Design Thinking (for Technology Entrepreneurship)

What is Design Thinking?

❖ Design Thinking (DT) is a discipline that uses the designer's sensibility and methods to match people's needs with what is technologically feasible and what a viable business strategy can convert into customer value and market opportunity, according to Tim Brown of IDEO, and thinking like a designer can transform the way one develops products, services, processes, systems and even strategy.

❖ DT is a methodology that ingrains in the whole gamut of innovation activities a disposition of user-centered or broadly speaking, a human-centered design orientation.

❖ It is about designing products or services based on close observation of the user's need and expectations or disliking of about the product or the way a product is configured, packaged, marketed, sold, and supported.

Opportunity and scope due to existing Gap: Industry and Innovation

❖ 'Innovation' as an organizational capability bares a wide gap between importance and performance. According to a **BCG survey** (2015), 70% of executives responded that this is despite being 'innovation' was slated as a topmost priority.
  Other surveys by **IESE, KPMG**, and '**The Conference Board, Inc**.' confirm this.

❖ According to **LSE survey** (2016), nearly 80% of the executives consider innovation as the most critical capability, but not satisfied with its performance in their companies

❖ Several research and business articles being published, today, delineate the same.

❖ In view of this imperative, companies are gearing up to accelerate efforts to change their cultures, foster innovation, and serve customers more effectively.

❖ This emphasis on 'innovation' has emerged as an opportunity for industry as well as in people's professional career.

Innovation: The Common Element

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Entrepreneurs

More freedom with risks

Both are leaders and Innovators

Intrapreneurs

Take less risks
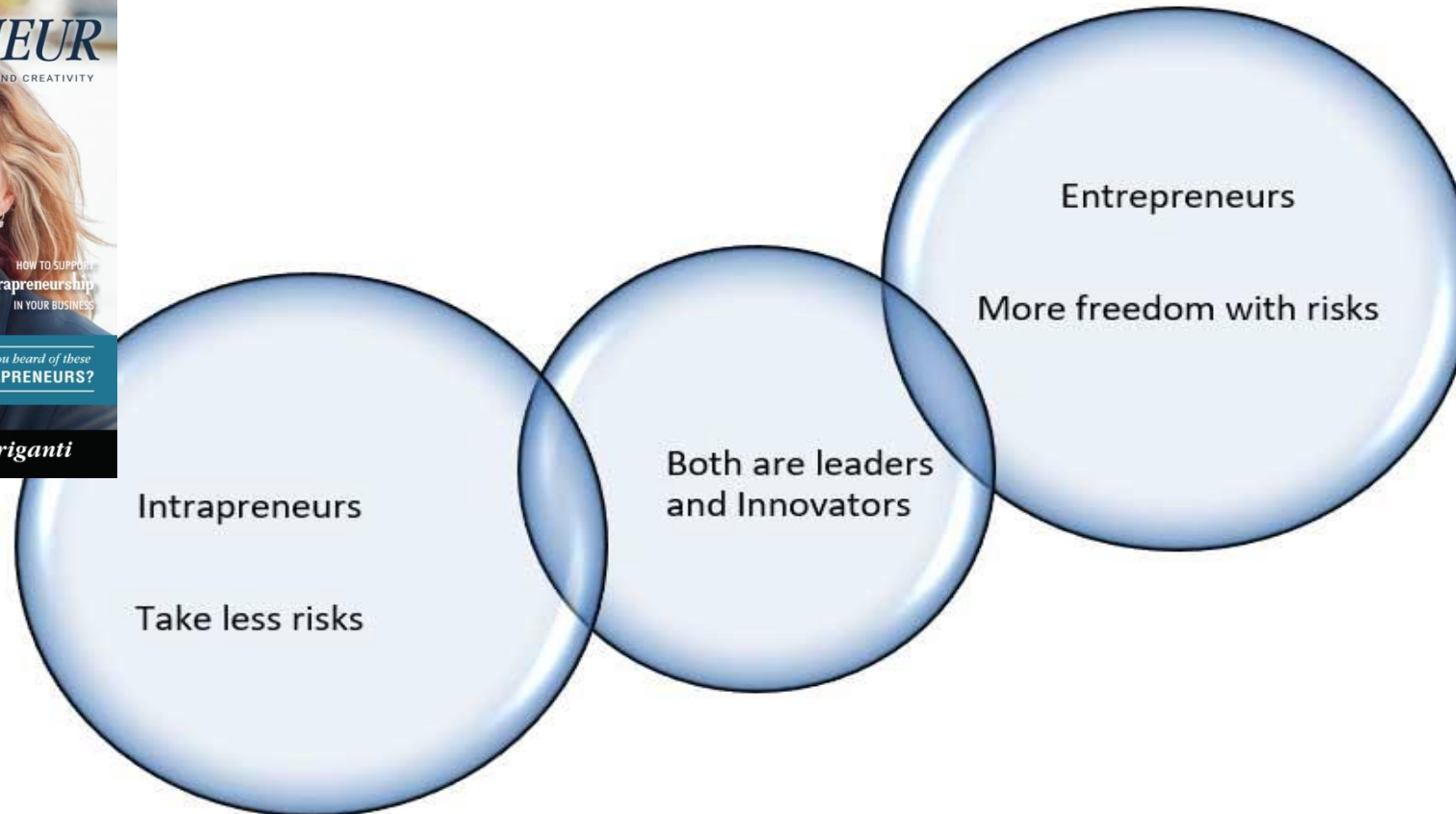
Design Thinking (DT) as a basis for Innovation:
(Elucidation with reference to Stanford d.school's DT Model)

- ❖ **Empathize:** Innovation approach is user-centered (human-centered), based on discovery and deep understanding of pain points (problem)/ gains desired.

- ❖ **Define:** Innovation would be targeted to solve a problem, based on insight developed.

- ❖ **Ideate:** Innovation based on generation , analysis and critical evaluation of ideas, considering the user desirability, technical feasibility and economic viability of the solution.

- ❖ **Prototype:** Innovation should be materialized in efficacious transformational terms.

- ❖ **Test:** Innovation ought to be verified with user and the solution to be refined.

