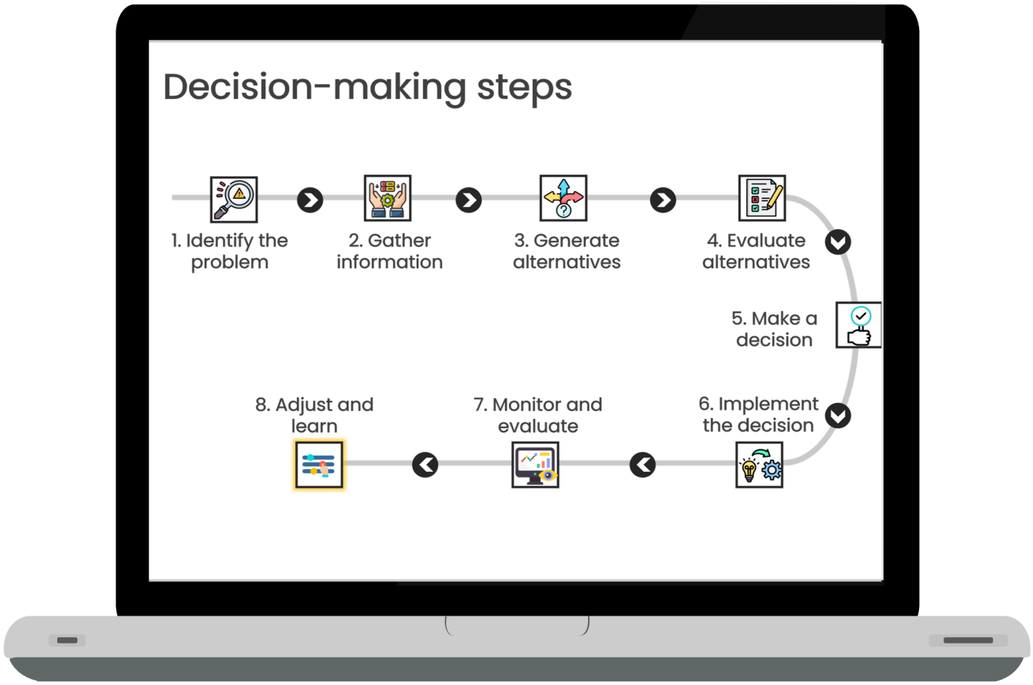
DECODING DECISION MODELING

Tiago Brasil
Lead Data Engineer



1

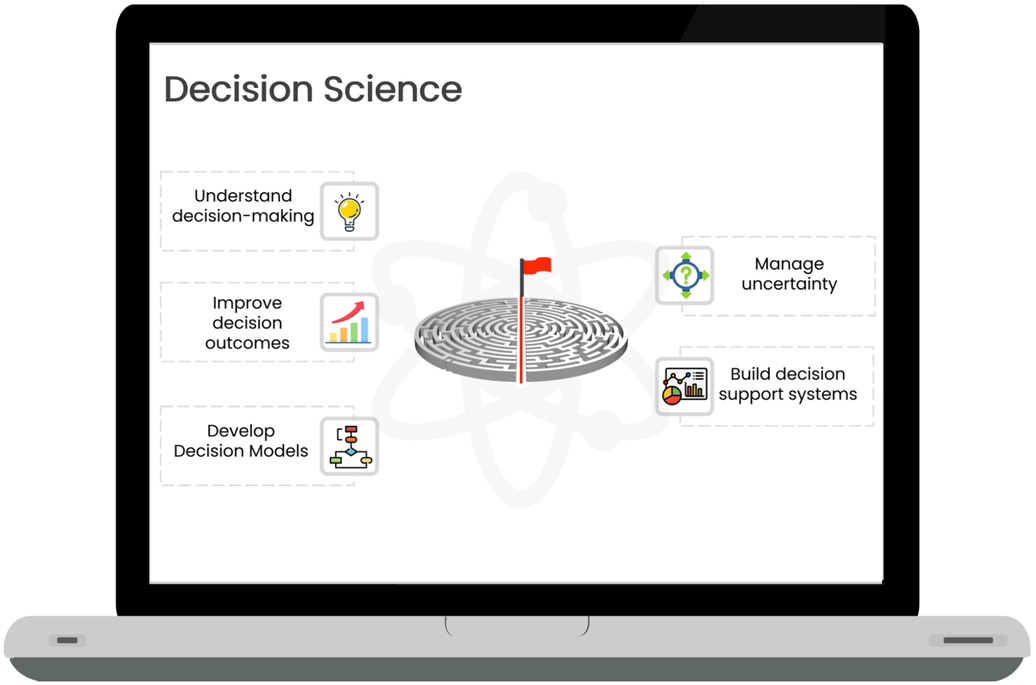
Foundations of Decision Modeling



Introduction

1

Foundations of Decision Modeling

