# New Product Development
# 10th & 11th Oct 2023

# Mid-Sem Feedback
# ENT 101 – Autumn 2023

# What did you like about the course ?

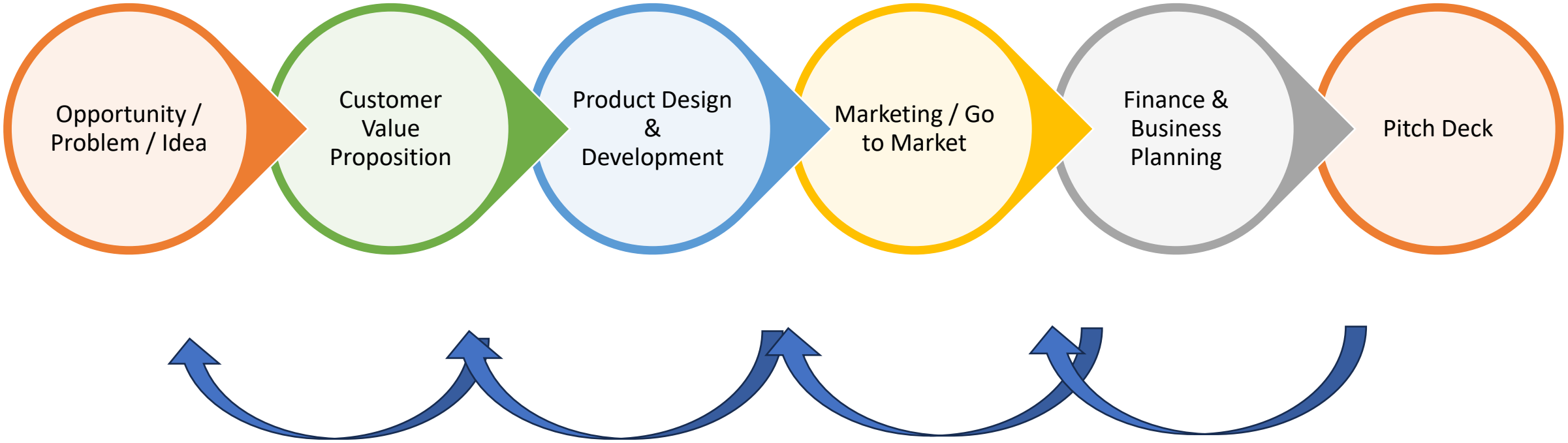
- Interactive learning
- Fun classes
- Real life companies I can relate to now
- Understanding from the basics
- The way of finding problems and searching for innovative solutions
- Pretty much everything
- Practical approach and examples, learning by two way communication.
- The faculties are Extremely experienced people of the industry and even after that they take class from so basic level.
- Examples that are given for scenarios to help us understand better.
- Mostly the ability to think something new and implement it to make a responsive company
- Entrepreneurship concepts
- The teaching style and real life examples
- I was already interested about start ups and all and this course helped me know more about it.
- example based learning and interesting to know about unicorns in real
- Learning through practical examples and boring theory (like from PPT)
- Use of variety of examples
- The way they are building the mindset of students on entrepreneurship is amazing and enjoyable interactions are good.
- The understanding I gained about various commercial terms.
- Very lively atmosphere and learning through examples.
- The lessons are discussion based
- Less homeworks, More Interaction

# What are your suggestions to improve the course ?

- More practical and **teams should be made by profs** so that they are more diverse
- Pls give a set of **practice Question or sheet**, before the quiz or exam around which the final paper/ quiz will revolve so that we get an idea
- Most of the important points in the class is in the form of discussion only , not everyone can understand or follow the discussion with full effectiveness, then when we want to revise it ,how do we do it as they are not there in slides
- **I'd say the quiz**... Now it's not like I'm cribbing about that one question about Maslow but if the quiz could be less terminology related and more understanding related, it would be more useful I believe.
- **A reference material containing all terminologies in a rigorous manner**
- It will be great if you add more exam related resources that one could study before exam time...
- The course should be more creative **and more hands-on experiences** should be included.
- Little bit more descriptive slides for revision and stuff. And set of practice questions
- More examples sent on Moodle for further reference.
- **Student's and alumni interaction should be there** .
- Maybe 2 projects in a semester rather than 1.
- **Including an activity or assignment every class/week to make learning even better**
- **Timing of Tuesday class especially for Physics lab students**

