UCEST206

ENGINEERING ENTREPRENEURSHIP AND IPR

Module 1

Introduction to Ideation, Innovation & Entrepreneurship

- ❑ What is Ideation?
- ❑ Understanding Innovation
- ❑ Frameworks for Innovation
- ❑ The Entrepreneurial Mindset
- ❑ Starting a Business, types formation statutory compliances.
- ❑ Resources for Aspiring Entrepreneurs

Introduction to Intellectual Property Rights (IPR)

- ❑ Types of IPR: Patents, trademarks, copyrights, trade secrets
- ❑ Strategies for protecting intellectual property based on the type of innovation
- ❑ Role of IPR in securing funding and competitive advantage

Importance of building a strong team

- ❑ Identifying roles
- ❑ Skill sets
- ❑ Team dynamics

Identifying Pain Points and problem statement

- ❑ Idea Generation Techniques
- ❑ Developing and Refining Ideas
- ❑ Develop strategies for bringing your innovation to life

Course Outcomes (COs)

At the end of the course students should be able to:

Course Outcome		Bloom's Knowledge Level (KL)
CO1	Gain foundational knowledge of Innovation and Entrepreneurship, Intellectual Property Rights (IPR) and their importance for startups.	**K2**
CO2	Develop a framework for identifying, curating and validating engineering-based business ideas.	**K3**
CO3	Learn essential tools for understanding product-market fit and customer needs.	**K3**
CO4	Create a comprehensive business plan for a new venture.	**K6**
CO5	Develop skills for prototyping, stakeholder engagement, and team collaboration.	**K4**

Identifying Pain Points & Problem Statement

- ❑ Idea Generation Techniques
- ❑ Developing and Refining Ideas
- ❑ Develop strategies for bringing your innovation to life

Pain Points and Problem Statement

- **A pain point is the emotional impact of a problem or obstacle.**
- **Identifying pain points** involves recognizing specific problems or challenges that users or customers face. This process is crucial for developing effective solutions and innovations.
- A **problem statement** is a concise description of these pain points, providing a clear focus for addressing them.
- **Identifying pain points can help you improve the customer experience, reach your target audience more effectively, and position your business as the solution.**

Identifying Pain Points and Problem Statement

Some ways to identify pain points and problem statements:

❑ Conduct research:

- Conduct surveys, interviews, or focus groups with stakeholders to understand challenges.
- Use methods like user research, contextual inquiry, user journey mapping, empathy mapping, the five whys, field studies, customer support analysis, and product review analysis.

❑ Analyze Data:

- Use data analytics to pinpoint recurring issues, bottlenecks, or areas for improvement.
- Look at data and metrics that measure the performance and outcomes of a process.
- This can include quantitative data like time, cost, quality, and customer satisfaction, or qualitative data like comments, reviews, or complaints.

ways to identify pain points contd…….

- **Conduct research:** Use methods like user research, contextual inquiry, user journey mapping, empathy mapping, the five whys, field studies, customer support analysis, and product review analysis.
- **Create user personas:** Use fictional representations of typical users to understand the needs and motivations of different user groups.
- **Listen to employees:** Conduct surveys or have one-to-one conversations to learn more about your employees' experience.
- **Engage with Stakeholders:** Involve customers, employees, and other stakeholders to gain diverse perspectives on the problems.
- **Prioritize Issues:** Determine which pain points have the most significant impact and should be addressed first.
- **Define the Problem Statement**: Clearly articulate the core issue.
  - **Example:** Instead of saying, "Our team struggles with communication," frame it as: "How can we streamline communication in our team to reduce misunderstandings and improve collaboration?"