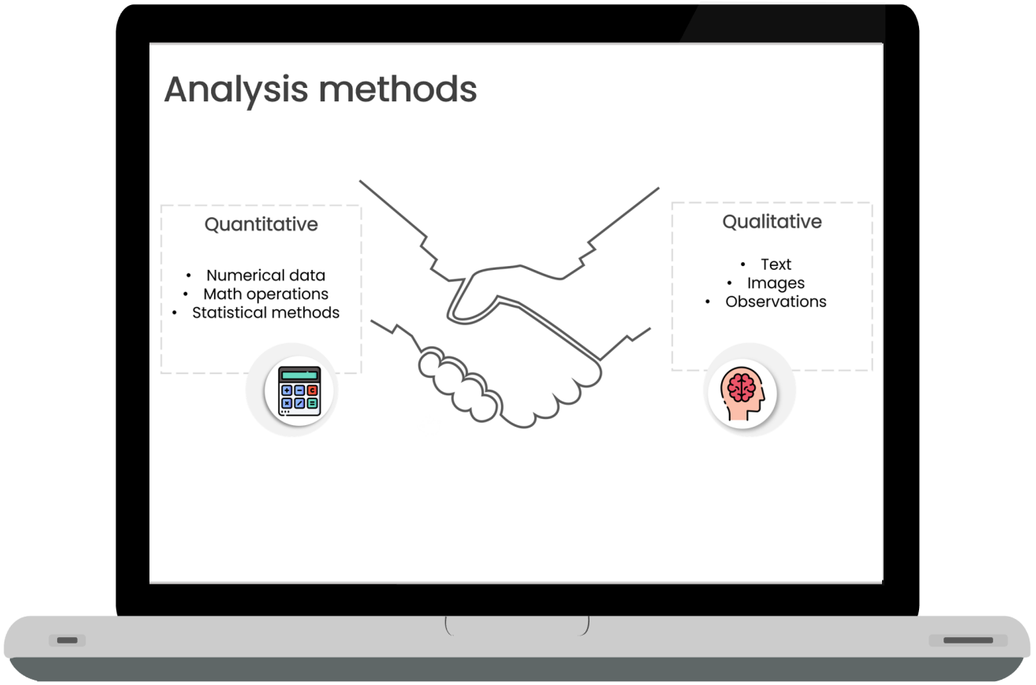


Introduction

Introduction to Decision Science

1

Foundations of Decision Modeling



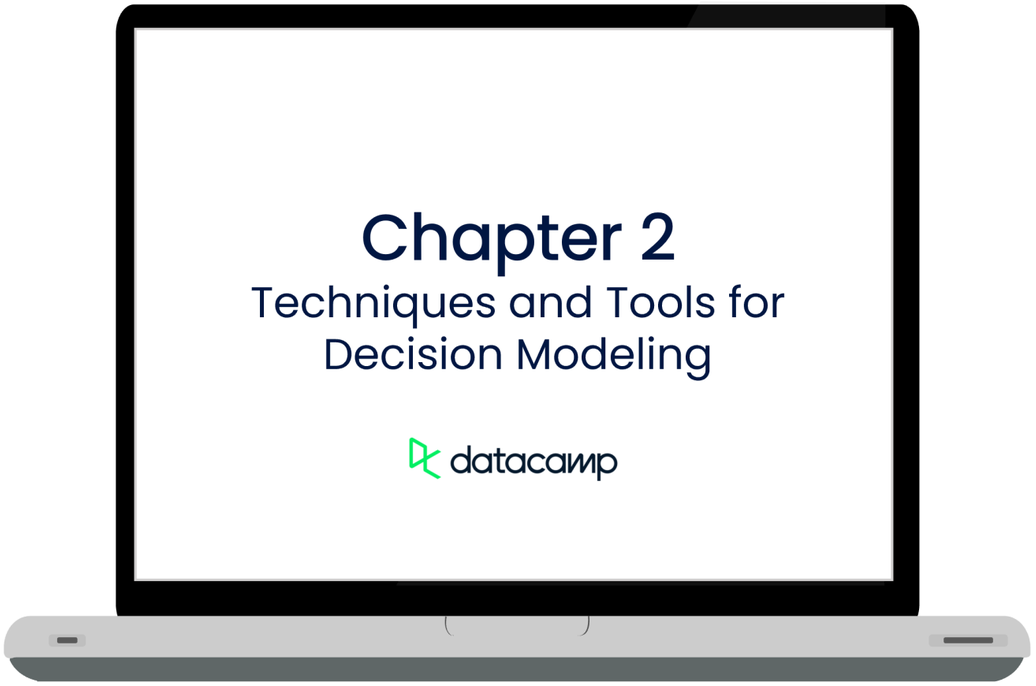
Introduction

Introduction to Decision Science

Introduction to Analysis Methods

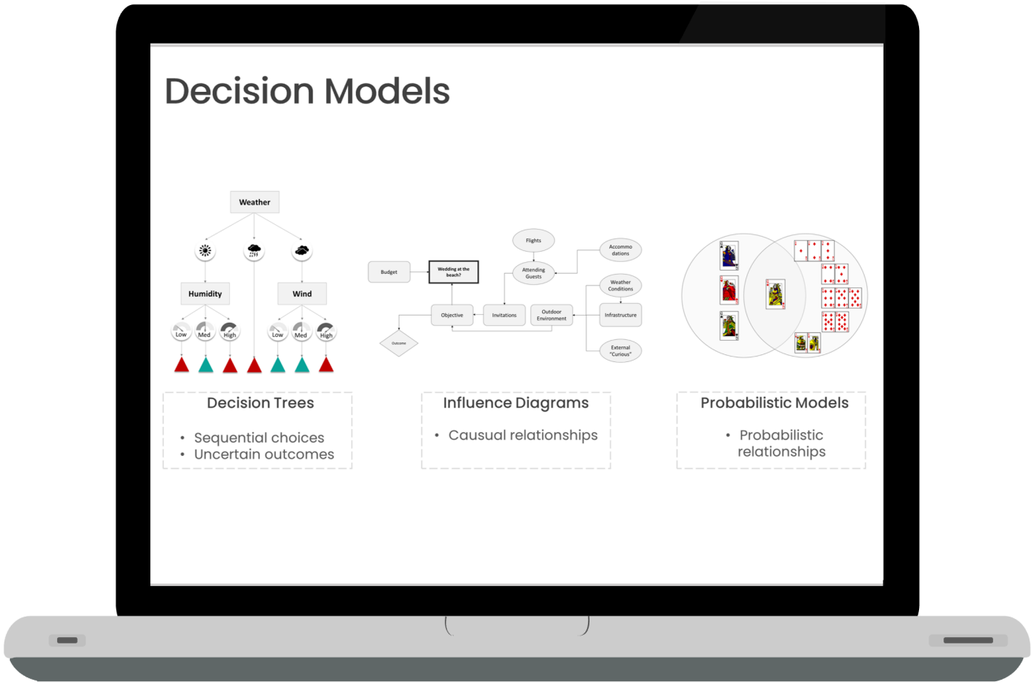