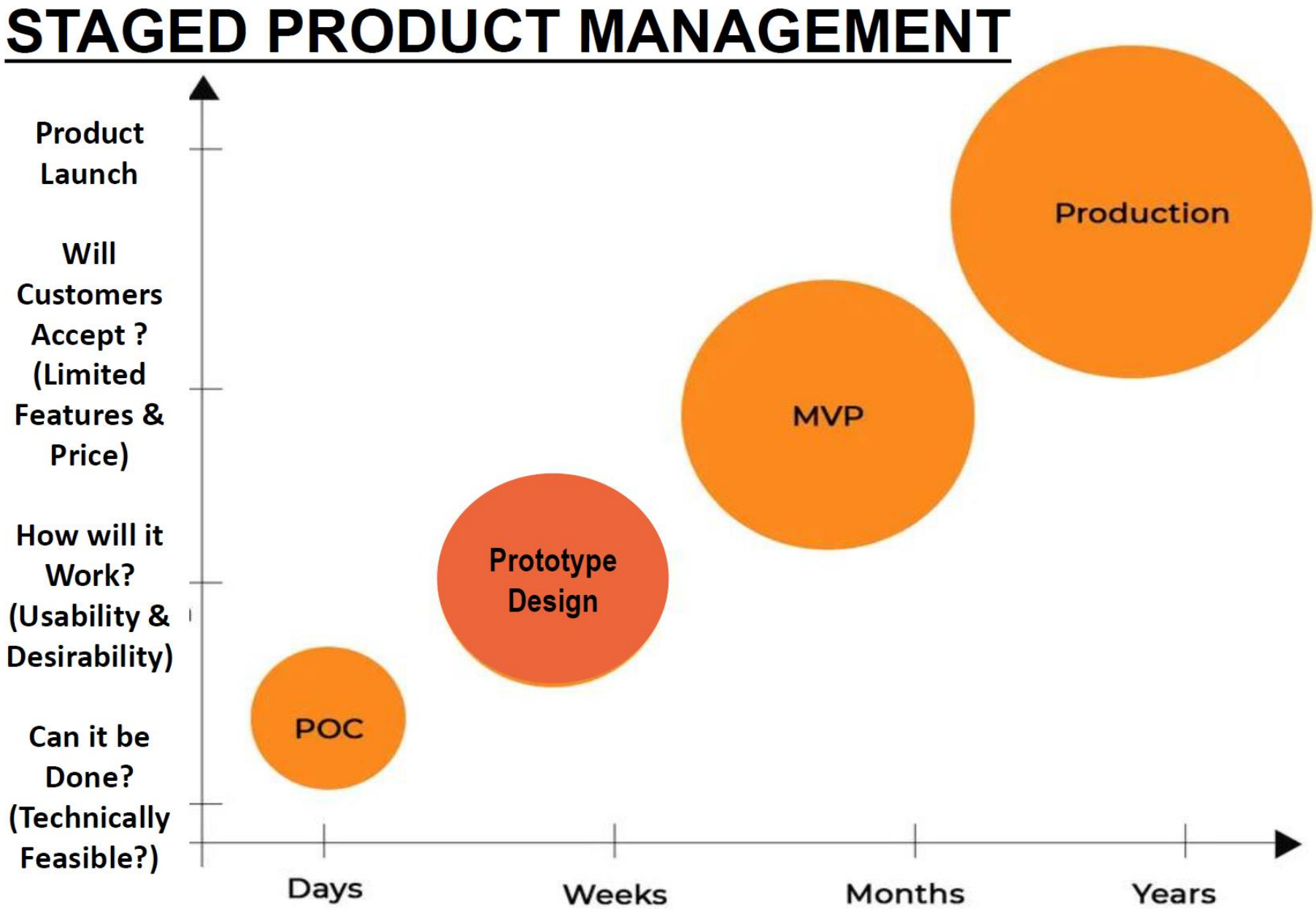
# Process for Start up Creation

## Continuous Learning & Iterative Process



# Lets speak about
# Learnings from Innovation

# Concept to POC to Prototype to MVP

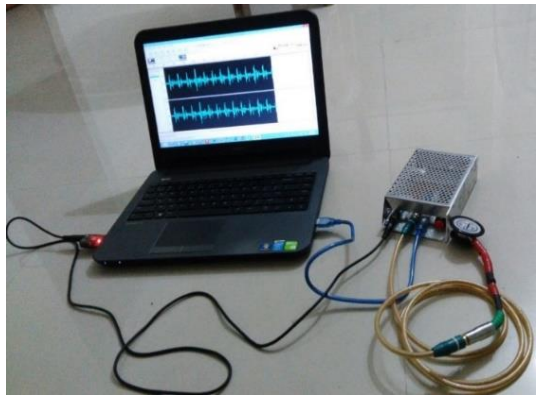





Slide courtesy: ENT 609

# Medical Device Innovation – '4D' Framework

**Define** (Idea)

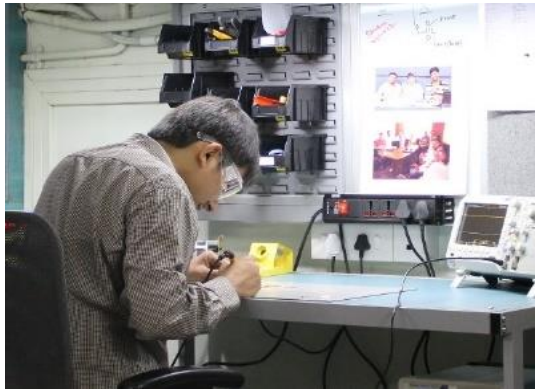


Proof-of-Concept

240

4:1

**Develop** (Invention)



Prototype

60

3:1

**Deliver** (Innovation)


Product

20

2:1

**Deploy** (Impact)


Practice

10



Credit : Prof B Ravi, BETIC

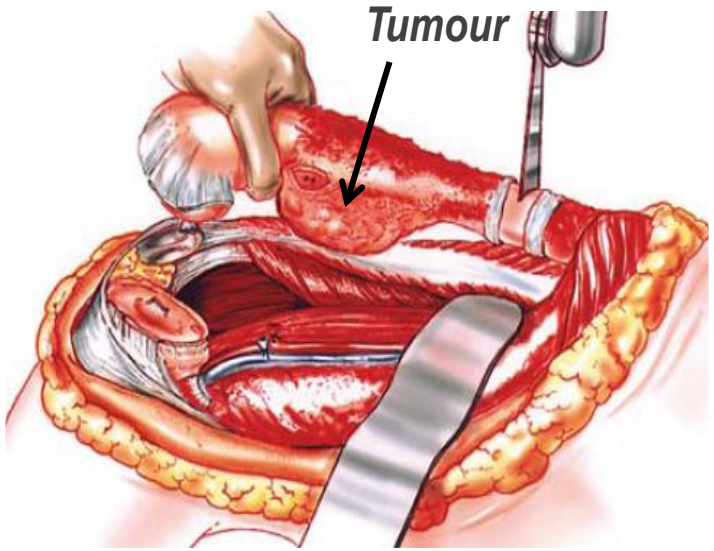
# DEFINE – Unmet Medical Need

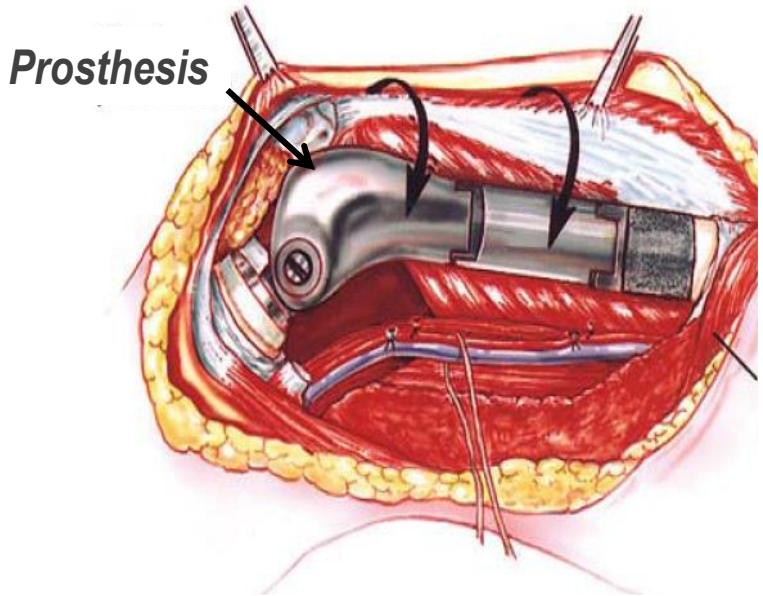
- **Brief & clear statement of unmet or unarticulated need of end-users in minimum words..**
