SCIE 4701/4702

SCIENCE & TECHNOLOGY INNOVATION, COMMERCIALIZATION, & ENTREPRENEURSHIP

PROFESSOR: AARON NEWMAN

INTRODUCTION

WHAT IS SURGE?

▸ One of the NS innovation sandboxes

▸ Provides experiences in:
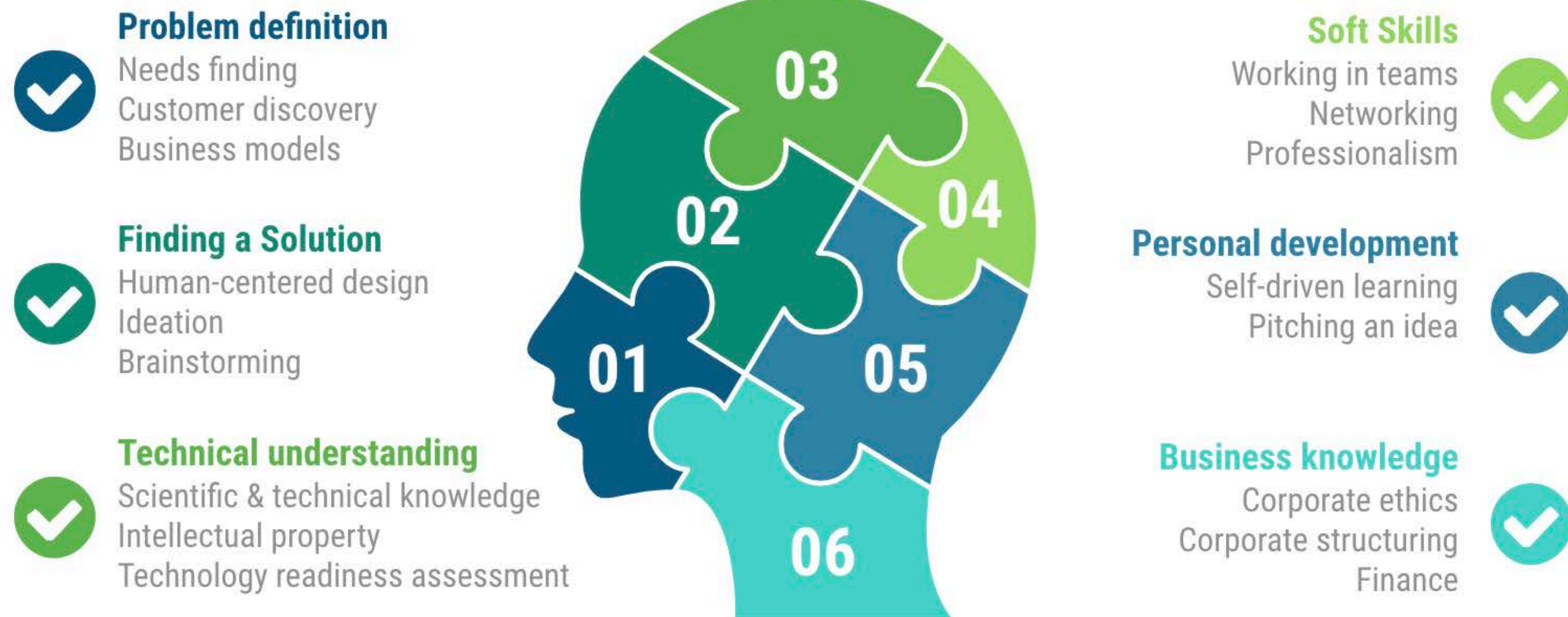
   ▸ Applying science to real world problems

   ▸ Creativity, innovation, design thinking

   ▸ Entrepreneurship and the startup ecosystem

   ▸ Leadership

What We Teach

Problem definition
Needs finding
Customer discovery
Business models

Finding a Solution
Human-centered design
Ideation
Brainstorming

Technical understanding
Scientific & technical knowledge
Intellectual property
Technology readiness assessment

Soft Skills
Working in teams
Networking
Professionalism

Personal development
Self-driven learning
Pitching an idea

Business knowledge
Corporate ethics
Corporate structuring
Finance

SURGE
Science Unleashed

SURGE
Science Unleashed

CORE PROGRAMMING

Discover	Deep Dives	Class	Residency	Next Steps
One-off, 1-3 hours Specific topics of interest to students and faculty Raise visibility, attract students	Hackathons Makeathons Startup Weekends Short Incubators (e.g., Launch Oceans)	Full year capstone course in processes of innovation and entrepreneurship Project-based experiential learning in teams	Mentorship, space, & financial support for teams Customer discovery, validation, prototyping Prepare teams for successful applications to next steps	Collide LaunchDal 100k IDEA Hub COVE, CDL Propel, Volta etc.

DALBOX COLLAB

▸ **Toolbox** - adventure-based problem-solving

▸ **MAKE** - physical prototyping

▸ **ACCESS** - national Innovative Design for Accessibility competition

▸ **LEAP** - leadership

WHY?

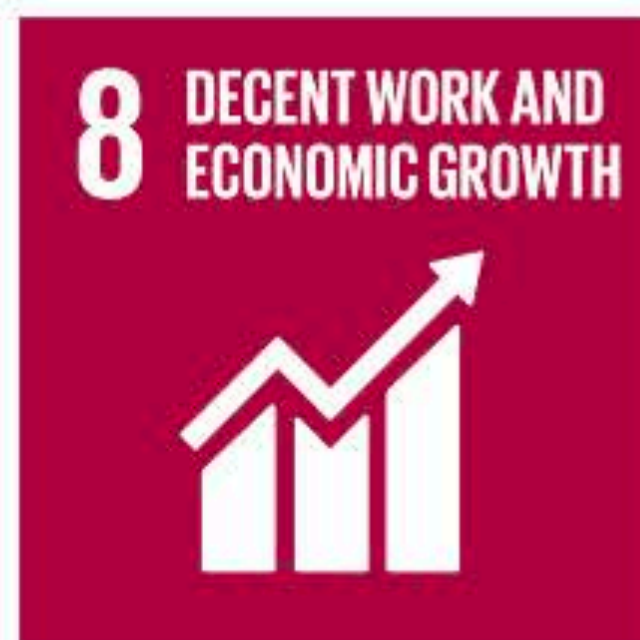We must learn to teach the best attitude to what is not yet known

– C.S. Sherrington

YOUR FUTURE

‣ Likely to pursue a graduate or professional degree

‣ Likely to work in an organization

‣ Likely to work with a range of people with very different backgrounds

‣ Likely to work on projects, in teams, to effect change

‣ Likely to end up in leadership/managerial position of some kind

ENTREVESTOR

- ▸ In spite of the pandemic, Atlantic Canada had more startups at the end of 2020 than ever before.