Design Thinking Principles

- Does the solution engross empathy for end-users?
- Is this the solution simple enough for the intended purpose accomplished?
- Is it useful?
- Is it elegant?

desirability
human needs

viability
business needs

feasibility
technical needs
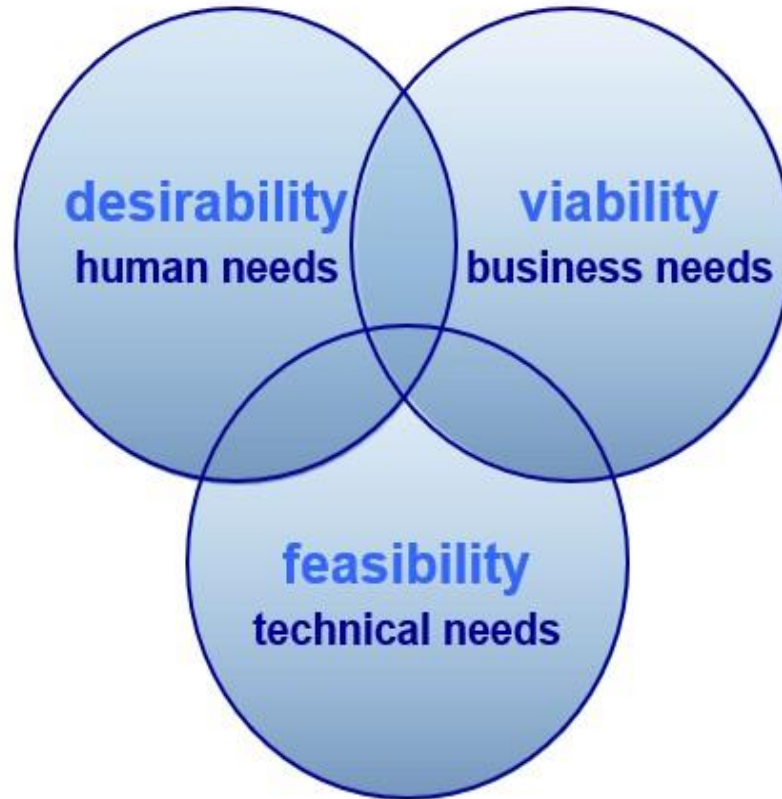
- Is the solution affordable?
- Does it improve profitability?
- Are the proficiency and skills available?
- How much is the ROI?

- **Innovation is at the Intersection.**

Product creation Phases:
0) Understand/observe
1) Visualize/Realize
2) Evaluating/Refining
3) Implement (detailed engineering)
4) Implement (manufacturing and liaison in vendor operation)

- How quickly can the solution be configured to suit the needs?
- Is the solution maintainable without much hassle?
- Is it consistent with the existing system profile?
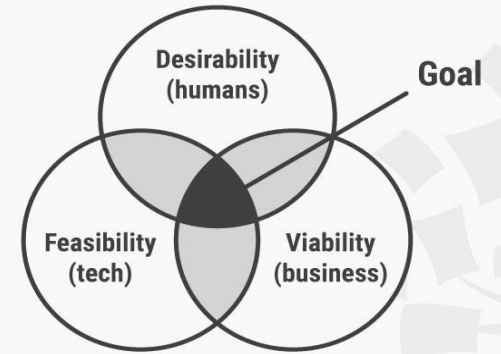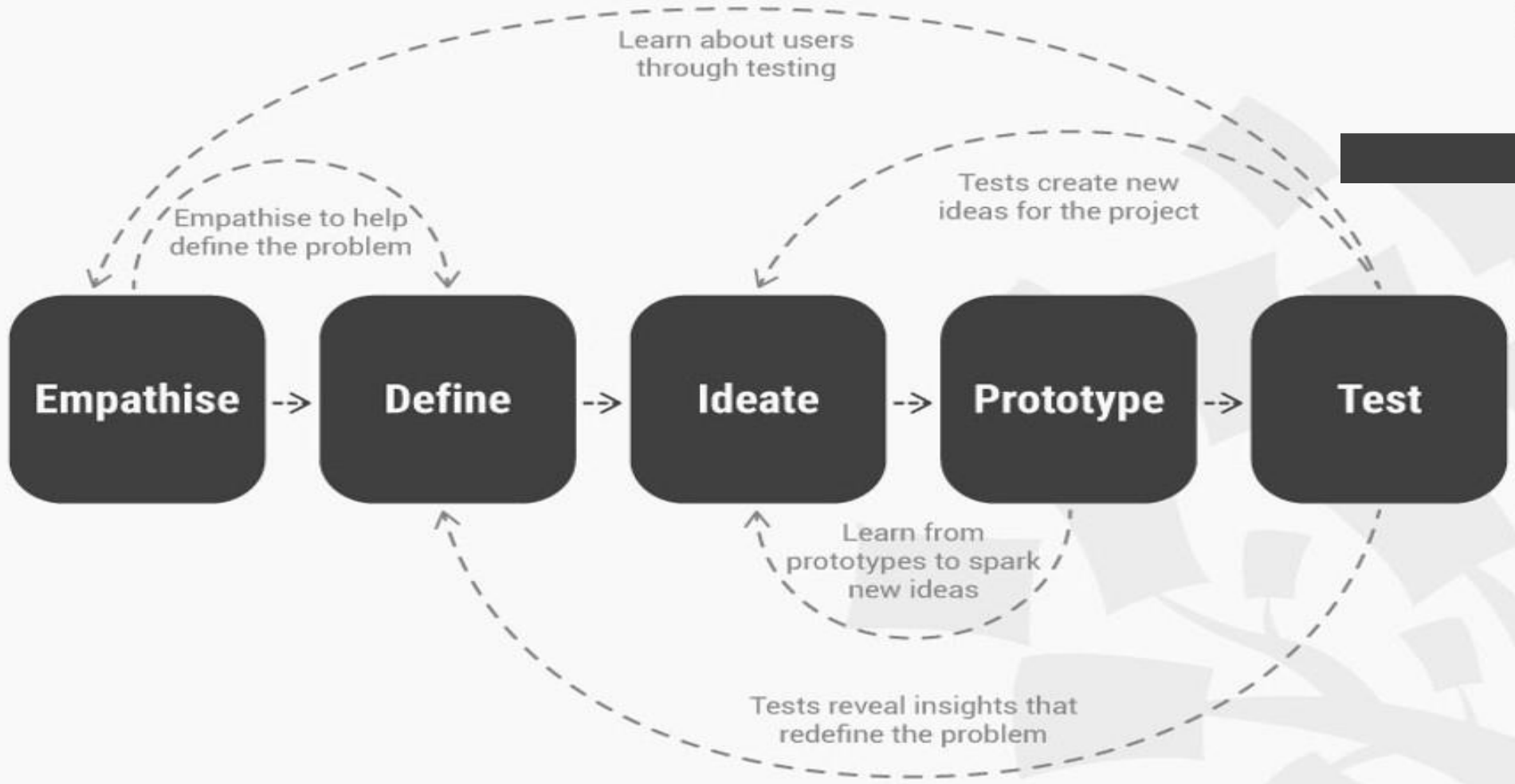- Is the solution conveniently supportable?