1

Foundations of Decision Modeling



1 Foundations of Decision Modeling

2 Techniques and Tools for Decision Modeling



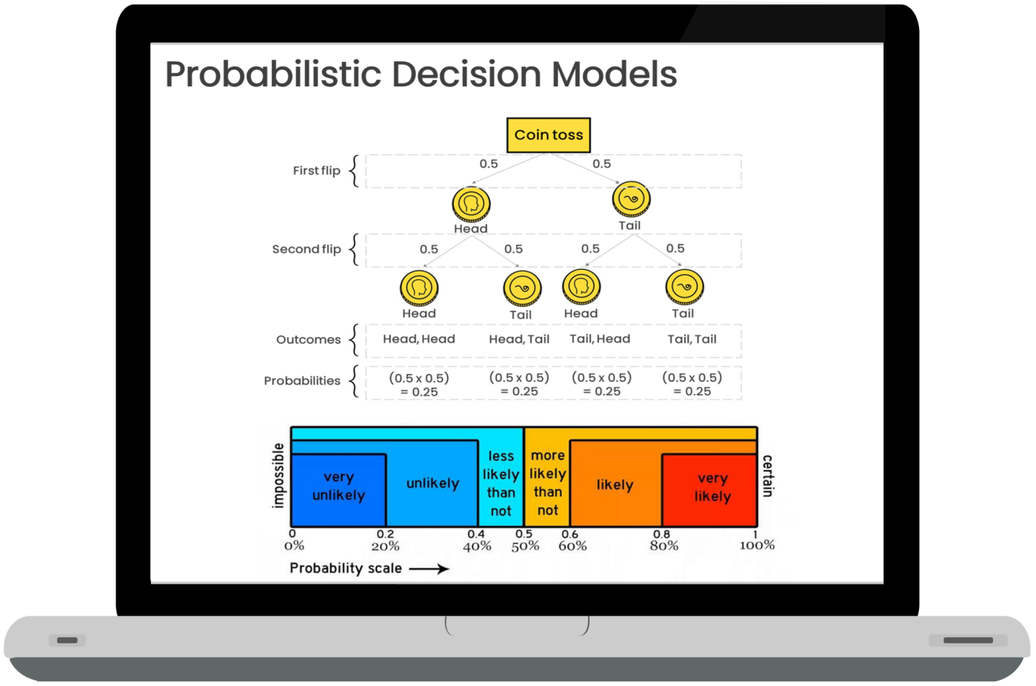
Constructing Decision Models

1

Foundations of Decision Modeling

2