Crafting a Problem Statement

A well-crafted problem statement should include:

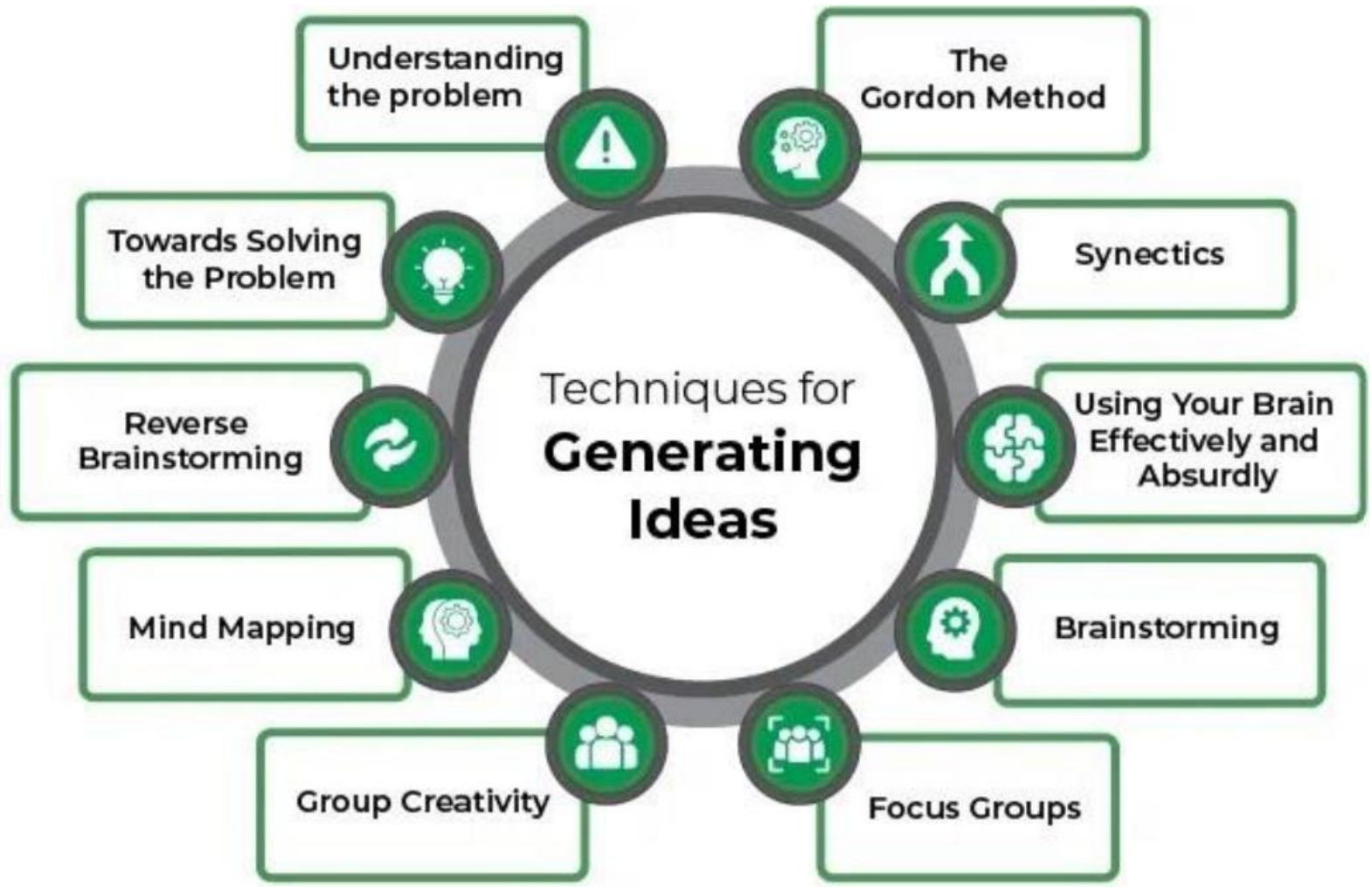
- **Current State**: Describe the existing situation with measurable indicators.
- **Future State**: Outline the desired outcome or improvement.
- **Target Date**: Set a specific timeline for achieving the future state.