Design Thinking: A Non-Linear Process
(Ref: Teo Yu Siang and Interaction Design Foundation, author of the diagram)

Desirability (humans)

Goal

Feasibility (tech)

Viability (business)

INTERACTION DESIGN FOUNDATION | INTERACTION-DESIGN.ORG

Learn about users through testing

Empathise to help define the problem

Tests create new ideas for the project

Empathise -> **Define** -> **Ideate** -> **Prototype** -> **Test**

Learn from prototypes to spark new ideas

Tests reveal insights that redefine the problem

Step 1: Empathize

❖ It is holding back ones opinions, mindset and beliefs, culture, learning and knowledge, purposefully in order to understand other peoples' (users/ customers) experiences of affairs and stuff deeply and meaningfully.

❖ It necessitates a high degree of ingenuity for imaginativeness to be able to see through another person's view point.

❖ It is absolutely necessary for absorbing and understanding the first-hand and raw information.

❖ It is not easy, since people generally are trained, due to grooming the process and acquire knowledge and experience to form judgments and opinions rather than absorbing and understanding the raw information.

Step 2: Define

What is 'Defining'?

❖ **Assimilation** of information gathered in the 'empathy phase' followed by **analyzing** and **synthesizing** the observation.

Analysis (analyzing): Breaking down complex concepts and problems into smaller and simpler elements for better understanding and comprehension.

Synthesis (synthesizing): Creatively putting together research output and analysis data to construct whole ideas. The steps followed respectively are organizing, interpreting and making sense of the data gathered to create a problem statement.

❖ Leading to creating meaningful and accurate problem statement based on developed insight

Step 3: Ideate

❖ This stage is aimed to elicit the best of ideas for solving a defined problem, through **Brainstorming** and even the wildest idea generation activities.

❖ *Creativity* and *Innovation* are the fountainheads and impetus behind developing solutions.

❖ Generation of ideas in good numbers or quantity is the aim, which on screening yields workable concepts, based on the filters of desirability, feasibility and viability.

Step 4: Prototype

What is a prototype?

❖ An early, inexpensive, and scaled-down version of a product that can be used to obtain the test results.

❖ It offers product creators the opportunity to bring their ideas to reality, test the practicability of the present design, and conceivably and reasonably investigate as to how the users perceive about a product.

Types of Prototyping:

❖ **Low-Fidelity Prototyping***:* It is generally not a very complete version and rather often uses only a few features of the final intended design.

❖ **High-Fidelity Prototyping***:* This version more or less resembles and operate as the finished product or closer to it.

Step 5: Test

What is Testing?

❖ Testing in design thinking refers to and purposed for obtaining feedback from the users about the developed prototype, involving features and functionalities.

❖ This feedback helps the developer to understand the users more accurately.

Why Testing?

❖ Collecting feedback is crucial in design thinking and product innovation, and without proper understanding of the users needs the right set iteration in product engineering and development will not take place and the process will fail.