Techniques and Tools for Decision Modeling



Constructing Decision Models

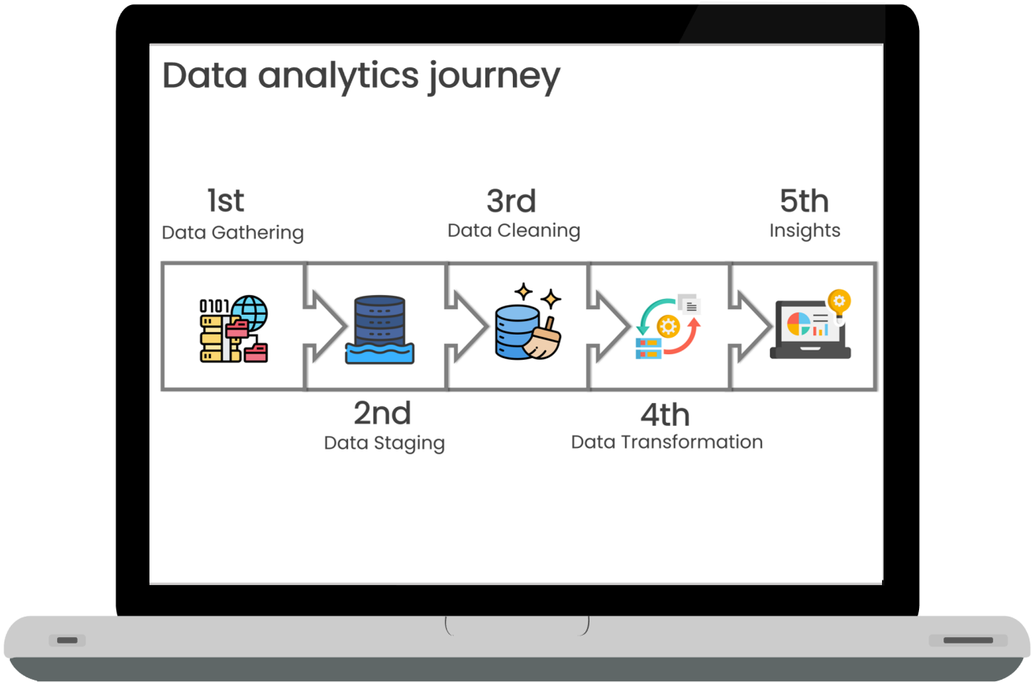
Probabilities in Decision Models

1

Foundations of Decision Modeling

2

Techniques and Tools for Decision Modeling



Constructing Decision Models

