![Politecnico di Milano campus building with clock tower, surrounded by trees and gardens. The Politecnico Milano 1863 logo is centered over the image.]

Ideation with AI

Angelo Cavallo

Challenge old norms and rethink how we approach problems

Example: Reinventing the Taxi Industry: Uber

Old Norm: The traditional taxi industry operated under a set of well-established rules: hailing a cab on the street, waiting in line at a taxi stand, and paying with cash or credit card in the car.

Challenging the Norm: Uber didn't just create an app for taxis; it completely rethought the **concept of transportation as a service**. They **questioned assumptions** like, "Does a car need to be owned by a taxi company?" and "Do customers need to hail a cab on the street?"

New Approach: By introducing **ride-sharing**, they democratized the access to private cars, made transportation more efficient, and created a system that worked around customer needs—like using a smartphone for booking, real-time tracking, and cashless payment.

Challenge old norms and rethink how we approach problems

Exemple: Redesigning Fast Food: McDonald's "Create Your Taste"

Old Norm: Fast food restaurants have traditionally focused on speed, simplicity, and a limited menu (like burgers, fries, and soft drinks). There was an assumption that people were willing to sacrifice customization for the sake of convenience and speed.

•**Challenging the Norm:** McDonald's wanted to challenge the assumption that customers were okay with limited choices and often lack personalization. They asked, "What if fast food could offer a customized, more personalized dining experience without sacrificing convenience?"

•**New Approach:** McDonald's introduced **"Create Your Taste"**, where customers could design their own burgers with a variety of ingredients, prepared quickly. They maintained speed but also catered to the growing demand for **personalization** in food.

**Challenge old norms and rethink how we approach problems**

Beyond Meat: Rethinking Food Production

Old Norm: Traditional meat production is resource-intensive, with concerns about animal welfare, sustainability, and health risks associated with processed meats.

•**Challenging the Norm:** Beyond Meat asked, "What if we could create a **plant-based meat alternative** that mimics the taste, texture, and nutritional profile of real meat?"

•**New Approach:** Beyond Meat created plant-based meat substitutes that **taste and look like real meat**, targeting both environmentally conscious consumers and meat-eaters looking for healthier alternatives.

KEY PROCESSES IN IDEATION

Constraint Removal

⬇

Different Perspectives

⬇

Backwards-Forwards Thinking
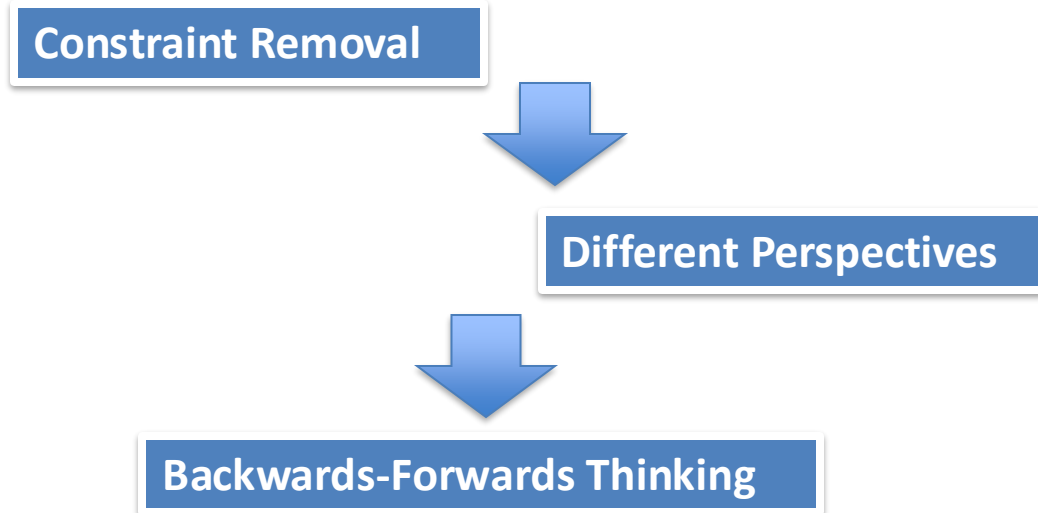
1. Constrain Removal

•**Action**: Identify and remove constraints that block creative solutions, whether mental, organizational, or technical.