❖ If the users encounter any problem with the present solution version then the Product engineering team must rethink and design some alternative versions.
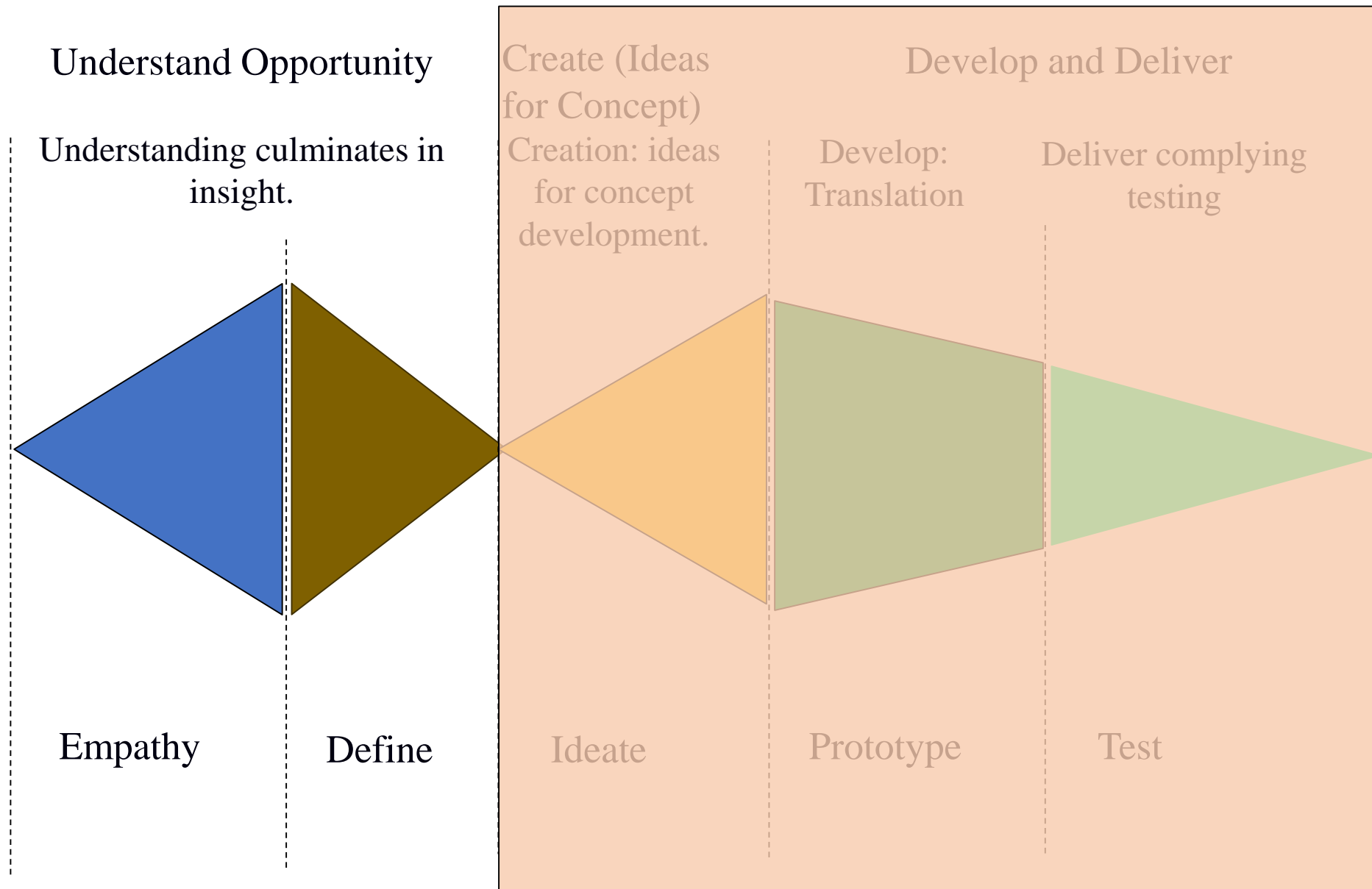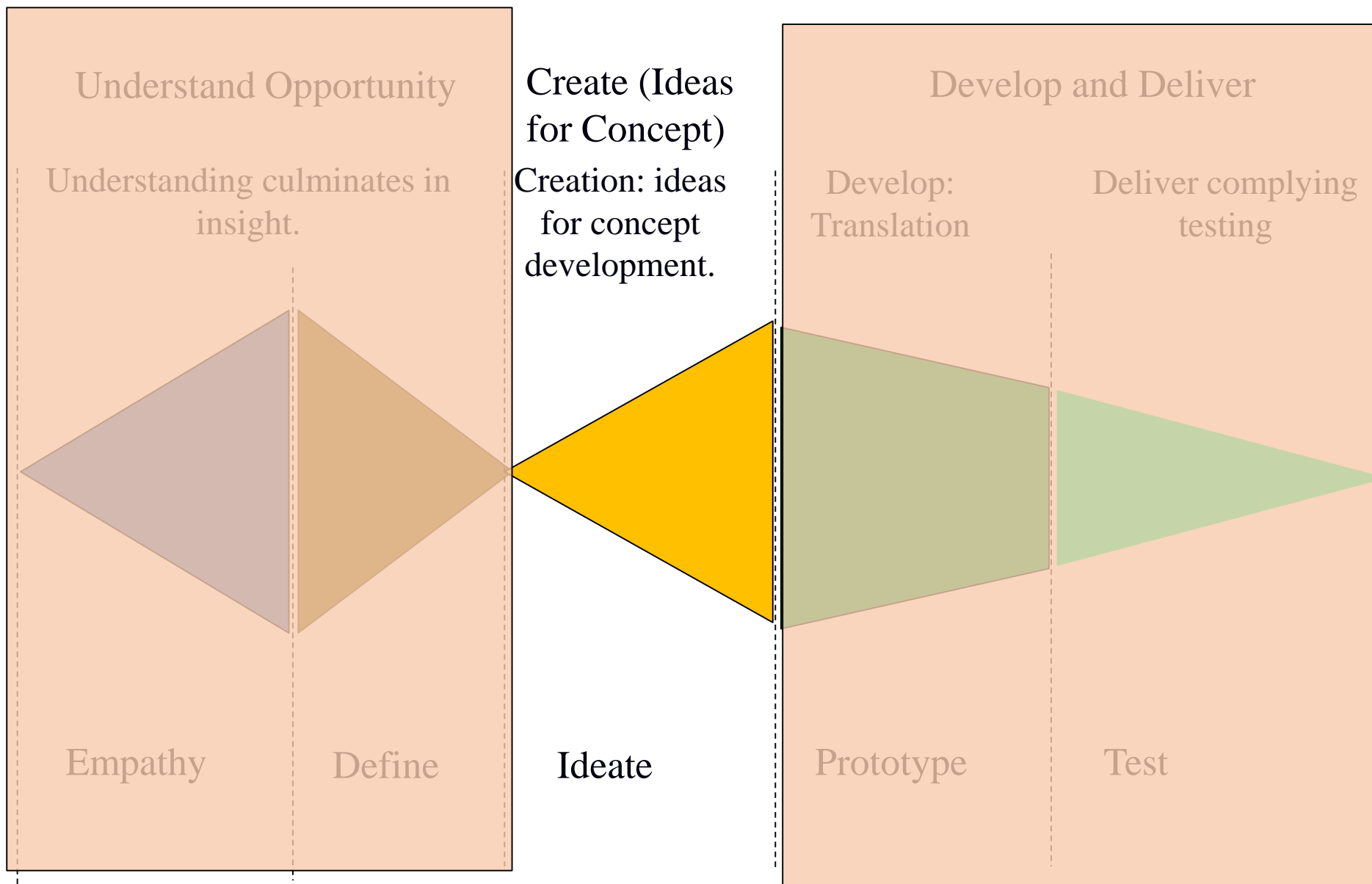
Conclusion

❖ This session addresses a **functional definition** of 'design thinking' **for primary understanding** about it.