- **Include *what*, *why* and *who*** (need and target customer)
  - What is it , Who is it for, Why is it valuable

***Example: "Tumour knee prosthesis** to **reconstruct gap in bone** for **osteosarcoma patients."***

***what*** ← → ***why*** ← → ***who*** ← →

- **Requires clinical immersion, observation and discussion with end-users, clinicians and other stakeholders.**



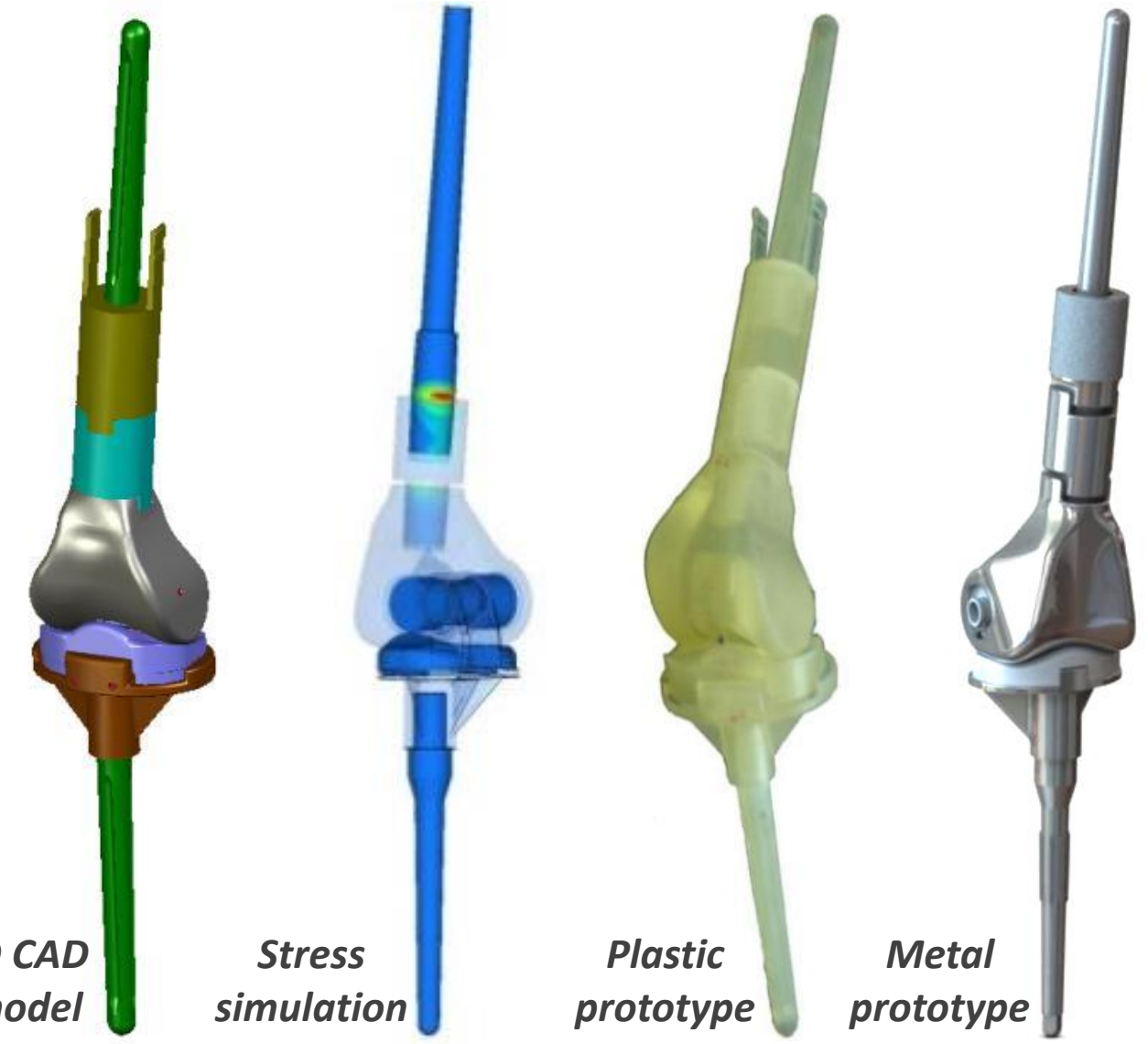






Credit : Prof B Ravi, BETIC

# DEVELOP – Design and Prototype

- Product embodiment and components
- Simulation of mechanism and stresses
- Manufacturability, maintenance and other lifecycle considerations.
- Rapid prototyping in plastic and metal
- Electronics, software and user interface
- Usability engineering: labels & manuals
- Early feedback from clinicians.