- ▸ ...employment at Atlantic Canadian high-growth companies increased 7 percent in 2020, with 40 percent of the companies in the community increasing staff

- ▸ **...many young people who were trying to start a company a few years ago, and have jumped to attractive positions with scaling or established innovation-driven companies. The sector is healthy and demand for good people is strong**.

- ▸ http://entrevestor.com/home/entry/our-databank-shows-fewer-new-companies-more-failures-in-2020
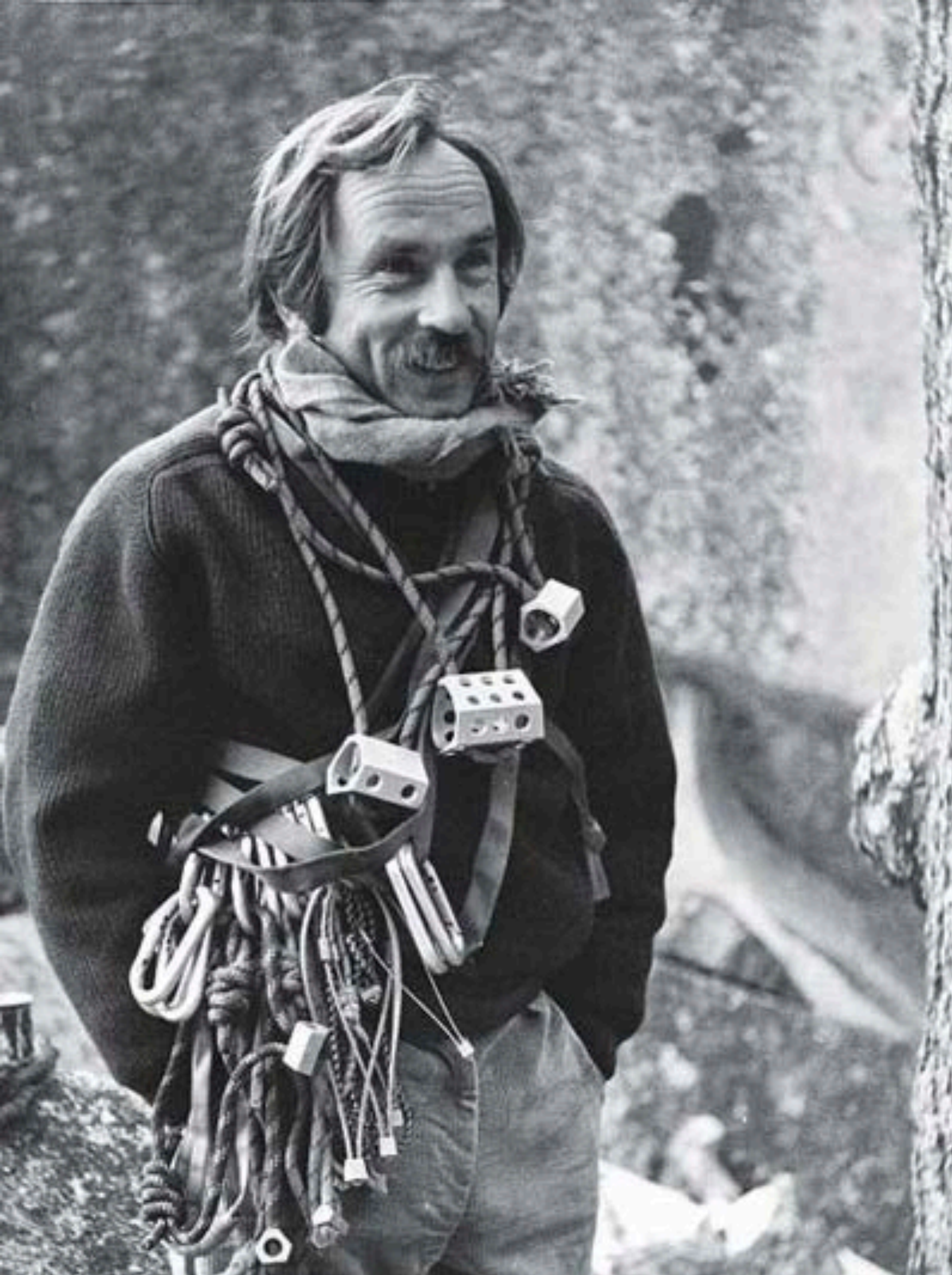
'Business can produce food, cure disease, control population, employ people, and generally enrich our lives. And it can do these good things and make a profit without losing its soul.'
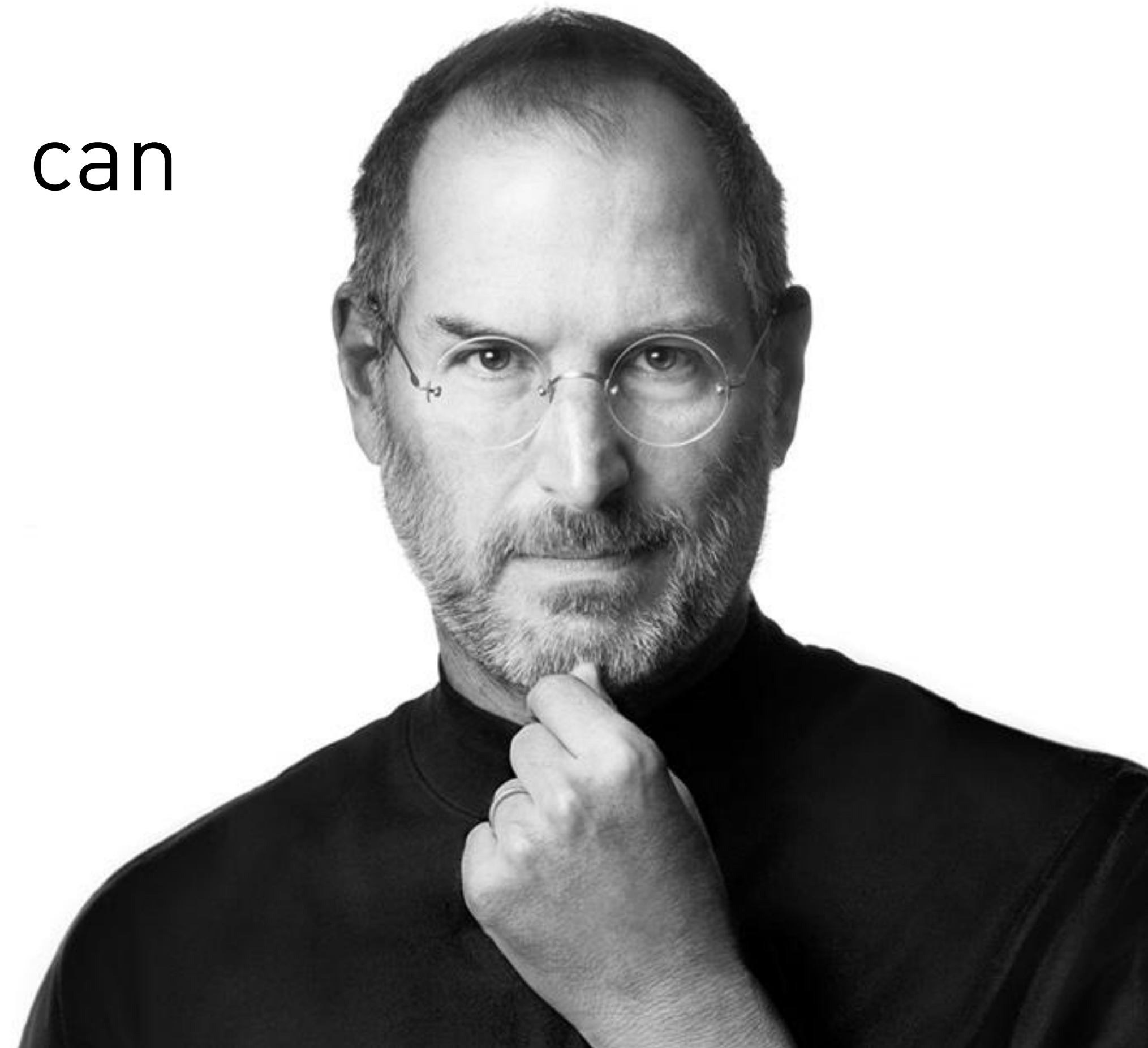
– Yvon Chouinard
founder, Patagonia