Example 1: E-commerce Delivery Delays

Pain Point: Many customers in rural India face significant delays in receiving their e-commerce orders due to inadequate logistics infrastructure.

Problem Statement: Currently, customers in rural areas experience an average delivery time of 10-15 days, compared to the target of 3-5 days, which we aim to achieve by the end of the next fiscal year. This delay affects customer satisfaction and reduces repeat purchases.

Idea Generation Techniques



1. Understanding the Problem

- Understanding the given problem is the most important step to solving the problem or generating ideas to solve the problem.

- It involves a systematic examination and comprehension of the problem the user is trying to solve. This is the first and the most crucial step in the case of creative problem solving.

- The aim of this step is to lay a strong foundation that the ideas that will be generated later are well structured, informed, related to the main problem, and most likely to lead to the proper solutions

Some of the key characteristics of Understanding the problem are:

- **Problem Definition:** Before trying to solve the problem or even generate an idea, it is necessary to express the problem in the easiest way possible.

- **Gathering Information:** To understand the given problem, it is necessary to do some research and gather as much information as possible from other sources. This can include market research, data analysis, receiving feedback from customers, conducting surveys, etc.

- **Identification of Stakeholders:** It is also necessary to find out who will benefit from the solution of the problem, because they can provide some insights about the problem which will help in the idea generation process

2. Towards Solving the Problem

The phase, Towards Solving the Problem, **is the swift transition from understanding the problem to the phase of generating ideas**. Once a deep understanding of the problem has been gained, the solver can start to think about it and generate ideas to solve the problem and think about the potential solutions.

- **Mind Mapping:** Mind Mapping is a visualization technique that is used to create a diagram like structure and put the ideas, tasks etc.

- **SCAMPER:** SCAMPER technique stands for Substitute, Combine, Adapt, Modify, Put to another use, Eliminate, and Reverse is a technique which lets the user to view the problem from different angles and apply those aforementioned strategies to generate new ideas.

- **Lateral Thinking:** Lateral thinking is also another heavily used approach to generate ideas to solve problems. It seeks solution of the problem via indirect approaches.

3. Reverse Brainstorming

Reverse Brainstorming works in exactly opposite manner that of the traditional Brainstorming. Brainstorming sessions are usually done to generate ideas to solve a problem, whereas the reverse brainstorming is done to generate ideas which will cause a problem.

Below are some of the key characteristics of Reverse Brainstorming:

- **Define the Problem:** It starts with defining the problem clearly and precisely, of whose solution we are trying to find.

- **Reverse the Goal:** Instead to directly finding the solution to the problem, encourage the participants to think how to create the problem or even make it worse. This approach will involve thinking about the actions, behavior and different factors which will lead to the problem.

- **Evaluate and Reverse:** After collecting a pool of ideas which causes the problem or make it harder, the participants evaluate those ideas, then starts the actual brainstorming method to find the solution of those problems in the traditional way

4. Mind Mapping

- Mind Mapping is a graphical and visualizing approach used to represent the thoughts, ideas, concepts etc. and organize them in a hierarchical and interconnected manner.
- The main function of Mind Mapping is to recreate the process which happens inside human brain while trying to think about any solution of a particular problem.

Below are the some of the most important components of a Mind Map:

- **Central Idea:** This occupies the center of the Mind Map, it represents the main concept or the main issue which is being solved.
- **Branches:** This are the thin lines that are used to join the key items and themes with the Central Idea in the middle.
- **Keywords or Phrases:** On each one of the branches (apart from the central idea), certain keywords or phrases are used to represent the main idea or issue of that sub-category or branch.

5. Group Creativity

- Group Creativity is also known as collaborative creativity is a phase where a group of individual come together to share their ideas about solving a same problem.
- It is the ability of a team to work together to solve a certain problem given to them by thinking creatively and develop new concepts collectively to extend the capability of a single person's thinking power.