*3D CAD model* *Stress simulation* *Plastic prototype* *Metal prototype*



Credit : Prof B Ravi, BETIC

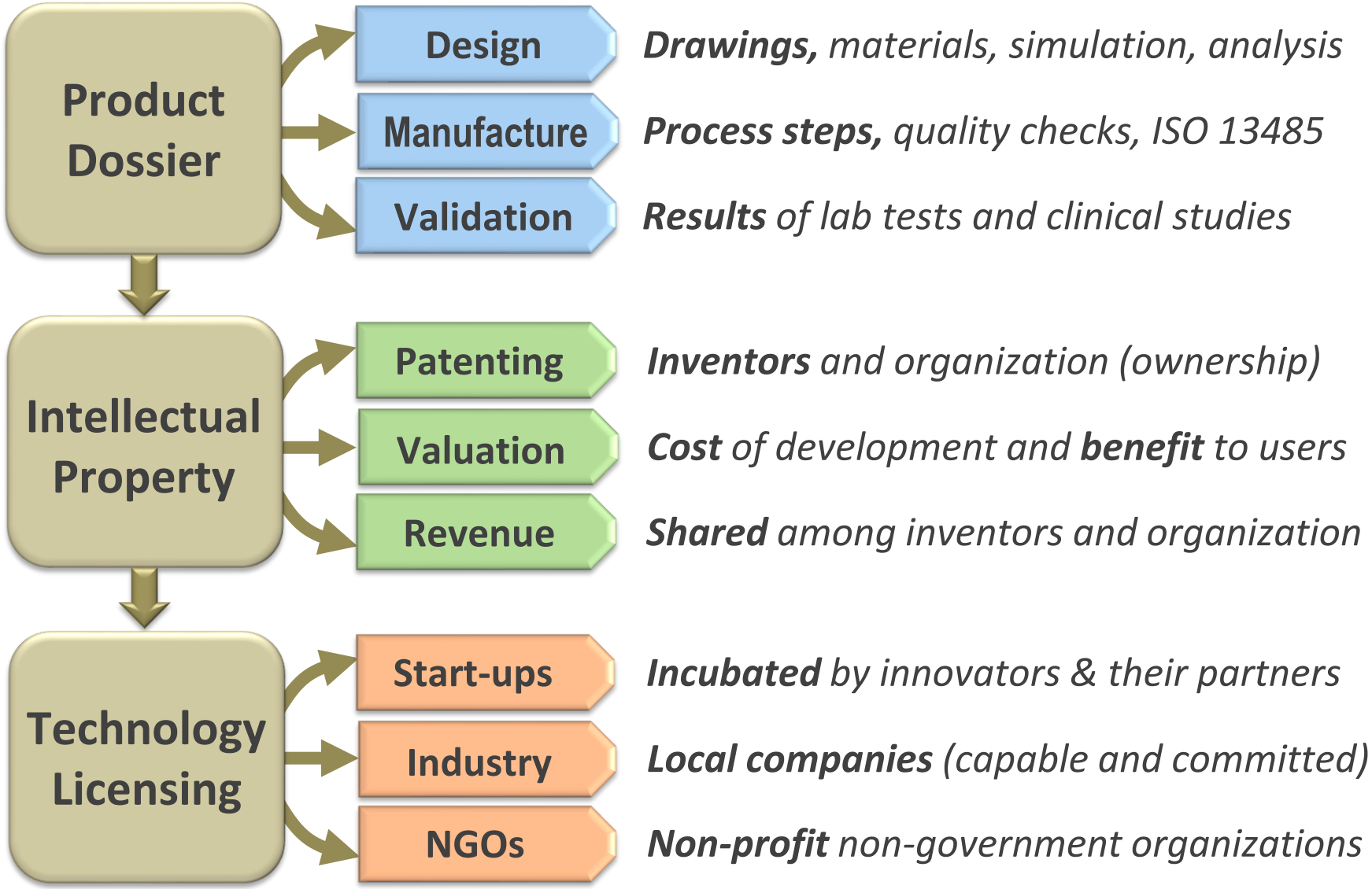
# DELIVER – Manufacture and Validation

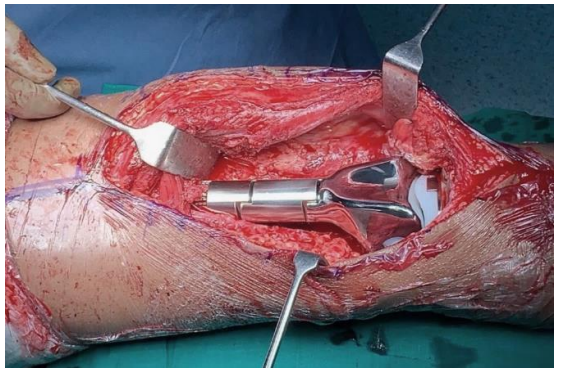
- **Medical-grade manufacturing of pilot batch** along with quality management system
- **Lab testing: Establish 'reasonable evidence of safety'** (biological, mechanical and electrical)
- **Human clinical trials: Prove device safety, efficacy,** accuracy (sensitivity, specificity)
- **Device certification for mass production & marketing,** based on risk class of device (low, medium, high)




Credit : Prof B Ravi, BETIC

# DEPLOY – IPR and Commercialization





Credit : Prof B Ravi, BETIC

# Product Innovation – Process Depiction I

**I. Define** (*Customer Discovery*)

- Team Building
- Clinical Immersion
- Problem Definition
- Concept & Feasibility