Probabilities in Decision Models

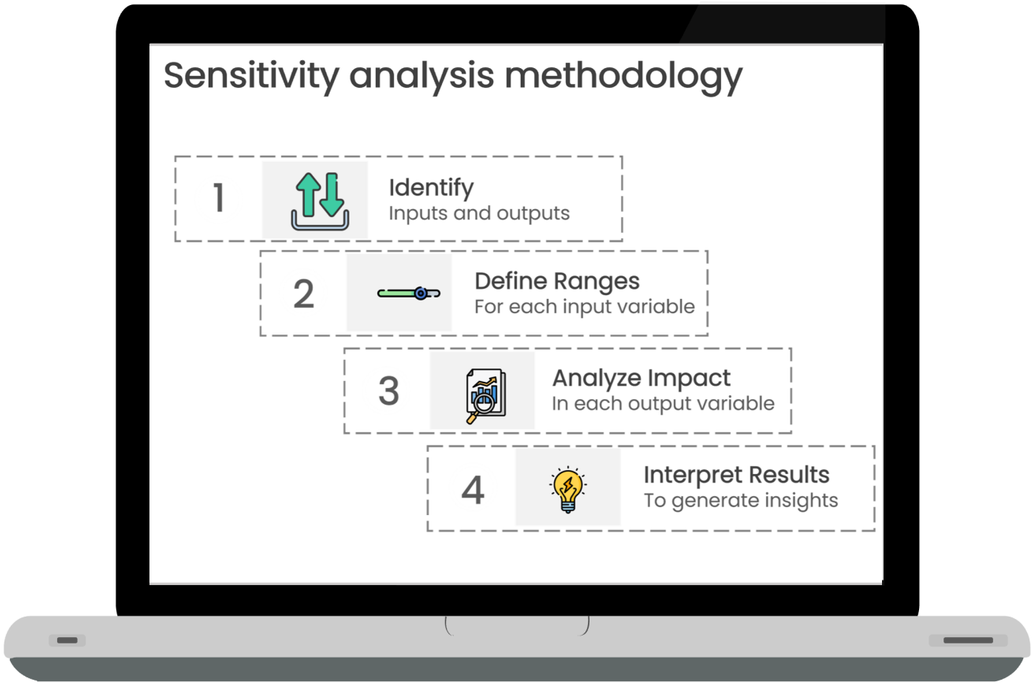
Data Analytics for Decision Models

1

Foundations of Decision Modeling

2

Techniques and Tools for Decision Modeling



Constructing Decision Models

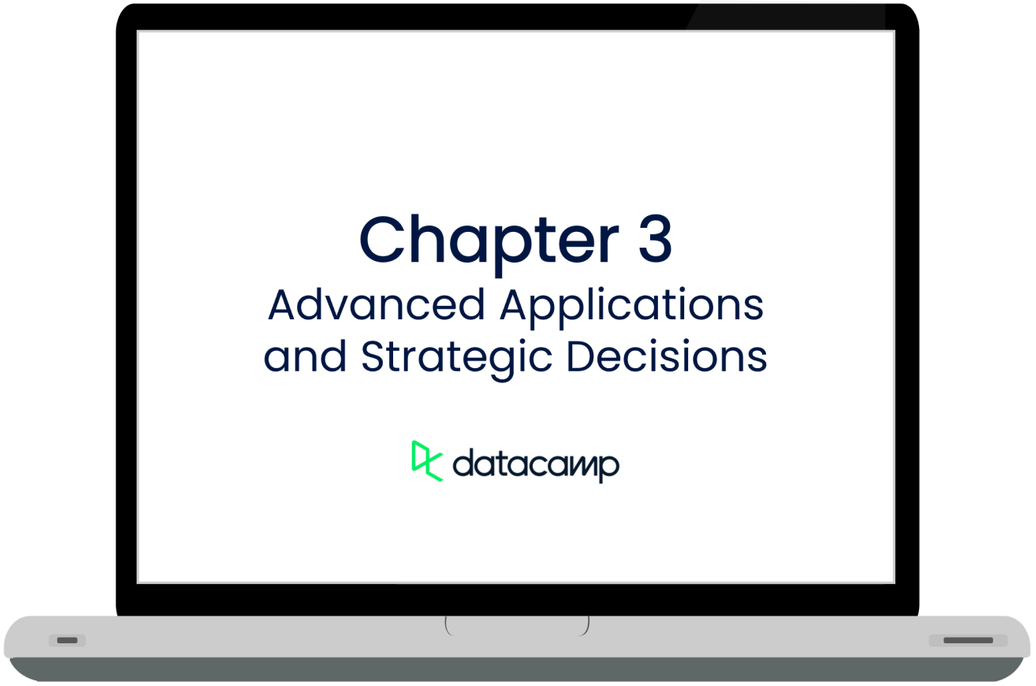