❖ Delineates the **inadequacy in practicing 'Innovation' in industry**, to help in **gauge the scope and opportunity for the industry**, covering corporate organisations and startups, to explore and embrace **as well as for the professionals** in this domain.

❖ The discussion covers **principles of design thinking** alongside the **innovation aspects** which is a common element in engineering practices be it a large corporate or a technology startup.

❖ Consequently, the aspect of **design thinking as a basis for Innovation** has been explicated, and

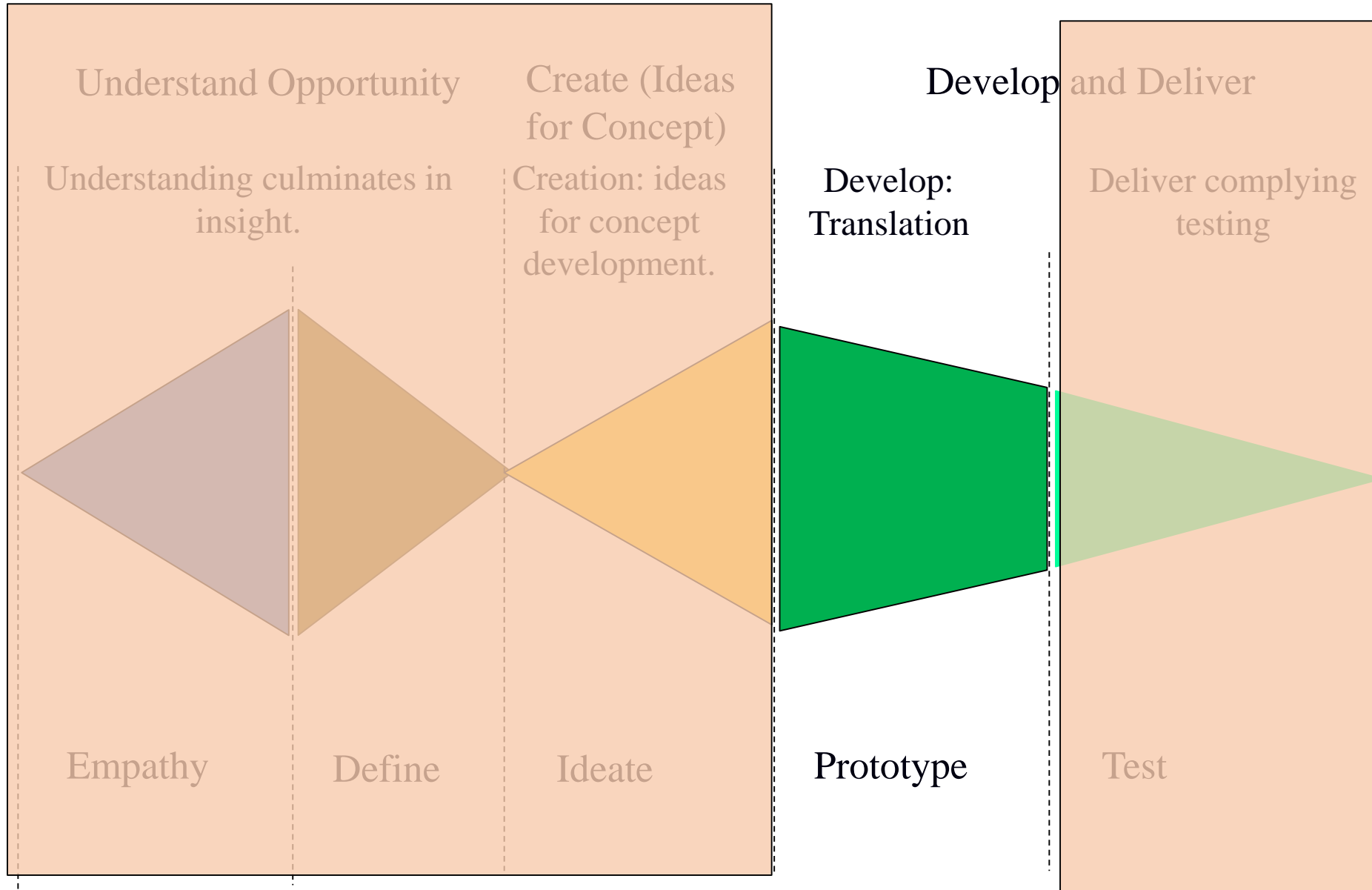❖ Briefly introducing the steps in **design thinking process steps**.