INNOVATION

'Everything around you that you call life, was made up by people that were no smarter than you. And you can change it, you can influence it, you can build your own things that other people can use.'
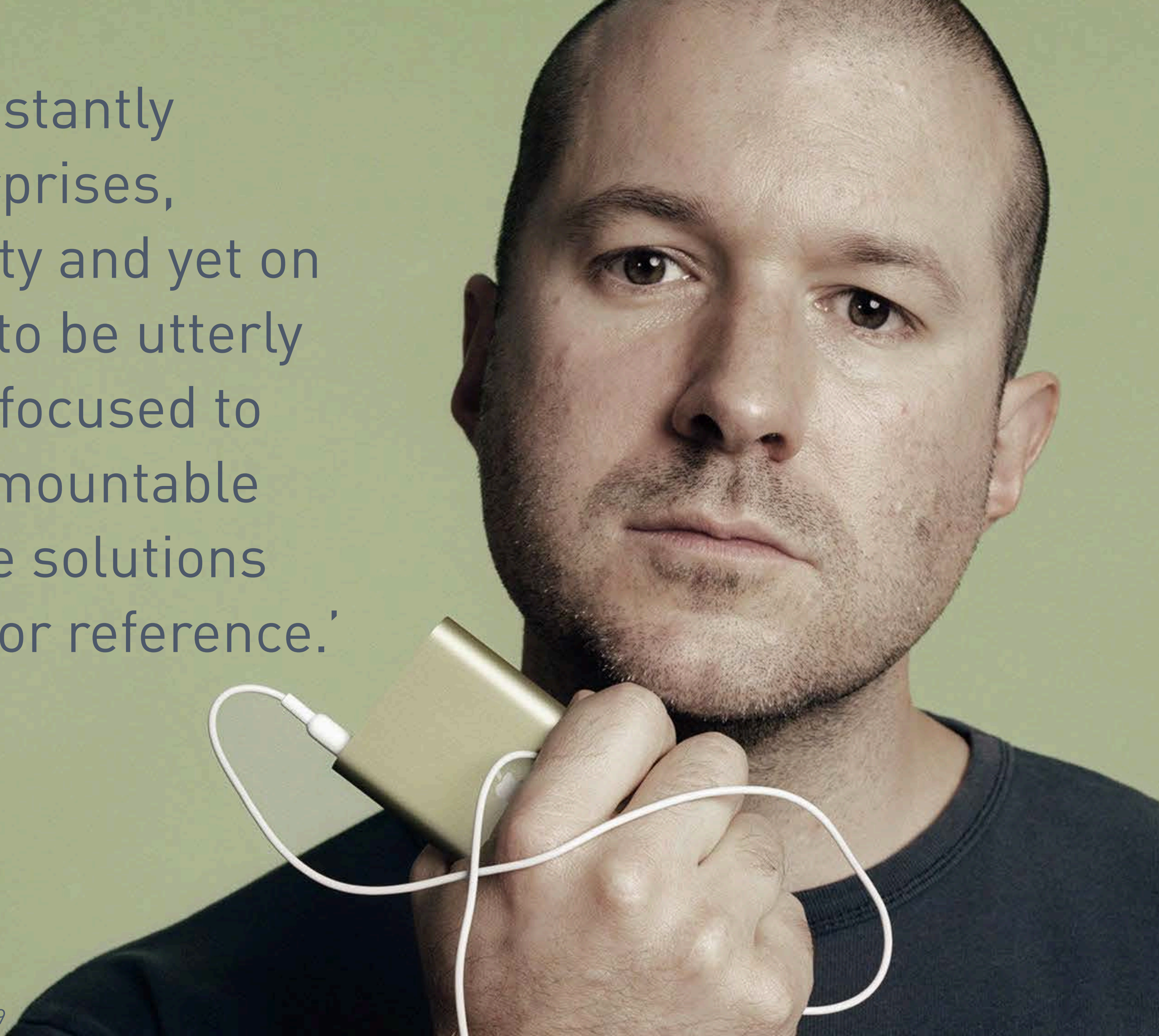
- Steve Jobs