•**Goal**: Free up mental and operational space for innovative ideas.

2. Different Perspectives

•**Action**: Gather insights from diverse teams, stakeholders, and external viewpoints to look at the problem from multiple angles.

•**Goal**: Create a well-rounded understanding of the challenge, minimizing biases and blind spots.

3. Backward & Forward Thinking

•**Action**: Anticipation/Dream of future opportunities and challenges (Forward Thinking) and then try to work Backward.

•**Goal**: Use **foresight into the future** to create innovative and well-grounded solutions.

Constraint Removal

💡 **What It Is:**

•Identifying limiting factors in a problem and imagining solutions without them.

•This helps break mental blocks and discover new possibilities.

🔧 **Tools & Techniques:**

"What If? / Assumption Reversal – List constraints, then flip them" **Exercise** – Ask, *What if we had unlimited resources? What if technology wasn't a barrier?*

Constraint Removal in Tech Business – Example: Cloud Computing & AWS

💡 **Problem:**

Before **Amazon Web Services (AWS)**, companies had to invest **millions** in **on-premise servers** and infrastructure to run their online businesses. This was expensive, slow, and inefficient.

🛠 **Typical Constraints:**

• Companies **must own** and maintain their own data centers.

• Scaling requires **huge upfront investment**.

• Server maintenance is **complex and costly**.

🚀 **Applying Constraint Removal:**

1. **Remove the constraint:** *What if businesses didn't need to own their own servers?*
2. **New Possibilities:**
   1. Offer **cloud-based, on-demand computing power** as a service.
   2. Companies pay only for what they use (**pay-as-you-go model**).
   3. Enable instant global scaling **without infrastructure investment**.

🌐 **Real-World Inspiration:**

• **Amazon launched AWS (2006), revolutionizing cloud computing**.

• Instead of building their own infrastructure, startups (like Netflix, Airbnb, and Uber) could scale instantly using AWS.

• Today, **AWS, Microsoft Azure, and Google Cloud** dominate a trillion-dollar industry that **eliminated the need for owning physical servers**.

🔑 **Key Lesson:**

By challenging the assumption that "every company must own its own data center," AWS **unlocked a massive new industry** and made global-scale computing **accessible to anyone**.

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💡 **Problem:**

Before **SpaceX**, launching rockets was extremely expensive because rockets were **single-use**—they burned up or crashed into the ocean after each mission. This made spaceflight **unsustainable and cost-prohibitive**.

🛠 **Typical Constraints:**

•Rockets **must be disposable** (traditional assumption).

•Space travel **is only for governments** (NASA, Roscosmos).

•Launch costs are **too high for commercial viability**.

🚀 **Applying Constraint Removal:**

1.Remove the constraint: *What if rockets could be reused, like airplanes?*

2.New Possibilities:

   1. Design rockets with **vertical landing capabilities**.
   2. Reduce launch costs from **$100+ million to <$10 million per launch**.
   3. Make spaceflight **affordable for private companies and future Mars missions**.

🌍 **Real-World Inspiration:**

•In **2015, SpaceX's Falcon 9 became the first rocket to land vertically**, proving reusability was possible.

•**Starship** (under development) aims to be **fully reusable**—capable of carrying massive payloads and refueling in space.

•Reusability is making **space tourism (SpaceX, Blue Origin) and lunar colonization (NASA Artemis) financially feasible**.

🔑 **Key Lesson:**

By challenging the assumption that *rockets must be single-use*, SpaceX **dramatically reduced launch costs**, opening the doors for **private space exploration, satellite mega-constellations (Starlink), and interplanetary missions**.

💡 **What It Is:**

•Viewing the problem from multiple angles to find unexpected insights.