**II. Develop** (*Design Thinking*)

- Detailed Design
- Virtual Prototype
- Rapid Prototype
- Functional Prototype

**III. Deliver** (*Production & Scale-up*)

- Pilot Manufacturing
- Initial Testing
- Advanced Testing
- Device Certification

**IV. Deploy** (*Market*)

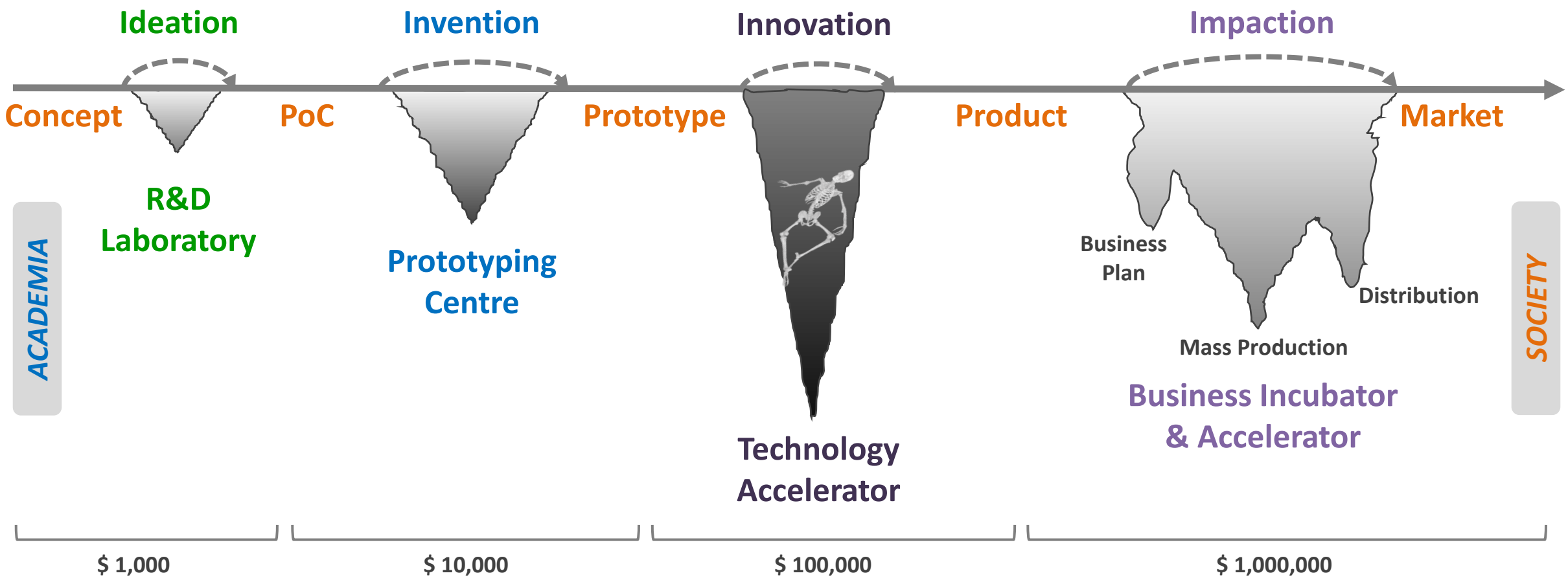
- IPR Management
- Business Model
- Product Distribution
- Scaling & Sustaining