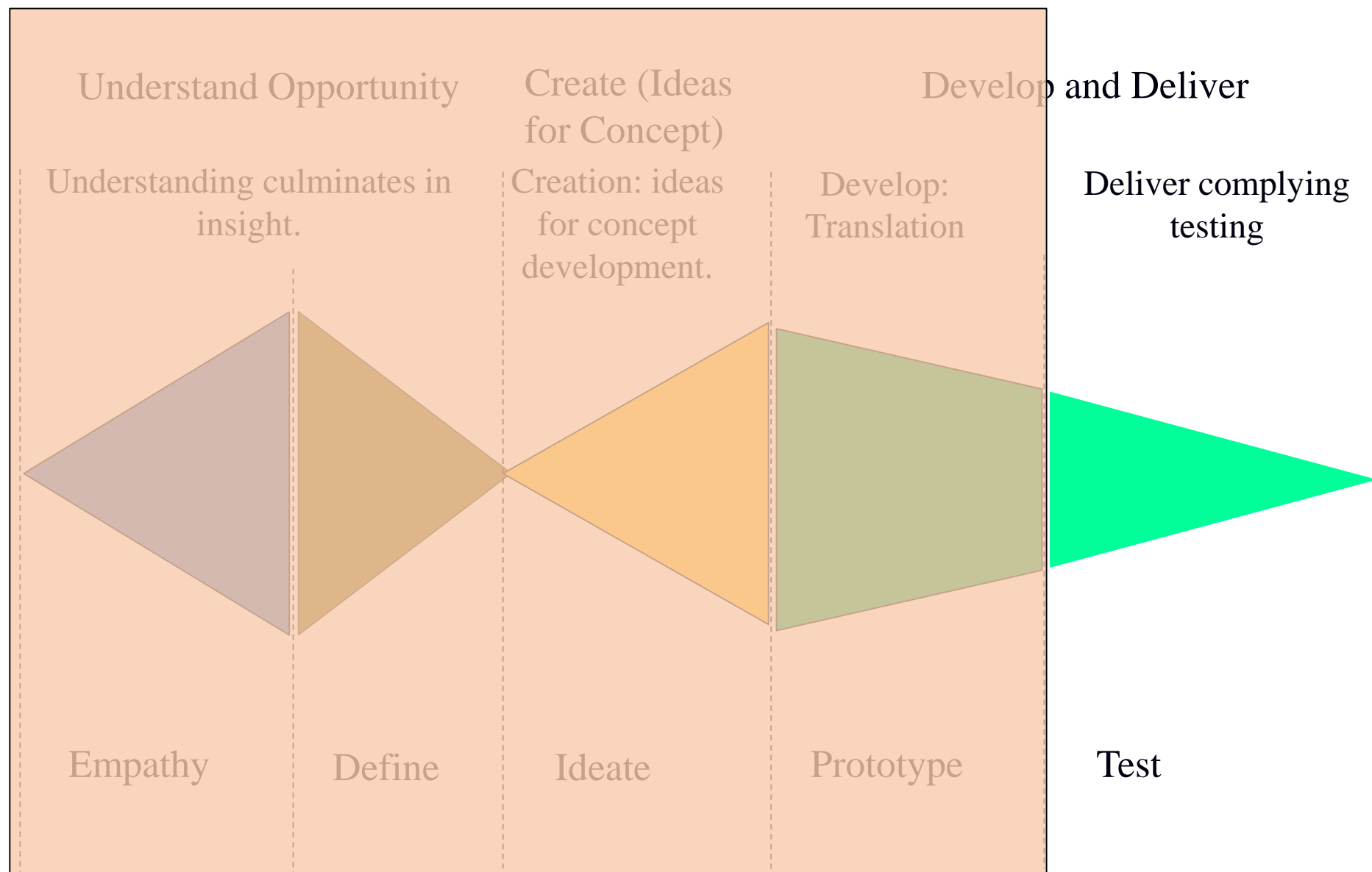# Design Thinking and Product Conceptualization & Development

A Perspective on Innovation: Design Thinking and Product Engineering Design and Development

❖ Design Thinking is an **innovation process inspired by empathy for the user's needs** followed by **ideation and implementation,** particularly **influencing new product design and development** as it is a means **to direct and focus design and development that results into effective commercialization.**

❖ Design Thinking in **the context of product development** commonly outlines the aspects like, **Empathizing** with users and potential customers**, developing insights** and grasp **user experiences and problems, ideating for problem-solving** in design engineering**, building prototypes, MVP (**minimum viable products) for **feedback** on the product, which is **obtained by testing** with the user and customers.

❖ It however, can be **perceived that Design Thinking** is immensely efficacious in the **front-end part of engineering development** and that **can yield a great product concept** which can productively be the candidate for high fidelity prototyping.

Understand Opportunity

Understanding culminates in insight.

Create (Ideas for Concept)
Creation: ideas for concept development.

Develop and Deliver

Develop: Translation

Deliver complying testing

Empathy

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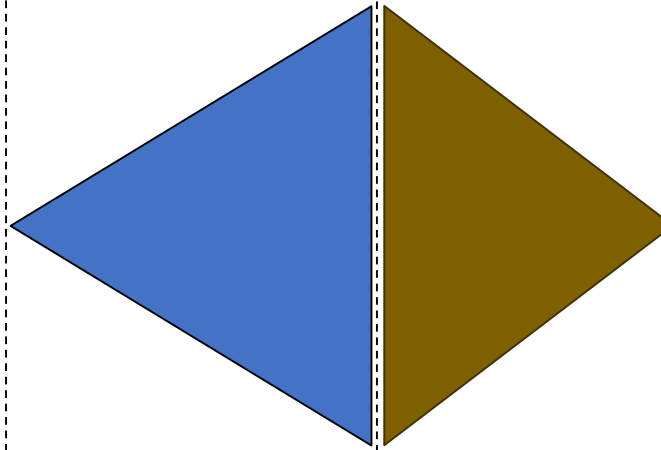
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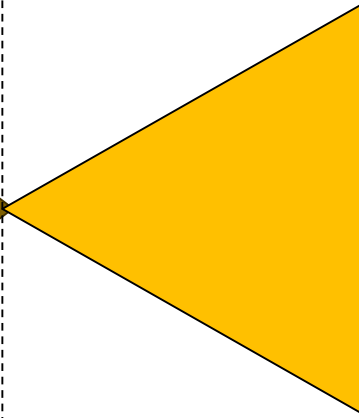Prototype

