



IMT Atlantique

Bretagne-Pays de la Loire

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Problem Understanding

Data Science Toolkit & Applications

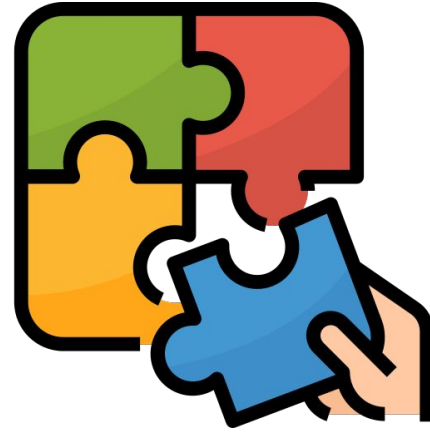
Lina Fahed & Laurent Brisson

Business Problem understanding

Problem understanding ⇒ The Foundation of Every Data Science Project

Why and How to Properly **Frame a Business Problem**?

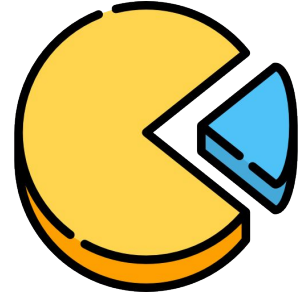
"A good model on a **bad problem** = guaranteed **failure**."



Why Is It Crucial?

Why Problem Understanding Is the Key?

- **80%** of a data project's **time** = understanding the need
- Example:
 - Predicting customer churn
 - vs. **understanding** why customers leave
 - → 2 approaches, 2 solutions
- "If I had an hour to solve a problem, I'd spend 55 minutes **thinking about the problem** and 5 minutes thinking about solutions." — Einstein



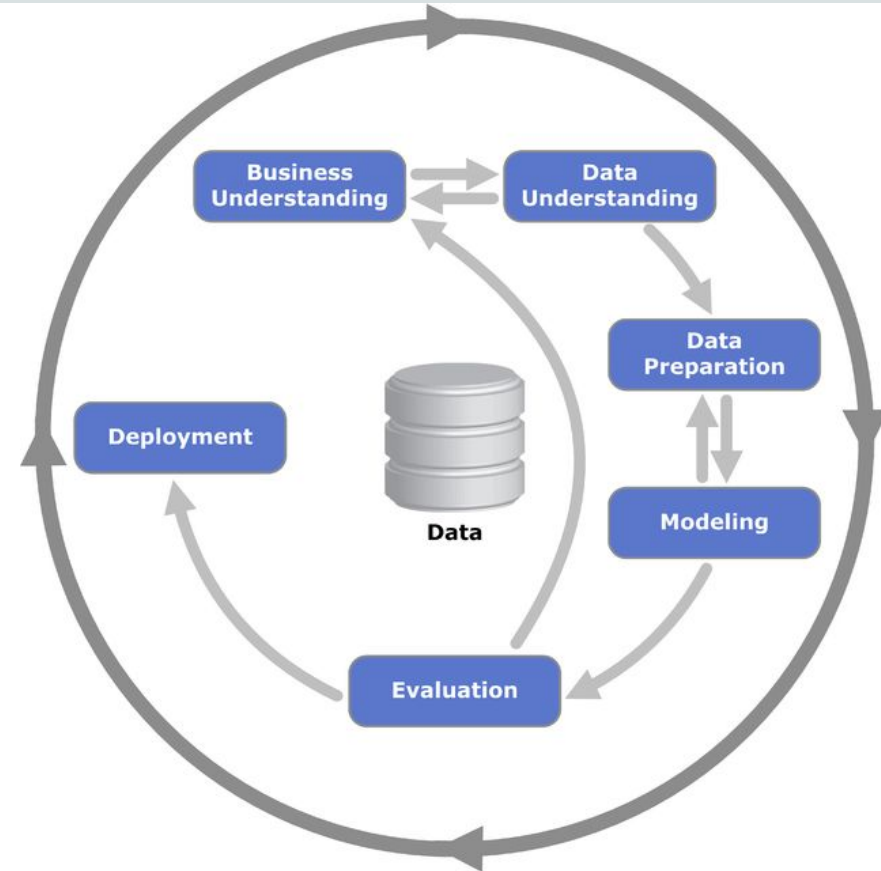
CRISP-DM: The Standard Methodology

CRISP-DM Steps:

1. **Business Understanding** (current focus)
2. Data Understanding
3. Data Preparation
4. Modeling
5. Evaluation
6. Deployment

"Don't skip the steps!"

While many teams hurry through this phase, establishing a strong business understanding is like **building the foundation of a house** – absolutely essential.