'On one hand to be constantly questioning, loving surprises, consumed with curiosity and yet on the other hand having to be utterly driven and completely focused to solve apparently insurmountable problems, even if those solutions are without precedent or reference.'
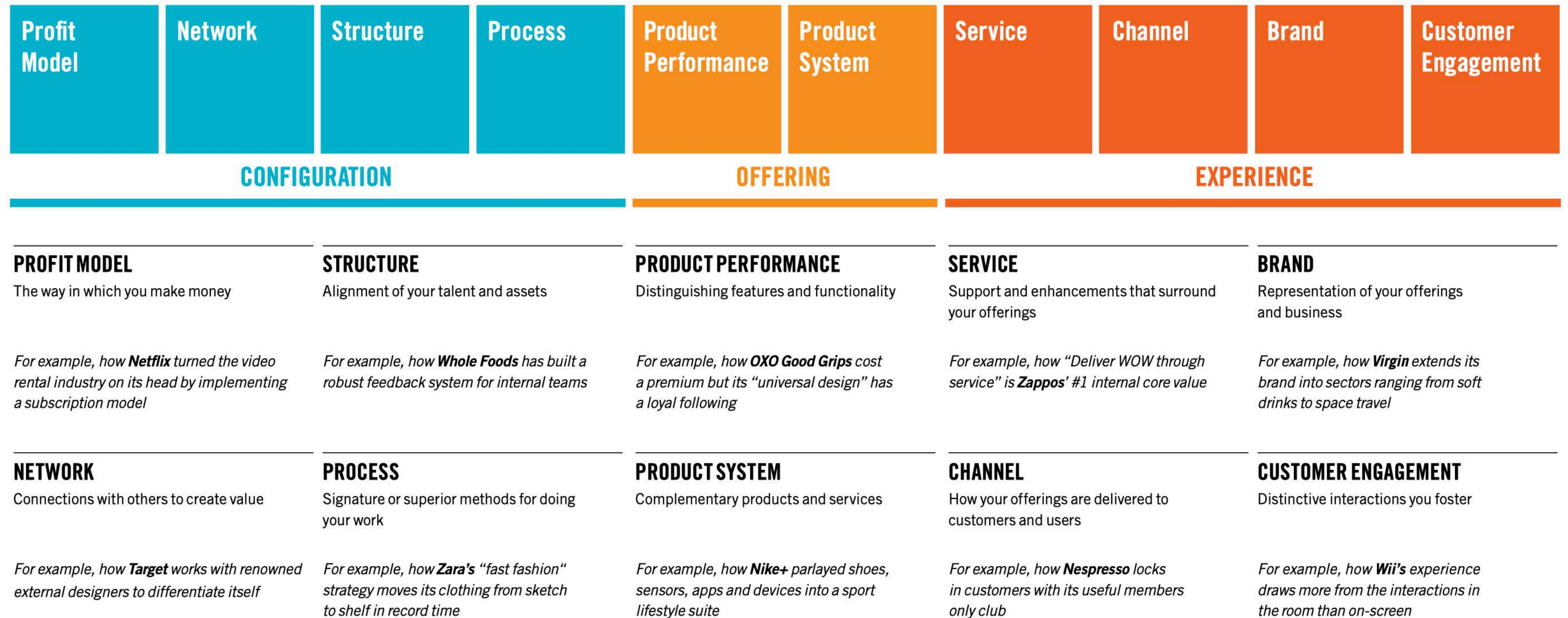
- Johnny Ive

Ten Types of Innovation

Keeley, Pikkel, Quinn, & Walters, 2013

Profit Model	Network	Structure	Process	Product Performance	Product System	Service	Channel	Brand	Customer Engagement
CONFIGURATION				**OFFERING**		**EXPERIENCE**			

PROFIT MODEL

The way in which you make money

For example, how **Netflix** turned the video rental industry on its head by implementing a subscription model

STRUCTURE

Alignment of your talent and assets

For example, how **Whole Foods** has built a robust feedback system for internal teams

PRODUCT PERFORMANCE

Distinguishing features and functionality

For example, how **OXO Good Grips** cost a premium but its "universal design" has a loyal following

SERVICE

Support and enhancements that surround your offerings

For example, how "Deliver WOW through service" is **Zappos'** #1 internal core value

BRAND

Representation of your offerings and business

For example, how **Virgin** extends its brand into sectors ranging from soft drinks to space travel

NETWORK

Connections with others to create value

For example, how **Target** works with renowned external designers to differentiate itself

PROCESS

Signature or superior methods for doing your work

For example, how **Zara's** "fast fashion" strategy moves its clothing from sketch to shelf in record time

PRODUCT SYSTEM

Complementary products and services

For example, how **Nike+** parlayed shoes, sensors, apps and devices into a sport lifestyle suite

CHANNEL

How your offerings are delivered to customers and users

For example, how **Nespresso** locks in customers with its useful members only club

CUSTOMER ENGAGEMENT

Distinctive interactions you foster

For example, how **Wii's** experience draws more from the interactions in the room than on-screen

Design Thinking

IDEO

Human-Centred

Collaborative

Optimistic

Experimental

"Design research both inspires imagination and informs intuition through a variety of methods with related intents: to expose patterns underlying the rich reality of people's behaviors and experiences, to explore reactions to probes and prototypes, and to shed light on the unknown through iterative hypothesis and experiment."

— Jane Fulton Suri

Hear

Inspiration

Interviews
Fieldwork
Secondary research

Create

Ideation

Refine objectives
Brainstorm
Prototype
Test

Deliver

Implementation

Model costs
Assess capabilities
Identify needs
Plan implementation
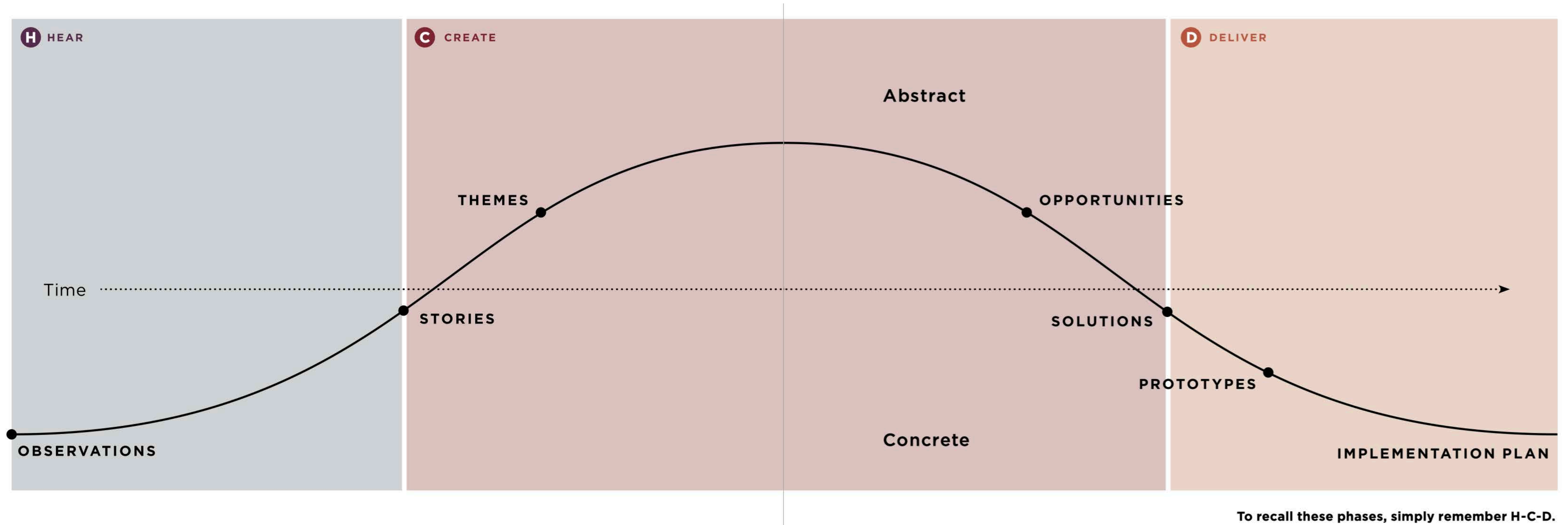
Experimentation