Slide: Prof. B Ravi, BETIC

# Medical Device Innovation – 'Valleys of Death'

TRL

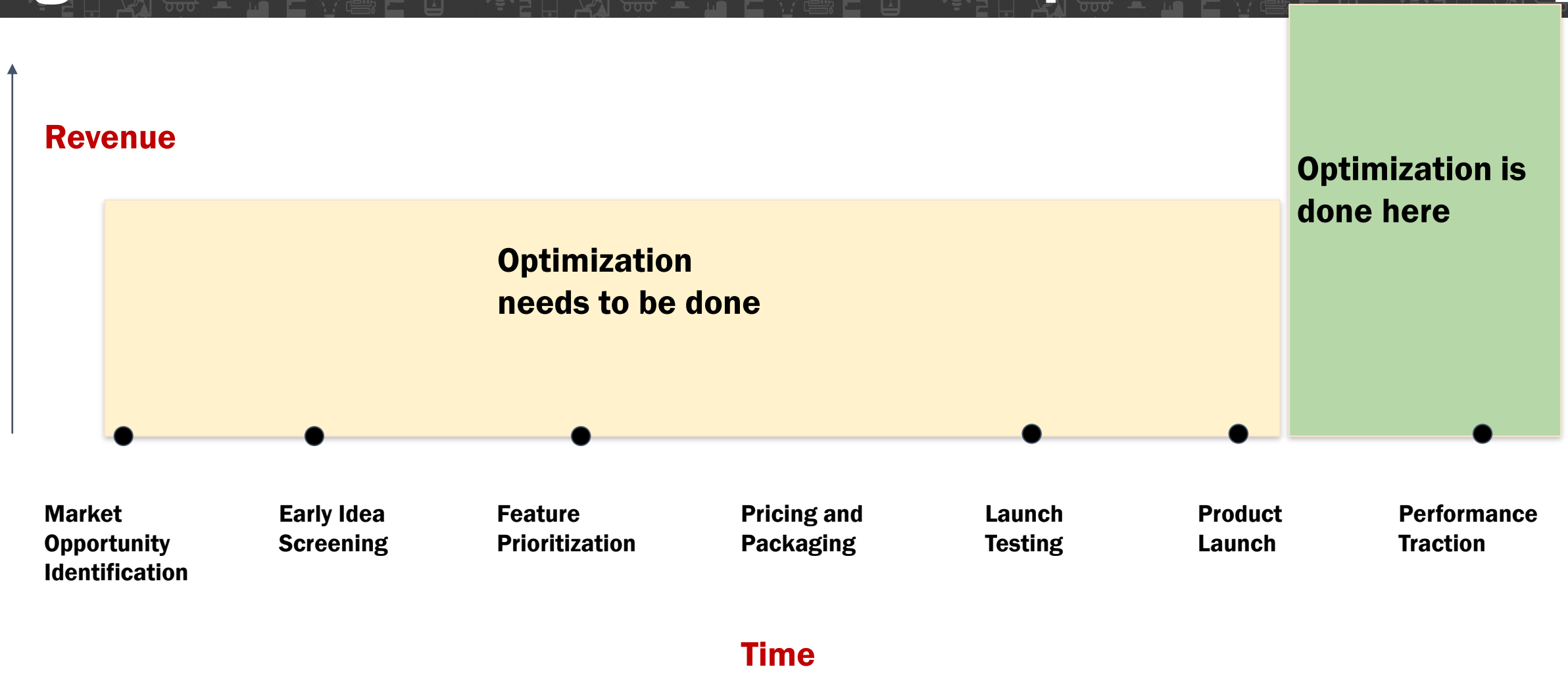



*Critical Gap: Translation of research prototypes into marketable products*



Credit : Prof B Rav, BETIC

# Digital Product Innovation – Process Depiction II






Slide: Milind Kopikare

# Product Strategy Framework

**Market Segment**: Who is your market?

**Customer Need**: What is the job the customer is trying to do?

**Market Trend**: What has changed in the market that will disrupt the status quo?

**Value Proposition**: How will this product address the customer's need?

**Differentiation:** What is your **MOAT (means defence)** or your **USP ( unique selling proposition)**

**Competition**: What are the alternatives in the market today?

**Go to market Strategy**: How will you build awareness ? How will you sell ?



Slide: Milind Kopikare

# Development of MVP – Minimum Viable Product

**Minimum Viable Product is that version of a new product which allows a team to collect the maximum amount of validated learning about customers with minimal amount of effort**

- **Eric Ries.**

**Scrappiest version of the product that your customers can use**

- **Milind Kopikare**



Slide: Milind Kopikare

# MVP Development : Case Study

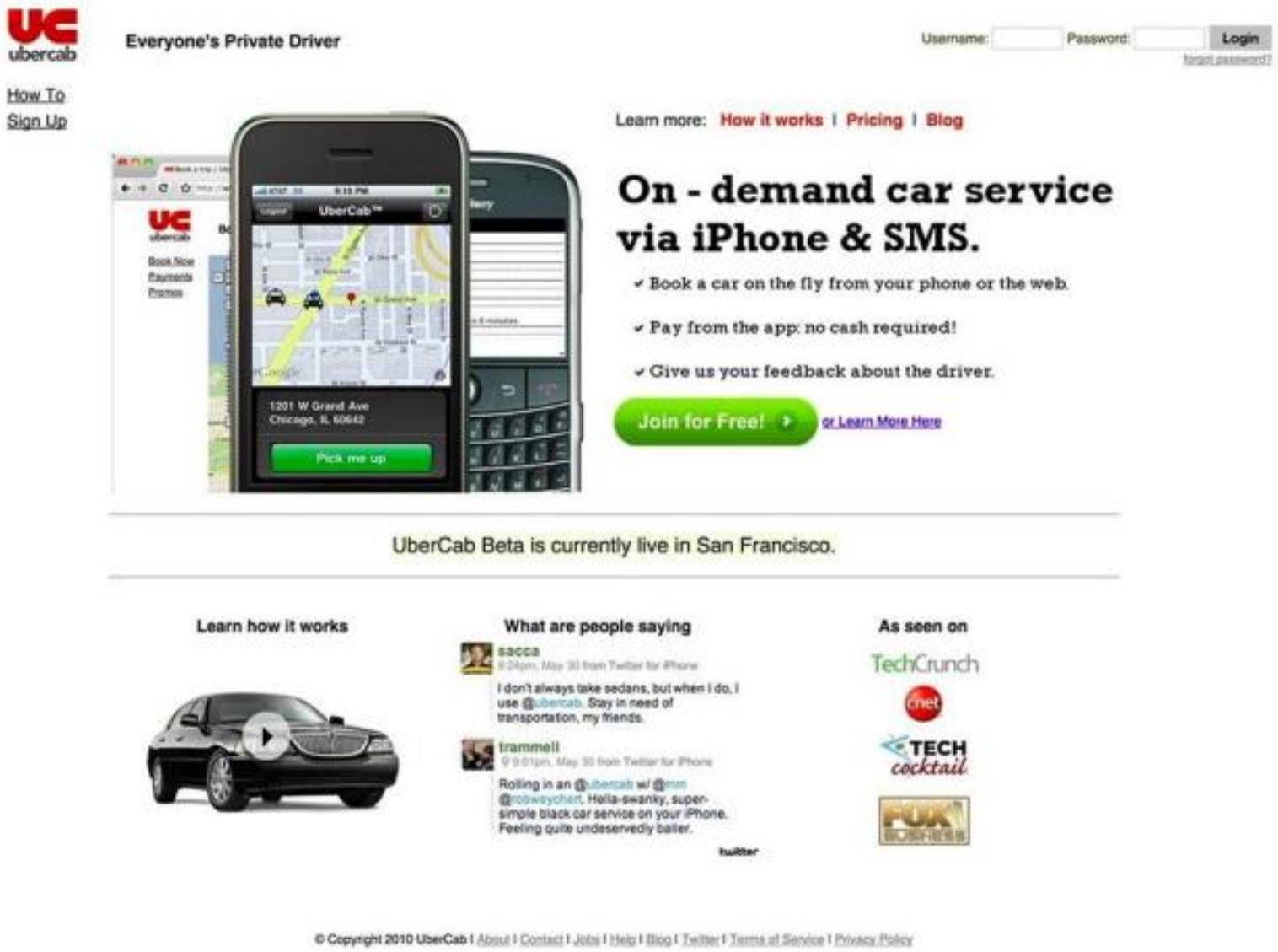
During its initial days, Travis used a Web based basic transportation application. The first version had a few features. It was developed on PHP, which used to allow customers to ‘hire’ a car, one and only car owned by him at the time.