Some of the most important points about Group Creativity is mentioned below:

- **Diversity of Perspectives:** Each group consists of members whose thinking capabilities are different than the others, they can come from different backgrounds, hold different experiences. This diverse atmosphere leads to more creative solutions.
- **Brainstorming:** Brainstorming are special sessions carried out to encourage the group members to encourage them and boost their creativity to generate more ideas. During this sessions the members are encouraged to share any kind of idea without any judgement or criticism.
- **Collaboration:** Collaboration and effective communication between the group members are a necessity for nurturing creative thinking.

6. Focus Groups

- Focus Groups is a Qualitative research method which mostly involves a small group, but a diverse kind of individuals who freely shares their thought and opinions on a specific topic given to them.
- The discussions of a focus groups are generally mentored by a moderator or facilitator.

Some key characteristics of Focus Groups are:

- **Size of the Group:** Generally, the size of Focus Groups are small, it typically consists of only 6-10 individuals. It is kept like this because this is perfect number to get diverse ideas and keeping the encouragement and communication between them.
- **Structured Discussion:** As a certain moderator or Facilitator is in charge of a Focus Groups, he or she is in control of what should be discussed and what structure it would follow.
- **Interactive Discussion:** As the number of members are kept small, everyone gets the chance to participate in the discussion and interact with each other, this helps to discuss the ideas between them and rectify the mistakes if any.

7. Brainstorming

- Brainstorming is a well known problem solving technique used to generate ideas within a group.
- Everyone in the group encourages each other to come up with new ideas whether they are absurd or practical without any criticism. T
- he main goal of a brainstorm session is to come up with a solution of the problem or challenge given to them.

Some of the characteristics of Brainstorming are:

- **Free Thinking:** All the members of the group can share their thoughts and ideas freely without facing any criticism. The main goal is to get as many idea as possible.
- **Divergent Thinking:** It is also a form of Divergent Thinking; it allows the members to think about multiple possible ways to solve the problem.
- **Done within a group:** Brainstorming sessions are usually conducted in a group. So, the idea and the discussion remains secret to that group members only.

8. Using Your Brain Effectively and Absurdly

This encourages both rational thinking and the deliberate use of the unconventional concepts to stimulate creativity. It uses the both sides of a human mind, one that thinks rationally and tries to find the solution in a more rational manner, and the other which solely lives in the imaginary world and thinks absurdly. It is helpful to stimulate creativity in the mind's of the solver and generate ideas.

- **Effective Thinking:** This aspect of the using our brain effectively involves using the brain logically and efficiently. It solely depends upon the structured thinking and analysis of the problem thoroughly.
- **Absurd Thinking:** This might sound silly, but sometimes the absurd and imaginary thinking encourages the user to try some out of the box approaches to solve the problem.
- **Thinking Visually and Conceptually:** Using diagrams and Mind Maps is also helpful to effectively use our brain and generate new techniques to solve the problem.

9. Synectics

- Synectics has been derived from the Greek Word "synectikos," which means "bringing different ideas into unified connection.
- "Synectics is used to establish connections between unrelated concepts/ideas generated during brainstorming sessions. It lets the users members to think beyond the traditional approaches and come up with something out of the box.

Some of the key charactertistics are:

- **Use of Analogy and Metaphors:** In Synectics, most of the times it relies on the use of different analogies and metaphors to establish connections between unrelated topics. By creating a connection between unrelated topics, new ideas can be generated easily.
- **Relaxation and Playfulness:** Creation of a Playful and Relax environment is necessary in case of Synectics. Relax environment is helpful to encourage people generate more ideas.
- **No Judgement or Criticism:** The participants are encouraged to not to judge others after listening to their ideas and not criticise them. This allows the other participants to think more freely without fearing of criticism.