- "Lean" method
- Clearly define assumptions and *small* testable hypotheses
- Identify most crucial questions or assumptions you need to move forward
- Generate tests (possibly using prototypes) to ask the questions
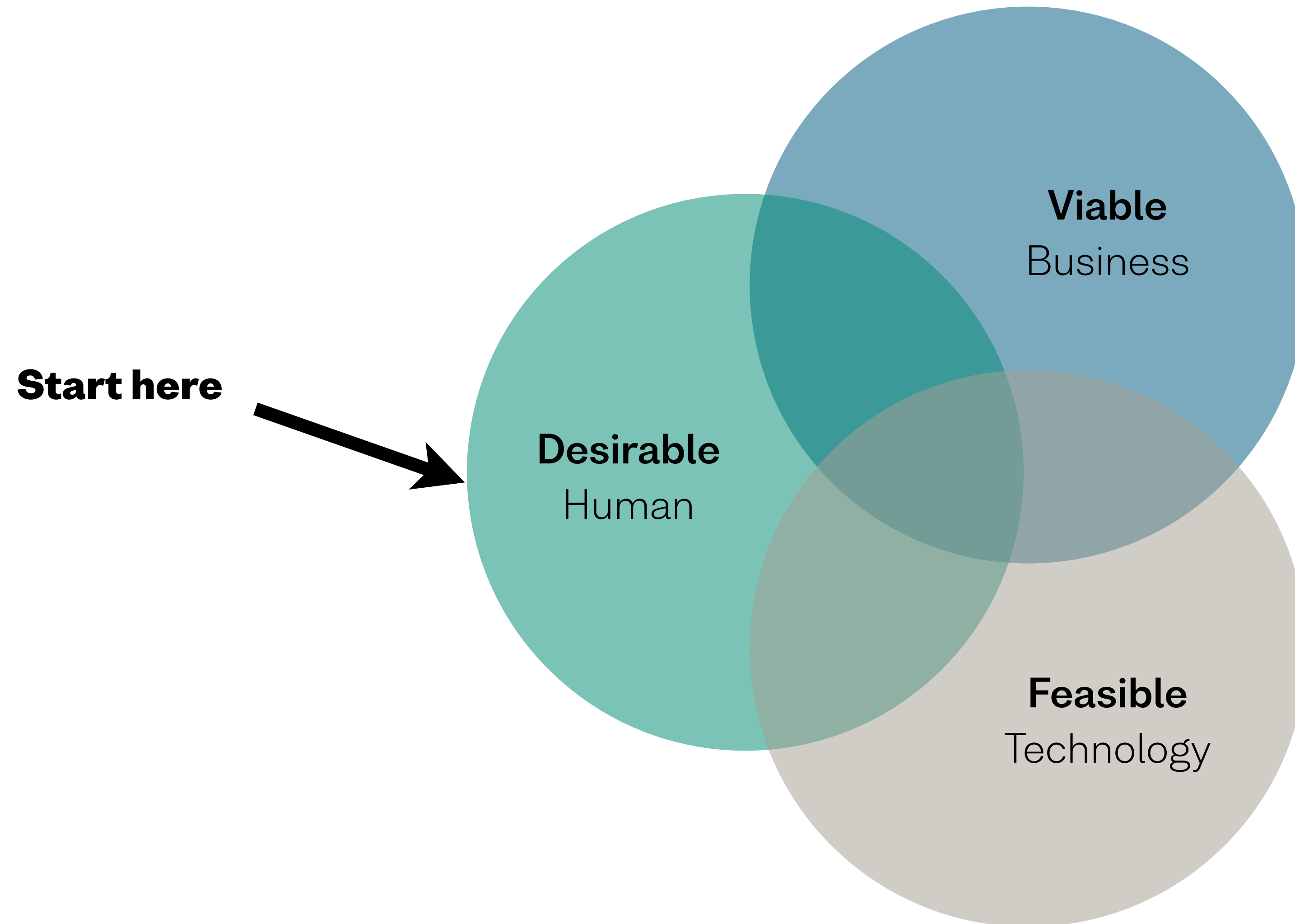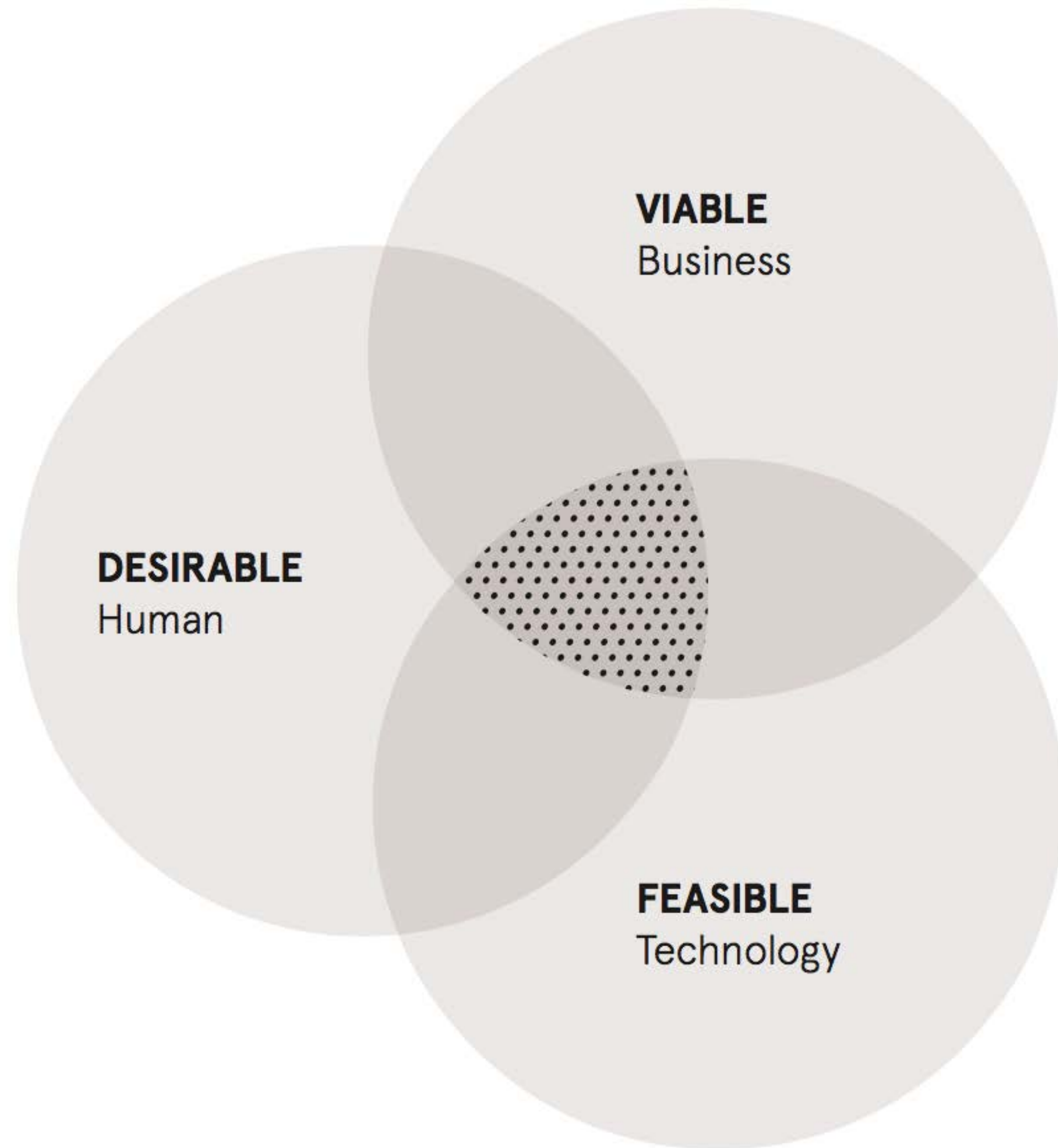- Define data you will collect and how it will inform next steps