•Helps eliminate bias and discover new needs.

🔧 **Tools & Techniques:**

•**Empathy Mapping** – Understand what users *say, think, feel, and do*.

•**Personas & Role-Playing** – Put yourself in different users' shoes (e.g., a beginner, expert, disabled user, child).

Different Perspectives: Empathy Mapping – Example: Smart Glasses (AR/VR)

📌 **Context:** A company is designing **next-gen smart glasses** with augmented reality (AR).

✴ **Using Empathy Mapping** (What users **say, think, feel, and do**):

Perspective	Say (What they express)	Think (Inner thoughts)	Feel(Emotions)	Do (Actions)
Tech Enthusiast	"I love cutting-edge tech!"	"Will this replace my smartphone?"	Excited & curious	Reads reviews, pre-orders
Everyday User	"Looks cool, but is it useful?"	"Will I look weird wearing these?"	Hesitant, skeptical	Watches demo videos, waits for reviews
Privacy Advocate	"Are these spying on me?"	"How do they handle data?"	Concerned, cautious	Avoids purchase, researches policies
Visually Impaired User	"Can this assist my vision?"	"Could AR help me navigate?"	Hopeful & intrigued	Seeks accessibility features

🌍 Outcome:
The team realizes fashion & privacy concerns are major barriers.
They redesign the glasses to look sleek & discreet and implement clear privacy indicators (e.g., a light when cameras are active).

Different Perspectives: Personas & Role-Playing – Example: Electric Vehicles (EVs)

📌 **Context:** A car company is designing a **new EV model** for urban commuters.
🛠 **Creating User Personas:**

Persona	Needs & Pain Points
Tech-Savvy Early Adopter 🧑💻	Wants **cutting-edge features** (self-driving, over-the-air updates). Expects premium build quality.
Budget-Conscious Driver 💰	Worried about **EV affordability**. Needs an **EV under $30K with long battery life**.
Eco-Friendly Advocate 🌱	Wants a **sustainable** car with **recyclable materials** and **solar charging options**.
Ride-Share Driver 🚗	Needs **fast charging** and **low maintenance** to maximize earnings.
First-Time EV Buyer 😕	Fears **range anxiety** and **lack of charging stations**. Needs reassurance.

Outcome:
- The company **introduces different trims**—a **budget model**, a **tech-loaded model**, and a **long-range version**.
- To ease **range anxiety**, they add **real-time charging station locators** in the app.

💡 **What It Is:**

•Instead of solving a problem step by step, start from the **desired future outcome** and work backward.

•Helps reveal steps you might otherwise overlook.

🔧 **Tools & Techniques:**

•**Future Mapping** – Visualizing the **ideal outcome** and breaking it down into necessary steps.

•**"Pre-Mortem" Exercise** – Assume a project **has already failed** in the future. What went wrong? Now, fix it.

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📌 **Context:** A space agency wants to establish a **self-sustaining human colony on Mars**.

⚒ **Using Future Mapping:**

•**Step 1: Define the Future Vision** → A **fully operational** Mars colony with **1,000+ residents, food production, and energy independence**.

•**Step 2: Work Backwards to Identify Key Milestones:**

Future Goal (2050+) 🌍🏠	How Did We Get There?
🏢 **Thriving Mars Colony**	Reliable **habitats, farms, and energy systems** in place.
🚀 **Regular Cargo Missions**	Cheap **reusable rockets** (like Starship) deliver supplies.
💡 **Martian Power Grid**	Built **solar farms and nuclear micro-reactors** for energy.
🏗 **3D-Printed Structures**	Used **autonomous robots** to build before humans arrived.
🌱 **Sustainable Food Production**	Developed **hydroponic & algae-based farming** for Mars.
🚀 **First Crewed Landing (2030s)**	Sent astronauts to test **life support systems**.

🌍 **Outcome:**

•By working backward, the agency realizes **food production** and **nuclear power** must be developed **before colonists arrive**.

•They prioritize **robotic missions** for infrastructure-building in the 2030s.