The 4 Key Questions of Business Understanding

The 4 Questions to Always Ask

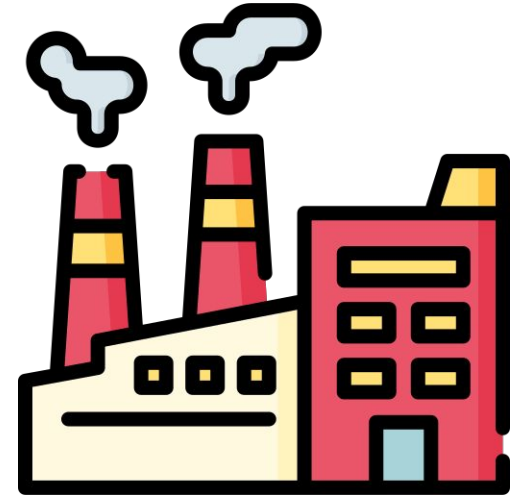
- What is the **business goal**? e.g., reduce costs, increase sales
- Who are the **stakeholders**? e.g., marketing, production, management
- What are the **success criteria**? e.g., +5% retention, -10% defects
- What are the **constraints**? e.g., GDPR, budget, real-time



Concrete Example – Industrial Case

Practical Case: Predictive Maintenance Optimization

- **Business Problem:** Reduce machine downtime
- **Data Translation:** Predict failures before they happen
- **Success Criterion:** -30% downtime in 6 months
- **Constraints:** Existing sensors, no new hardware



Pitfalls to Avoid

Common Mistakes and How to Avoid Them



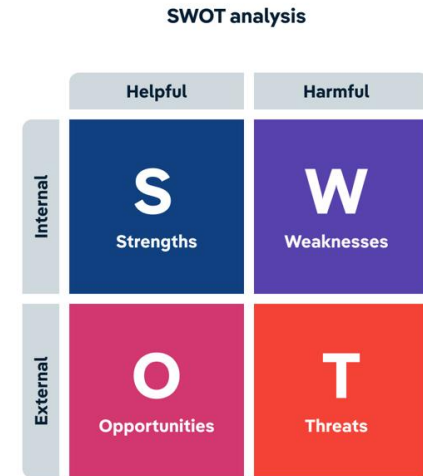
Pitfall	Solution
Confusing correlation and causality	Always validate with business experts
Ignoring ROI	Prioritize high-impact problems
Forgetting constraints	Integrate technical/legal limits early

Tools to Formalize the Need

Tools and Methods to Frame the Problem

- **5 Whys**: Technique to dig into the root cause
- **SWOT**: Strengths, Weaknesses, Opportunities, Threats
- **User Stories**: "As a [role], I want [action] to [benefit]"
 - Example: "As a production manager, I want to predict failures to avoid production stops."

IBISWorld



Workshop – Your Turn!

Scenario: "A supermarket wants to reduce food waste by 20% within 1 year. You are the data science team in charge of the project."

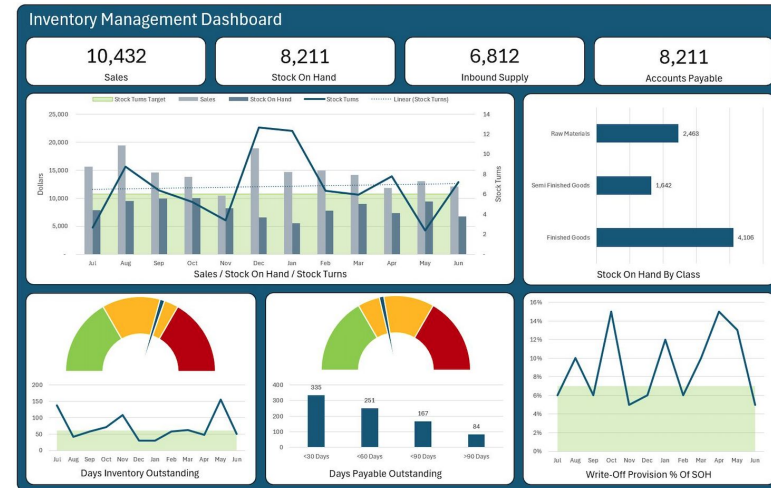
Instructions:

- In groups, answer the 4 key questions:
 - What is the precise **business goal**?
 - Who are the **stakeholders**?
 - What are the measurable **success criteria**?
 - What are the **constraints** (technical, legal, organizational)?
- You have 3 minutes to answer

Workshop Correction: Supermarket Case Review

What is the specific business objective?	“Reduce food waste by 20% in one year by optimizing inventory and expiration dates.” “Improve inventory turnover” “Forecast sales to adjust orders.”
Who are the stakeholders?	Management, department managers, logistics, suppliers, customers (indirectly)
What are the measurable success criteria?	“20% reduction in waste, 5% increase in margin on fresh produce, stable customer satisfaction.” “Reduce unsold inventory by 15%” “Reduce losses on fruits and vegetables.”
What are the constraints (technical, legal, organizational)?	GDPR (customer data), limited budget, integration with existing systems (checkout systems, ERP).

“There isn't just one right answer, but the framework needs to be precise, measurable, and realistic.”



Summary & Key Takeaways

- Problem Understanding = 50% of the project's success
- Asking the right questions $\Rightarrow$ finding the right answers
- Collaborate with business teams from the start