Measure

Learn
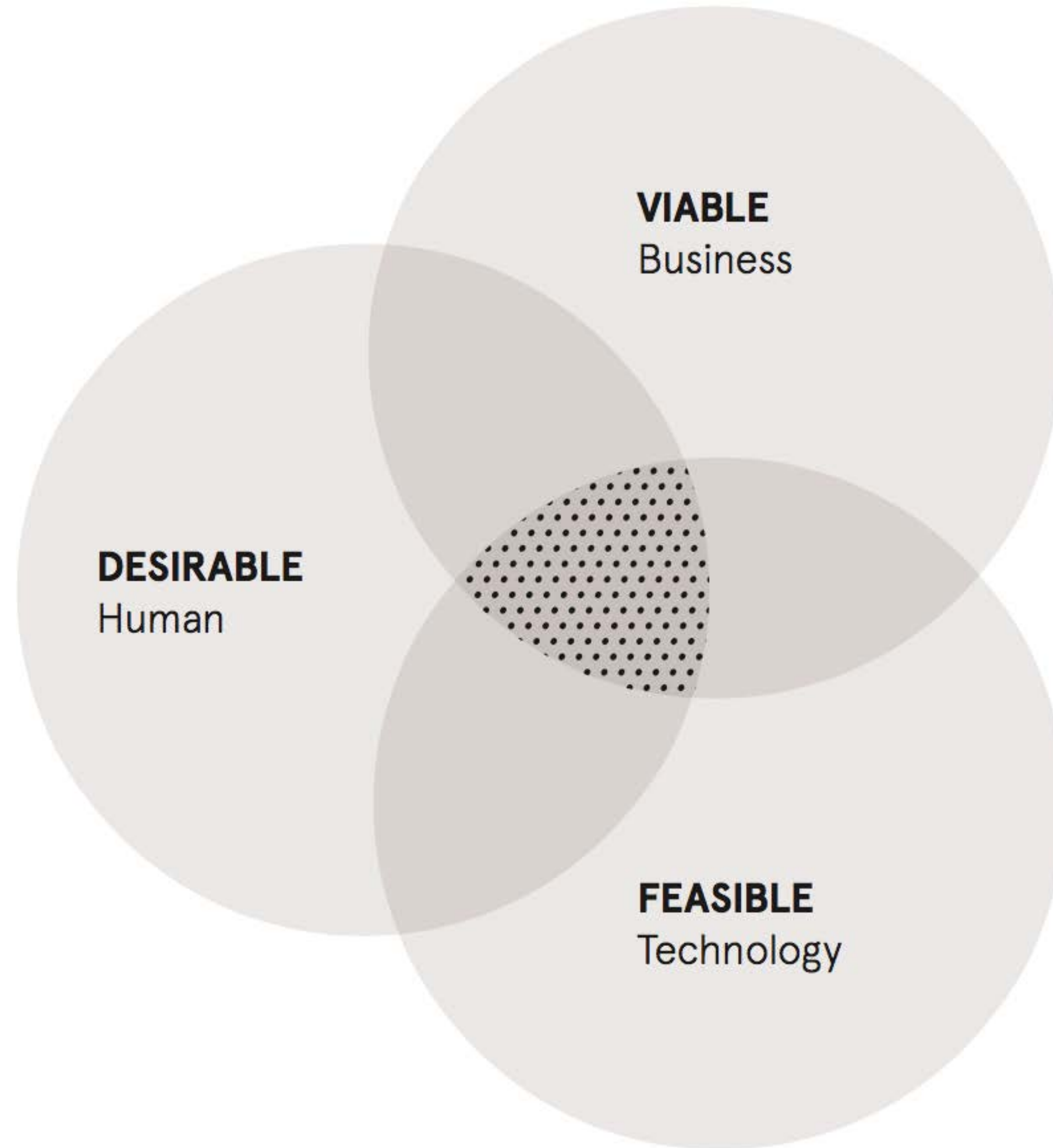
Build

Human-Centred Design

Viable
Business

Desirable
Human

Feasible