Probabilities in Decision Models

Data Analytics for Decision Models

Sensitivity analysis for Decision Models

1 Foundations of Decision Modeling

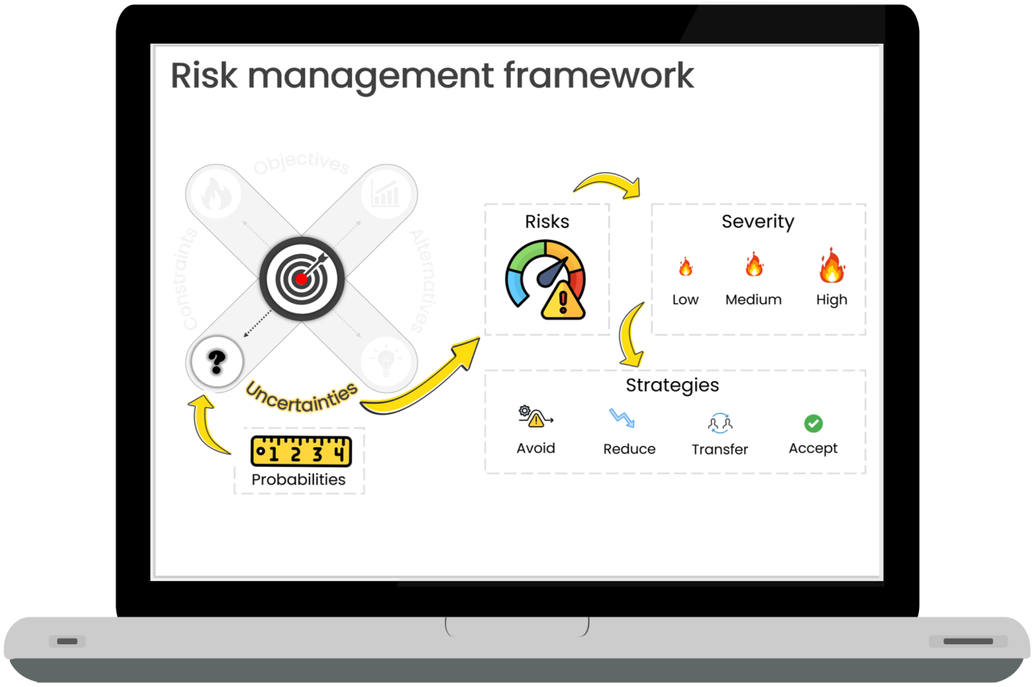
2 Techniques and Tools for Decision Modeling