10. The Gordon Method

- The Gordon Method is closely related to the Synectic method
- Synectic method is more structured than that of Gordon Method and it put emphasis on the use of Analogies and Metaphors to generate ideas. It follows a pre-defined process and uses specific "Operators" (Like images, diagrams etc as a hint to boost the idea generation), whereas the Gordon Method allows more flexibility in problem solving and relies upon the group collaboration, often with a Facilitator but no operators are used.

Some of it's key characteristics are:

- **Clear Problem Statement:** The Gordon Method starts with a clear and concise Problem Statement which needs to be solved.
- **Emphasis on Organisational Goal:** Gordon Method plays an important role of putting Emphasis on the Organisation's goal and objectives which aligns with Creative Thinking.
- **Use of Triggers and Stimuli:** The Gordon Method uses various types of Triggers and Stimuli like specific structured questions, scenarios, or various challenges which can provoke creative ideas.

Developing and Refining Ideas

Developing Ideas

a. Research and Exploration

- **Understand the Context**: Research the problem, target audience, and existing solutions.
- **Benchmarking**: Study competitors or similar industries for ideas and best practices.
- **Gather Insights**: Use data, user feedback, and trends to inform your idea generation.

b. Structured Creativity

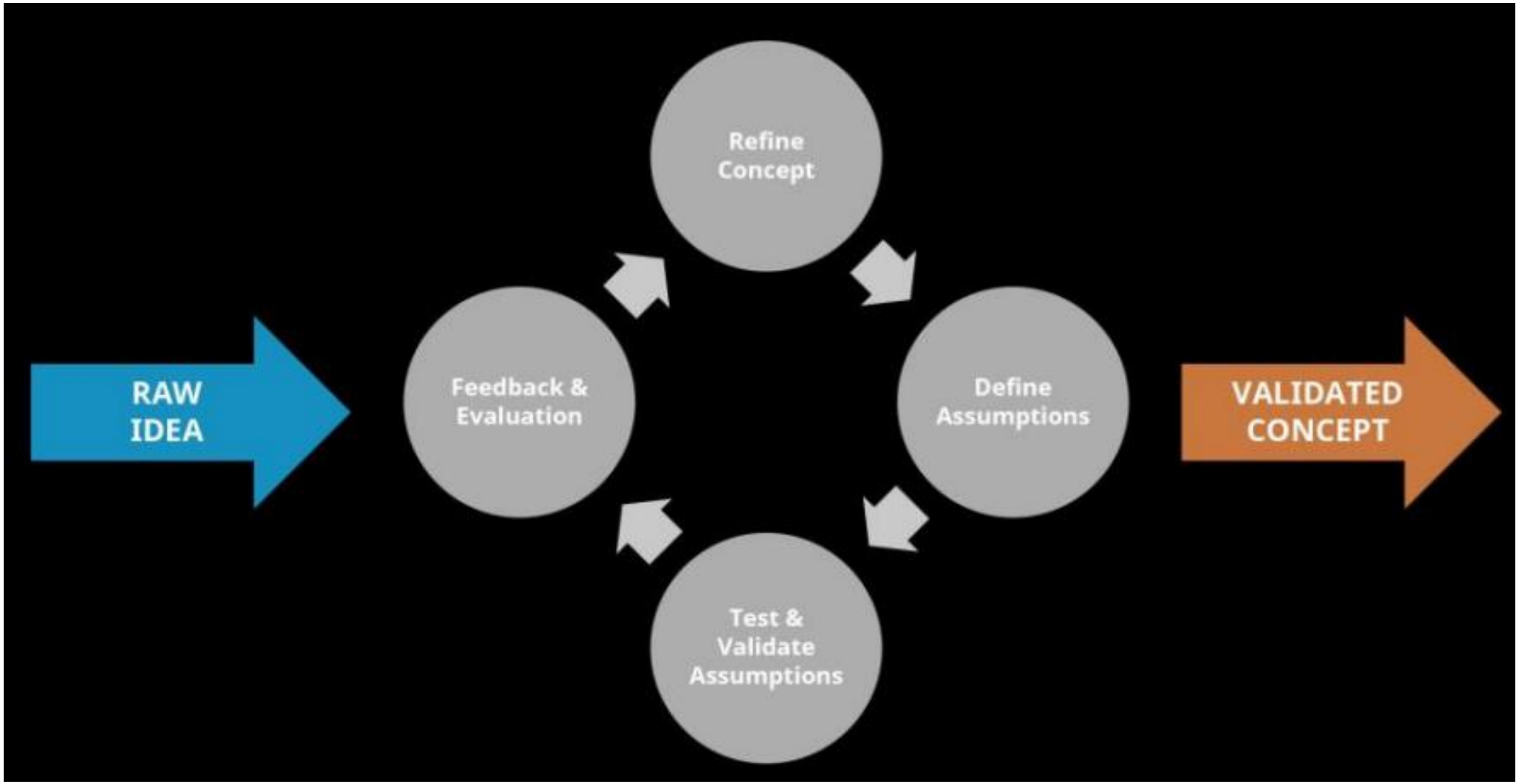
- **Brainstorming**: Collaborate with your team to generate a wide range of ideas without judgment.
- **Mind Mapping**: Use visual tools to connect related ideas and expand possibilities.
- **Design Thinking**: Focus on human-centered approaches to create innovative solutions.