Technology

IDEO
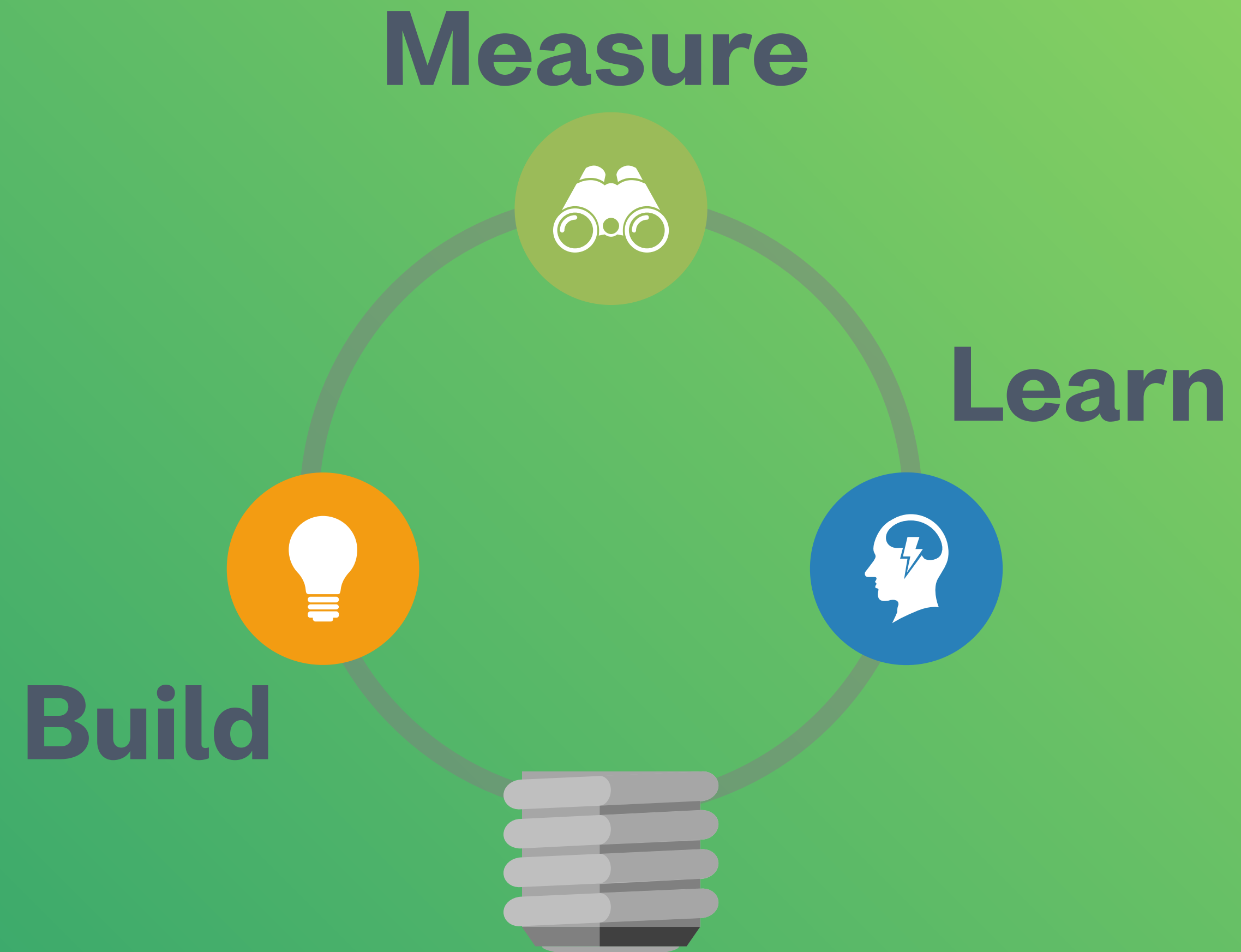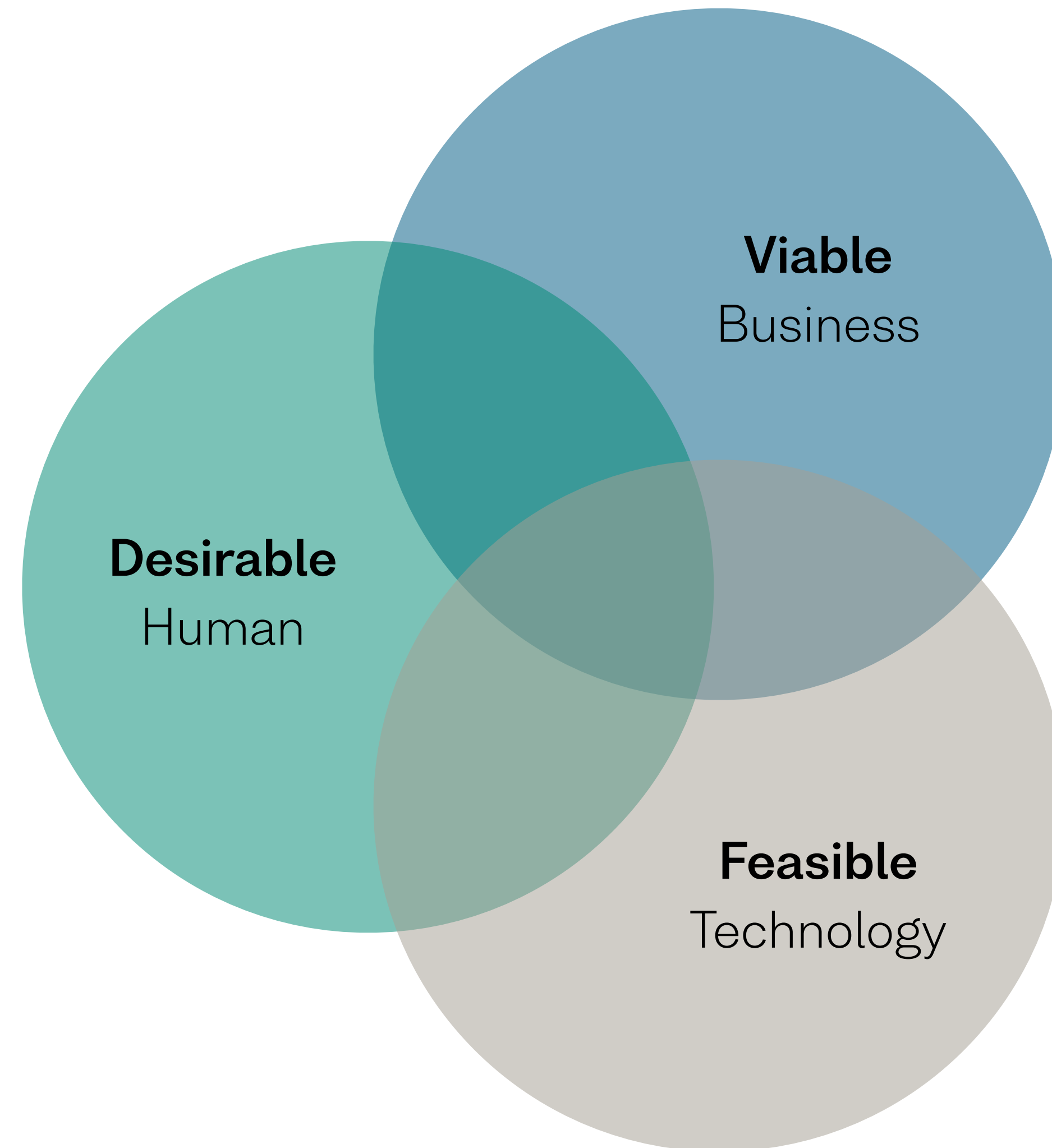
Human-Centred Design