1 Foundations of Decision Modeling

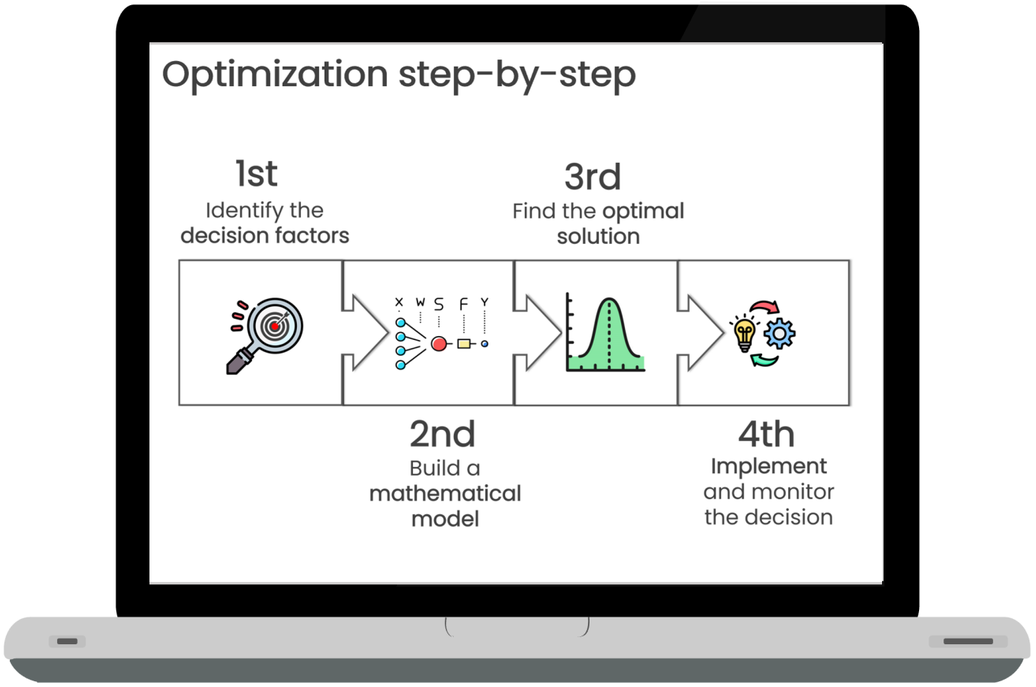
2 Techniques and Tools for Decision Modeling

3 Advanced Applications and Strategic Decisions



Risk and uncertainty management

1. Foundations of Decision Modeling
2. Techniques and Tools for Decision Modeling
3. Advanced Applications and Strategic Decisions