The mobile application simply displayed the location of the car.

At the beginning of the organization, Travis and his friends alone used the mobile app. Those, who wanted to join the app, were supposed to send an email to Travis, who used to provide the applicants with code giving access.

Then, he called 10 car drivers and explained them his business concept. Three out of ten drivers showed interest immediately in his business proposal. The rest is history.

# MVP Development : Case Study






Slide: Milind Kopikare

# Steps to an MVP

**Identify Assumptions**

**Write down all assumptions**

**Think Science Experiment**

**In order for this being successful, the following need to be true**

- **Customers have x, y, z problem**
- **____ matters to my customers**
- **_____ will pay for my product/service**
- **No satisfactory substitutes**



Slide: Milind Kopikare

# Product Design

- Customer discovery / User experiences
  - Tangible expectations (Functional)
  - Intangible expectations (Cognitive)
  - Business Goals / Purpose
  - Market / Societal Context
- Customer Discovery/ Market Research
  - Surveys
  - Personal interviews
  - Customer segmentation
  - Persona categorization

- Product design
  - Mechanical / Structural aspects
  - Functionally purposeful
  - Practical & Ergonomic
  - Aesthetically beautiful
- Product characteristics/brief
  - What problem? Why solve it?
  - Context (E.g. Use cases, Metrics)
  - Tech specs
  - Competitors, timeline

# Product Design


- Soft product design
  - Look, content, colours
  - Efficient, Intuitive, Compatible
  - Easy to navigate
  - Real-life simulatory
  - Engaging the user

- Hard product design
  - Material design
  - Mechanical / Structural design
  - Electronic design
  - Software design
  - Efficient, intuitive & appealing

# Product Design – MVP

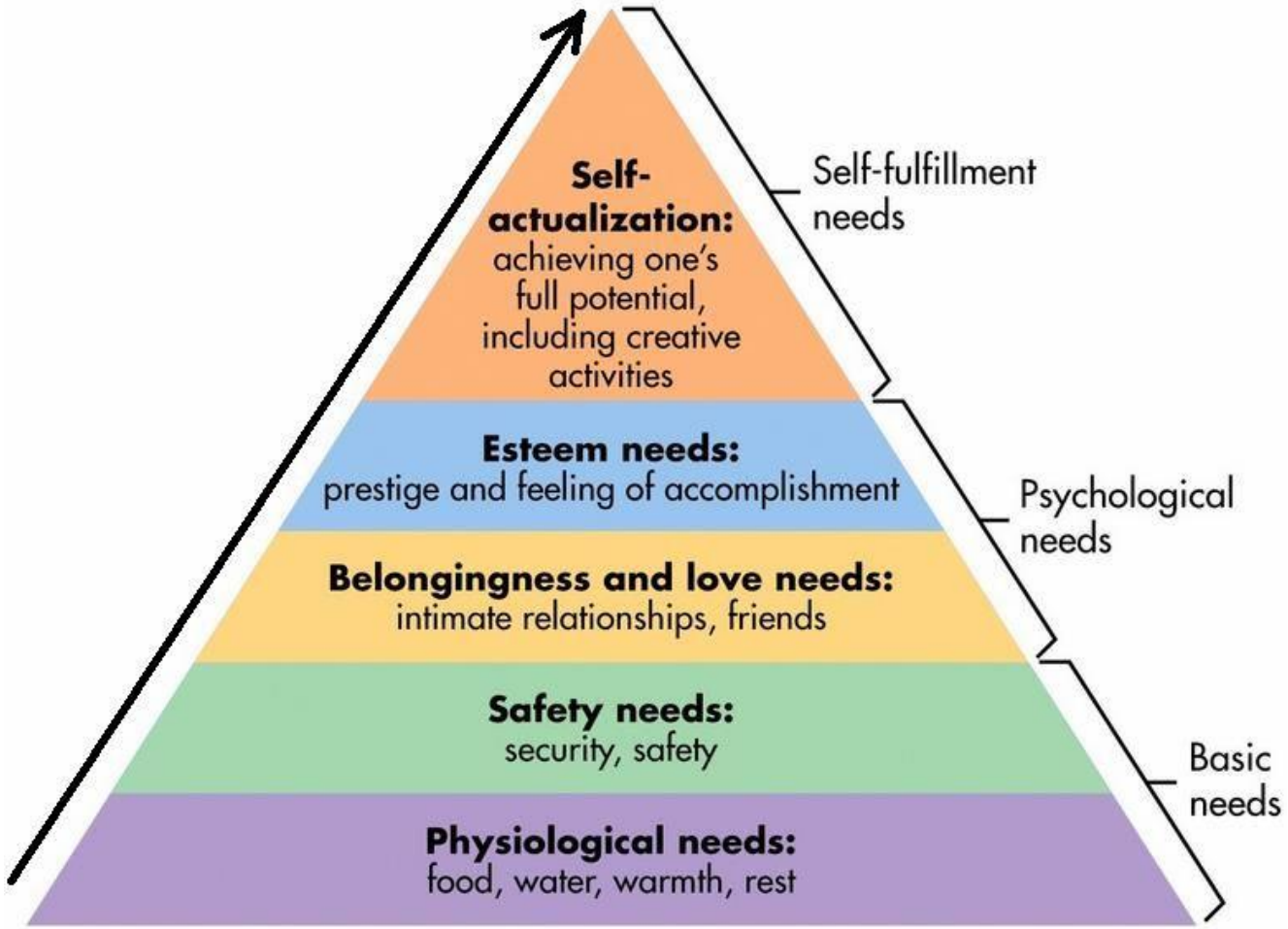
**Minimum Viable Product (MVP)** = **Material + Mechanical / Structural + Electronic + Software design**