c. Combine and Adapt

- **SCAMPER Technique**:
  - Substitute: What can be replaced in the idea?
  - Combine: Can two ideas be merged to create a better one?
  - Adapt: How can the idea be modified to fit new contexts?
  - Modify: Can features be enhanced or changed?
  - Put to Other Uses: Is there an alternative application for this idea?
  - Eliminate: What's unnecessary and can be removed?
  - Reverse: How can the process or concept be flipped?

d. Prototype Creation

- Develop basic models, sketches, or mock-ups to visualize and test the idea quickly.
- Focus on simplicity—early prototypes are meant to validate the concept, not be perfect.


RAW IDEA
Refine Concept
Define Assumptions
Test & Validate Assumptions
Feedback & Evaluation
VALIDATED CONCEPT

Refining Ideas

a. Gather Feedback

- **User Testing**: Share prototypes with stakeholders or end-users to collect input.
- **Iterative Feedback Loops**: Continuously refine the idea based on real-world use cases and feedback.

b. Evaluate Feasibility

- **Technical Viability**: Can the idea be implemented with available tools and technology?
- **Financial Feasibility**: Assess the costs versus expected returns.
- **Market Fit**: Does the idea solve a real problem or meet a specific need?

C. Prioritize Improvements

- Address the most critical flaws or limitations first.
- Balance between addressing concerns and maintaining the core vision of the idea.

d. Test and Iterate

- Refine the prototype into a more functional version based on evaluations.
- Repeat cycles of testing, feedback, and improvement until the idea is polished.

e. Align with Goals

- Ensure the refined idea aligns with your overall objectives, mission, and stakeholder expectations.

Develop strategies for bringing your innovation to life

Innovation can help companies stand out, attract new customers, and deepen relationships with existing ones. Here are some strategies for bringing an innovation to life:

- **Define objectives**: Clearly define your innovation strategy and ensure it aligns with your company's goals.
- **Collaborate:** Encourage collaboration across departments to leverage different perspectives and expertise.
- **Make it practical**: Create a prototype, show examples, and get customer input.
- **Show customer benefit:** Demonstrate how your innovation will solve customer problems or concerns.
- **Build a business case:** Show how your innovation will add value, improve efficiency, or reduce costs.

Contd…..

- **Allocate resources:** Set aside time and resources for innovation, and budget for these initiatives.
- **Find partners:** Look for partners to co-develop your idea, especially if it's too complex for your team to handle alone.
- **Invite your leader:** Get your leader to co-own the initiative.
- **Consider timing:** Make sure the timing is right for your leader.

THANK YOU