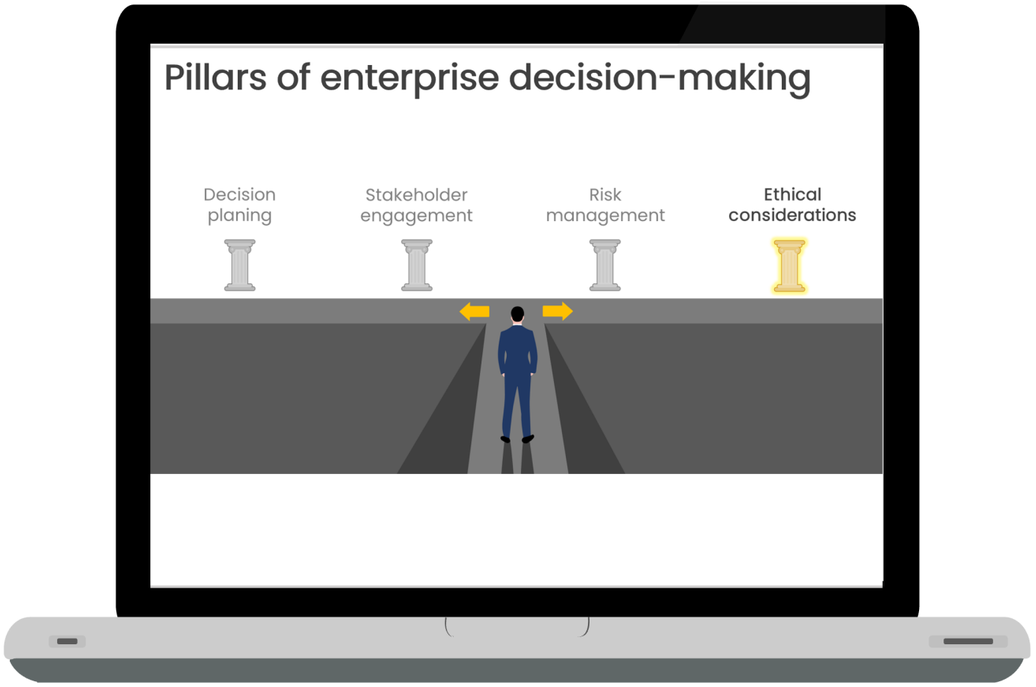
Risk and uncertainty management

Introduction to optimization

1 Foundations of Decision Modeling

2 Techniques and Tools for Decision Modeling

3 Advanced Applications and Strategic Decisions



Risk and uncertainty management

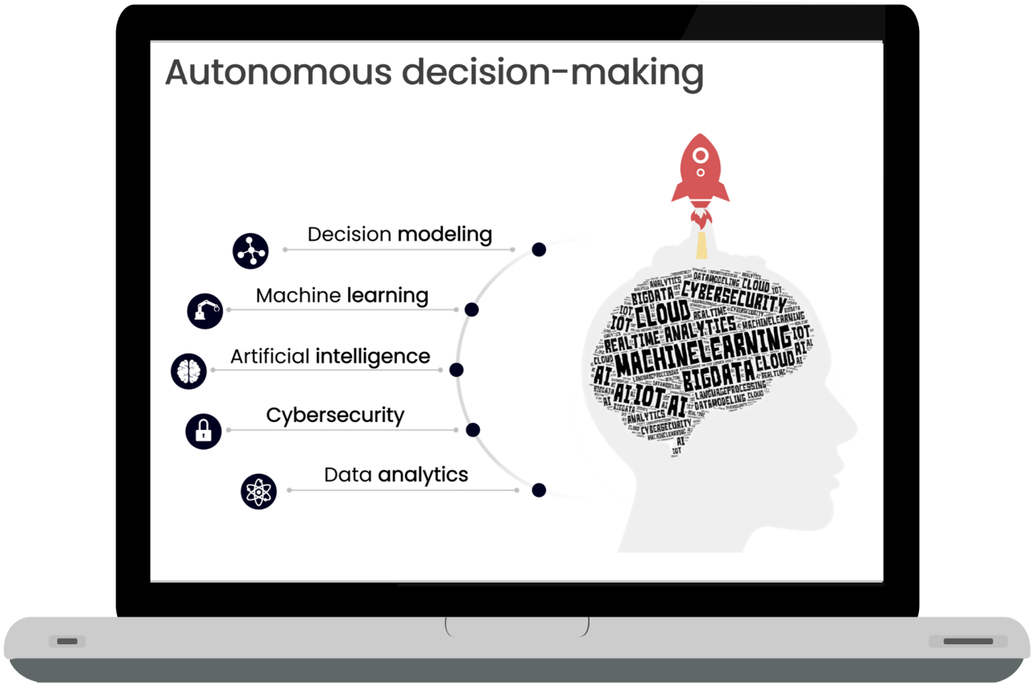
Introduction to optimization

Enterprise decision-making

1 Foundations of Decision Modeling

2 Techniques and Tools for Decision Modeling

3 Advanced Applications and Strategic Decisions



Risk and uncertainty management

Introduction to optimization

Enterprise decision-making

Autonomous decision-making

1 Foundations of Decision Modeling

2 Techniques and Tools for Decision Modeling

3 Advanced Applications and Strategic Decisions

Thank you!

DECODING DECISION MODELING