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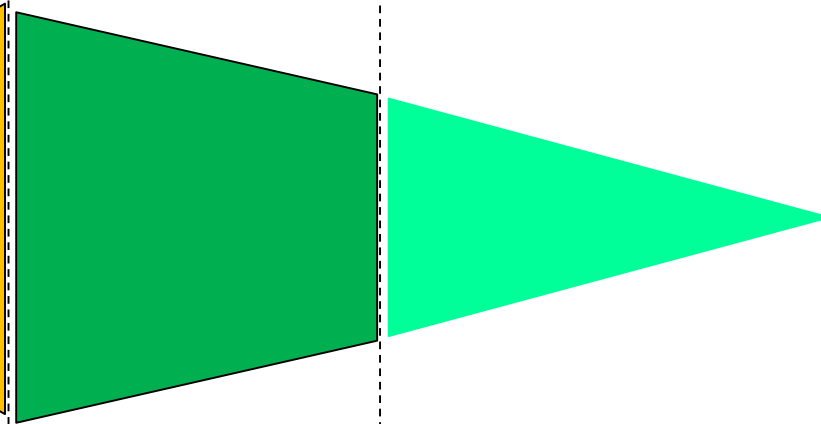
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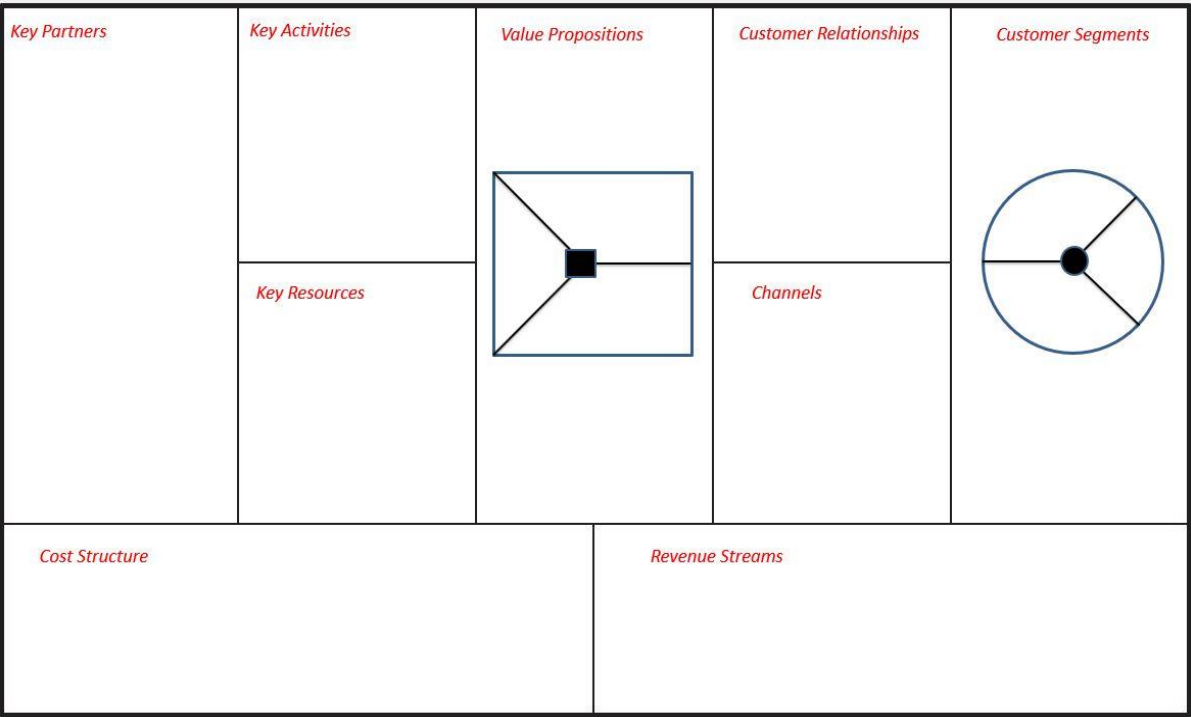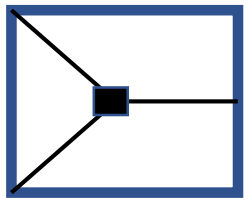Deliver complying testing

Empathy

Define

Ideate

Prototype

Test

DT's influence on Design Conceptualization

❖ It can well be understood that Design Thinking has the intertwining with the Product Engineering Design and Development process.

❖ It especially influences the front-end of innovation and development and particularly in product design conceptualization.

❖ Retracing from a DT model for the steps in product conceptualization development corroborates the above as is depicted through the last two diagrams.

❖ It helps to guide to efficacious 'Value Proposition'

Business Model Canvas and Value Proposition Canvas Elements

Key Partners	Key Activities	Value Propositions	Customer Relationships	Customer Segments
	Key Resources		Channels	
Cost Structure			Revenue Streams	

Value (Proposition) Map

Customer Profile Map

The 'value proposition' is to be embedded in a viable business model to capture value for the business venture and to carry out this exercise one may use the 'Business Model Canvas', a tool to illustrate how the venture creates, delivers, and captures value. These two organically integrate where the 'value proposition' acts as a plug-in to the 'Business Model Canvas' allowing the 'techno-preneur' to zoom into the details of how values are being created for customers.
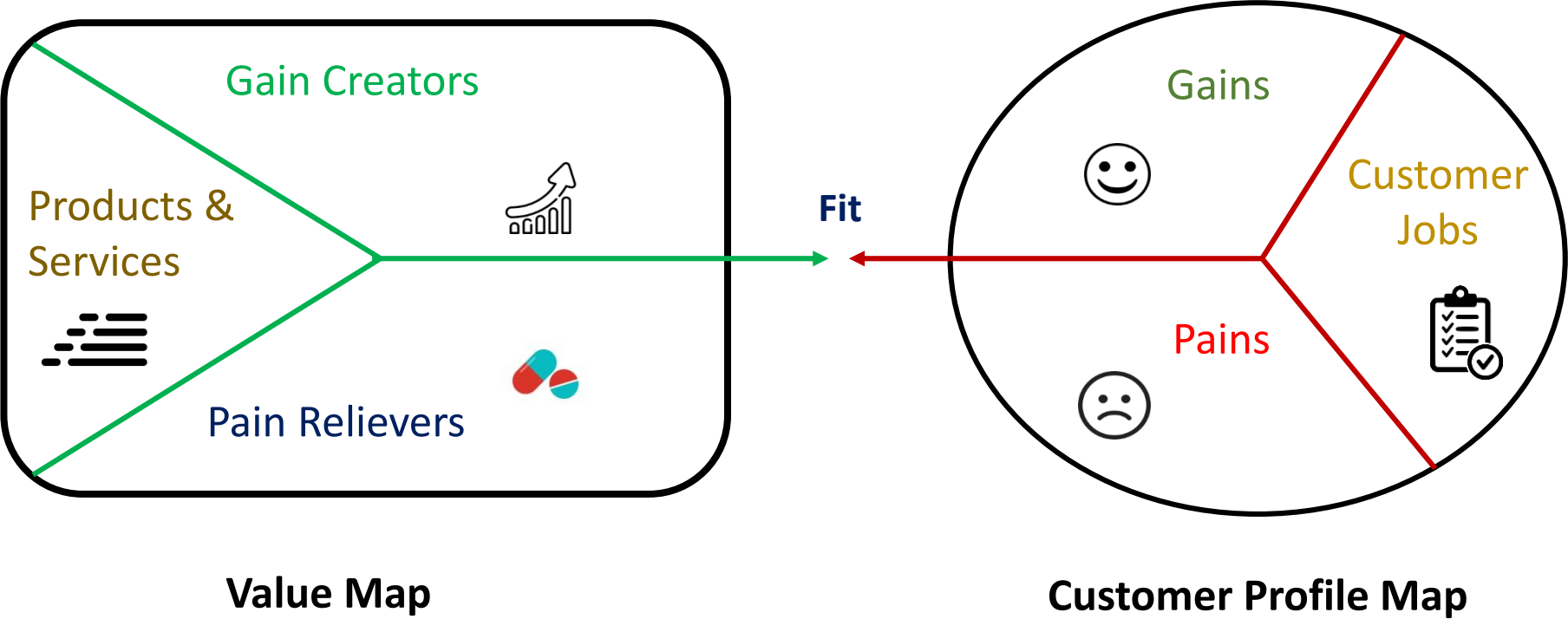
Value Proposition Canvas