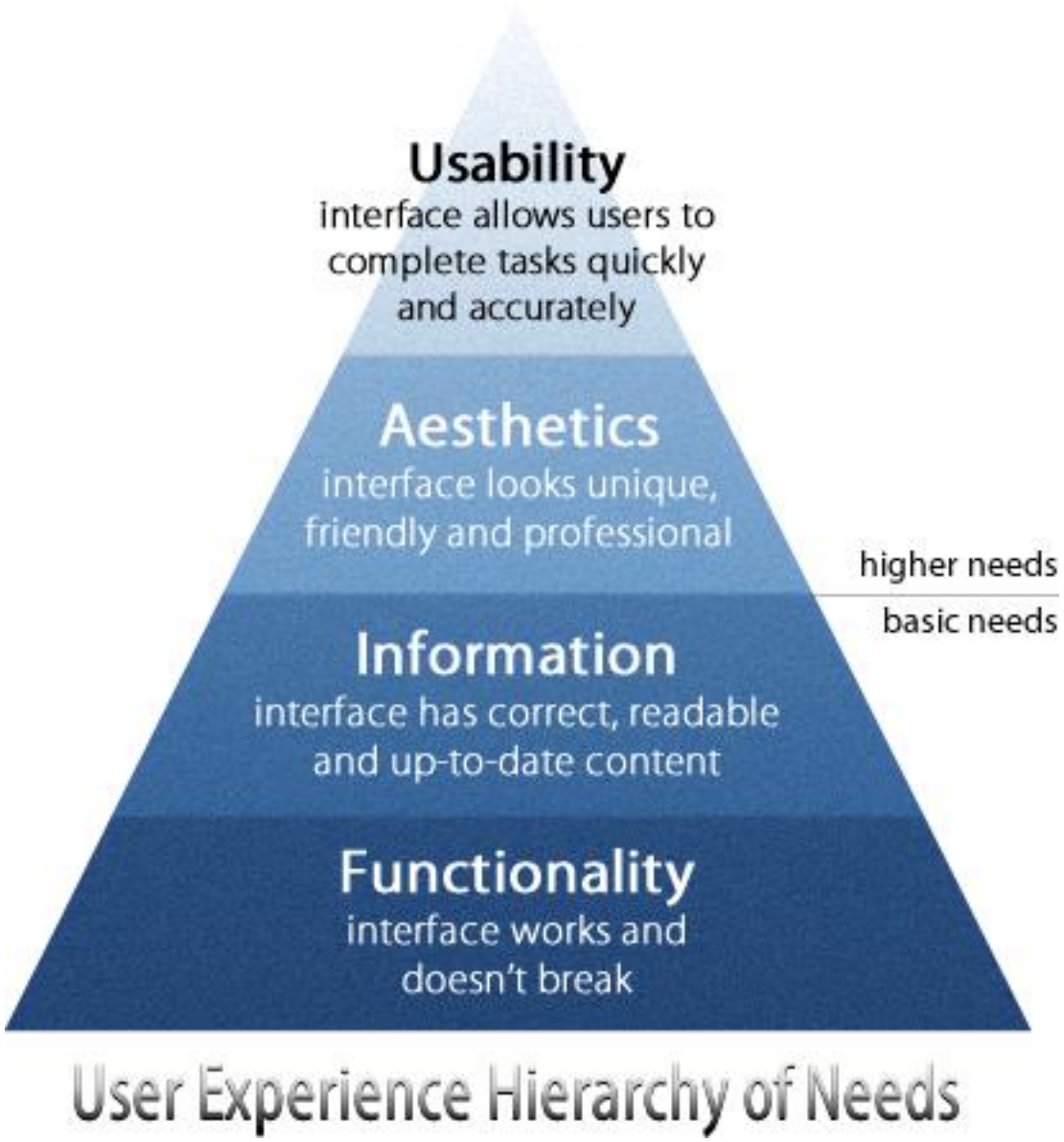

- **Material**
  - Physical, chemical
  - Functional, Reliable
  - Lightweight, Handleable
- **Mechanical / Structural**
  - Simple, Efficient (System)
  - Ergonomic, Portable
  - Strong, Durable
- **Electronic**
  - Efficient, Fast
  - Simple, Reliable
  - Seamless, Affordable
- **Software**
  - Light, Intuitive
  - Fast, Easy to learn
  - Error-free, Secure

**Verify & Validate**

**Digital Products**

# Customer Needs & MVP






Slide: Milind Kopikare

# Videos to watch

## Concept to Prototyping

https://youtu.be/i8C_de8EZY0

## Prototyping to Manufacturing

https://www.youtube.com/watch?v=WFL1Kk21EBE

# About Team Project : 10 marks, 14th Nov

**Guidelines**

1. **You need to pre submit the presentation (Pitch deck and video) on Moodle (Assignments have been created) by 31st Jan, 11:59 pm. Only one student per team must submit.**
2. **All members must be present on the Dias for the video and Q&A. We are doing this in 2 cohorts, the details of location, jury members and sequence of teams at the end of this note.**
3. **The TA will play your pitch video and the faculty will ask one / two questions. Any one student can answer. The Faculty will also go through the slide deck uploaded before evaluating the project team's work**
4. **Evaluation Criteria (from both presentation and video) :**

**Problem / Opportunity (2 marks),**

**Customer & Market Segments (2 marks),**

**Value Proposition (2 marks),**

**Revenue & Profit Streams (2 marks)**

**Q&A Only from class (2 marks).**

**Submissions : 13th Nov , midnight**

**Presentations : 14th Nov, 1130 to 1 pm, 2 parallel classrooms**

**3 min video ,Teams of 5**
**2 questions per team**