📌 **Context:** A startup is building a **Hyperloop**, a high-speed vacuum train for long-distance travel.

⚒ **Using Pre-Mortem Analysis:**

- **Step 1: Assume the Project Failed.**
    - "It's 2035, and the Hyperloop project has **completely failed**. Why?"
- **Step 2: Identify Possible Failure Points.**

Potential Cause of Failure ❌	How to Prevent It? ✅
💰 **Costs were too high**	Develop **cheaper tunneling** and **modular track systems**.
🚧 **Regulations blocked progress**	Work **with governments early** for approvals.
👥 **Low public adoption**	Offer **affordable pricing & marketing campaigns**.
⚙ **Technology was unreliable**	Build **test tracks** and validate safety before full rollout.

Outcome:
- The team realizes that **regulations and public trust** are major hurdles.
- They focus early on **lobbying policymakers** and **demonstrating Hyperloop safety with small-scale trials**.

START WITH A PROBLEM

Entrepreneurs looking for **relevant and urgent issues** to tackle should take a **structured approach** to identifying, analyzing, and validating pressing problems. Here's how they can do it:

Identifying a Relevant & Urgent Issue

To find a high-impact problem, entrepreneurs should focus on:

•**Market Pain Points** – What are customers struggling with right now? Look for inefficiencies, frustrations, or gaps in existing solutions.

•**Emerging Trends & Disruptions** – Keep an eye on new technologies, regulations, and global shifts (e.g., AI, sustainability, supply chain issues).

•**Crisis & Economic Pressures** – Economic downturns, pandemics, or regulatory changes create urgent problems that need solutions.

•**Industry Expert & Customer Input** – Talk to customers, industry insiders, and stakeholders to uncover pressing challenges.

Methods to Find These Issues:

•**User Interviews & Surveys** – Speak to potential customers or industries.

•**Social Listening** – Monitor platforms like Reddit, LinkedIn, Twitter, and industry forums.

•**Data & Reports** – Analyze reports from consulting firms (McKinsey, Gartner, CB Insights).

•**Competitor Gaps** – Study competitors and see where they fall short.

•**Personal Frustrations & Observations** – Problems you or your network frequently encounter.

START WITH A PROBLEM

Structuring the Issue

Once an issue is identified, it needs to be structured in a way that makes it solvable and appealing:

•**Problem Statement** – Define it clearly. Example: "Small businesses struggle with late payments, affecting cash flow and growth."

•**Target Audience** – Who suffers from this issue the most? Who will pay for a solution?

•**Pain Level** – How severe is the problem? (Mild inconvenience vs. major business risk)

•**Market Size** – How big is the opportunity? Are enough people affected?

•**Why Now?** – What makes this issue urgent today? Is there a trigger (e.g., regulatory change, new technology, crisis)?

•**Existing Solutions & Gaps** – What's already available? Why aren't those solutions sufficient?

Now, write down a problem that is relevant and urgent for you, your friends, your family, the EU, the world, or humanity.

Suggestions:

•Provide more than one alternative problem (no cost here at this stage).

•Multiple ideas allow for cross-pollination, where insights or solutions from one problem can inspire solutions for another. This cross-comparison can lead to creative breakthroughs and more innovative approaches to problem-solving.

Start by thinking 'big,' but then narrow it down to a smaller, yet still relevant and urgent, issue

NOW PLAY AND BE CRITICAL:

https://designsparks.app.creativityai.io

Suggestions

When generating new ideas in a team, there are several common mistakes to avoid to ensure that the process is creative, collaborative, and productive. Here are key pitfalls to watch out for:

- **Limiting Creativity Early On**
- **Lack of Clear Focus or Direction**
- **Not Encouraging Diverse Perspectives**
- **Overlooking Small Ideas or "Bad" Ideas**
- **Not Allowing Enough Time for Reflection**
- **Overcomplicating the Process**
- **Groupthink (Lack of Dissenting Voices)**
- **Lack of Follow-up or Action**

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