Gain Creators

Products & Services

Pain Relievers

Fit

Gains

Pains

Customer Jobs
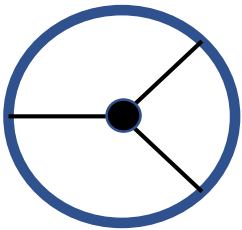
Value Map

Customer Profile Map

Value Proposition Design aids in

❖ Gaining clarity on the patterns of value creation by way of organizing information regarding customers need (jobs to be done, pains, and gains)

❖ Getting the venture-team aligned for leveraging the experience, skills and energy with shared language in creating value for the customers and business.

❖ Reducing the risks of failure and saving time by painstakingly testing the important hypotheses intrinsic to the product/ venture ideas.

❑ Overriding purpose is to Design, test, and deliver to meet the needs of the customers precisely

❑ Product Engineering team resorts to 'Value Proposition Canvas' a tool, apt for this purpose.

Value Proposition Canvas (VPC)

❖ **The Value (Proposition) Map** outlines the features of a specific 'value proposition' in the business model in a structured and meticulous way, categorising into **'Products and Services', 'Pain Relievers', and 'Gain Creators':**

▪ **Products and Services:** the items around which the 'value proposition' is built.

▪ **Pain Relievers:** how the products and services abate customer pains.

▪ **Gain Creators:** how the products and services sets forth customer gains.

❖ **The Customer (Segment) Profile** addresses a particular customer segment in the business model in a structured and explicit manner, **breaking the customer (problem-solution) 'Fit' down into 'Jobs-to-be-done', 'Pains', and 'Gains'.**

'Customer 'Jobs' , Pains and Gains

- **'Customer Jobs** ('Jobs-to-be-done') 'verbalises' what customers are trying to get done in their context.

- **'Pains'** characterise awful outcomes, risks (undesired potential outcomes), and obstacles pertained to customer jobs

  - Pain severity can be extreme or moderate perceived by a customer, like 'customer jobs' can be important or insignificant.

- **'Gains'** illustrate the outcomes desired to be achieved or the concrete benefits sought by the customer.

Customer 'Jobs' are mainly three types

- ❑ **Functional jobs:** When customers try to accomplish a specific task or solve a particular problem (example: grind spices or save contact in mobile phone)

- ❑ **Social jobs:** When customers crave to look good or gain status/ power (example: to look classy as a consumer or be perceived as tech-savvy)

- ❑ **Personal/emotional jobs:** When customers quest after a specific emotional state, such as feeling good or secure (example: achieving the feeling of safety in using a gas-oven or peace of mind with smoke-alarm).

Customer Gains

- **Required gains:** are those without which a solution wouldn't work (example: **the most basic expectation** that one can make a **call with a smartphone**).

- **Expected gains**: are rather basic which one **commonly would expect from a solution,** even if it could work without them (example: since **Tesla** introduced electric vehicle, the usual expectation **would nicely-designed and look stylish**)

- **Desired gains:** are those that go **beyond what one expects from a solution but would love** to have it if possible and usually customers would verbalise if queried (example: **Laptop computer to be seamlessly integrated with customer's other devices**)

- **Unexpected gains:** are those that go **beyond customer expectations/ desires (surprise)** and they wouldn't verbalise if queried (example: Before the introduction of **touch screens by 'Apple'** customers hardly thought of it as part of a phone.

With reference to 'Gain', a customer may perceive something **essential or nice to have**

the way for **'pains'** it is **'extreme' or moderate.**

Fit:

❖ The business achieves the first fit, the 'problem-solution fit' when customers are excited as for the 'value proposition' that materialises when,

▪ the key 'jobs-to-be-done' are addressed,

▪ extreme pains gets mitigated, and

▪ essential gains are created, the customers look for.

❑ It is to be tried relentlessly to find and maintain 'Fit' and striving for it is the essence of successful value proposition design.

❖ **The First Fit:**

❑ The **first 'Fit' (Problem-solution)** eventuates with the precise identification of relevant pains, gains and 'jobs-to-be-done', that the business reckon on as addressable through the 'value proposition design'

❑ Multiple alternative value propositions are prototyped to evolve with the ones that produce the best 'fit'. However, this 'Fit' as perceived to be as achieved is not yet proven and still remains as the progress document.

Three Stages of 'Fit'

❖ After the **Problem-Solution Fit (First Fit)**, the next steps in this regard are to find evidence that customers appreciate the value proposition or else it is to start over again with designing a new version, the quicker the better with rapid prototyping and for that to check:

➢ The **second 'Fit' (product-market)** eventuates when customers favourably or positively respond to the 'value proposition' and the offerings gain traction in the market.

➢ **The third 'Fit' (business model)** eventuates when the model is scalable and profitable.

❑ **Iterative process to match Value Proposition and Business Model:**

▪ The quest for 'business model fit' necessitates rigorous back and forth between designing a value proposition that creates value for customers and a business model that creates value for the business. An iterative