Start here →

Viable
Business

Desirable
Human

Feasible
Technology

IDEO

VIABLE
Business

DESIRABLE
Human

FEASIBLE
Technology

Start here

DESIRABLE
Human

VIABLE
Business

FEASIBLE
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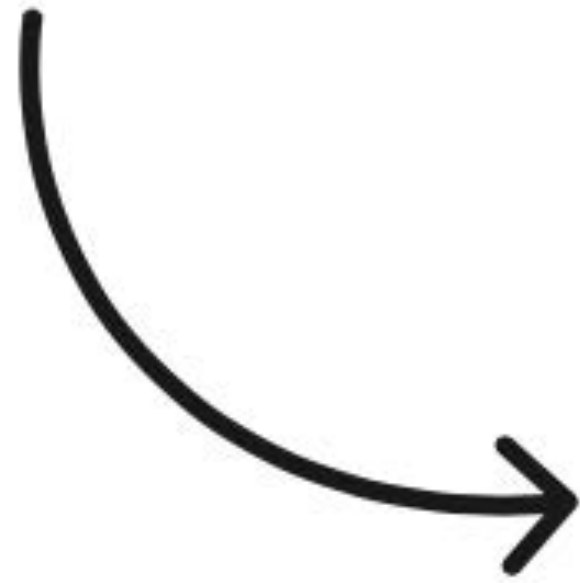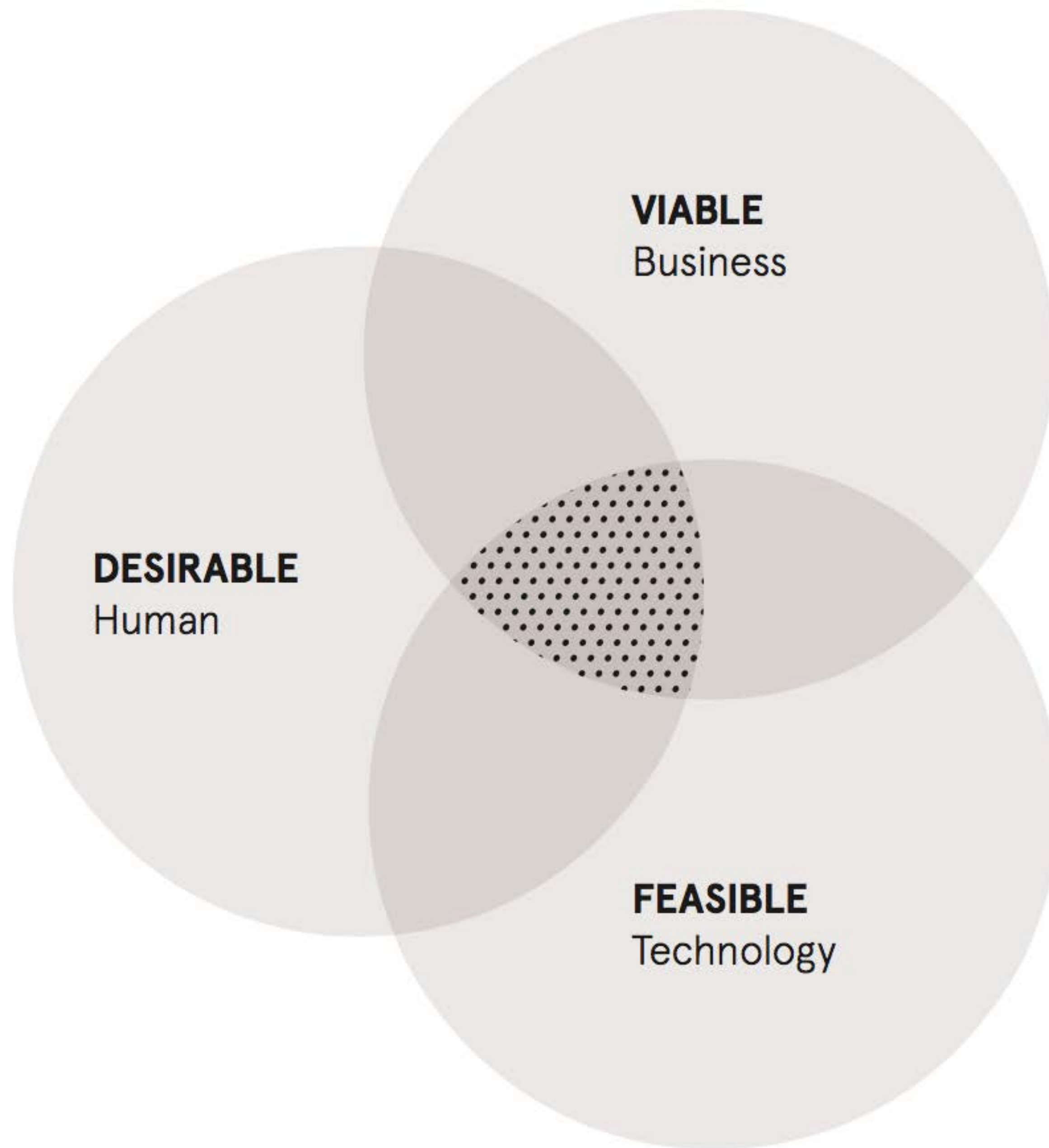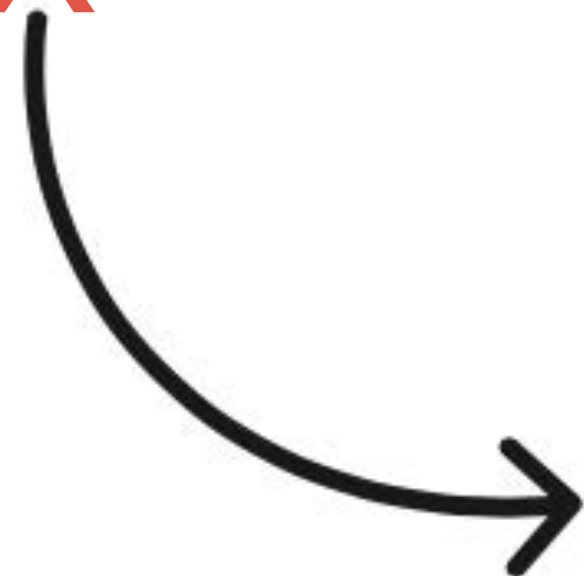
START WHERE?

Fall in love with a problem, not a solution

IDENTIFY A CHALLENGE

▸ Problem statement

  ▸ Framed in human terms

  ▸ Narrow enough to be manageable

  ▸ Broad enough to allow creativity

▸ "How might we...?"

PROBLEM STATEMENT

▸ **Who** does the problem affect (stakeholders)?

▸ **What** are the implications of the problem?

▸ **How** severe is the problem?

▸ **Where** does the problem occur?

▸ **Why** does the problem occur?

PROBLEM STATEMENT

‣ **Who** does the problem affect (stakeholders)?

‣ **What** are the implications of the problem?

‣ **How** severe is the problem?

‣ **Where** does the problem occur?

‣ **Why** does the problem occur?

All of your answers are HYPOTHESES that must be validated or falsified by talking to humans

Qualitative Research

- **"Get out of the building" (get out of your head)**

- **Interviews**

- **Observations "in the wild"**

Goals

- Understand the person

- Understand human experience of problem

- Pain points

- Themes and stories

User Journey Map

- **Map out steps of "journey" of job-to-be-done**

- **Identify pain points and opportunities for solutions**

VALUE PROPOSITION CANVAS

Value Proposition
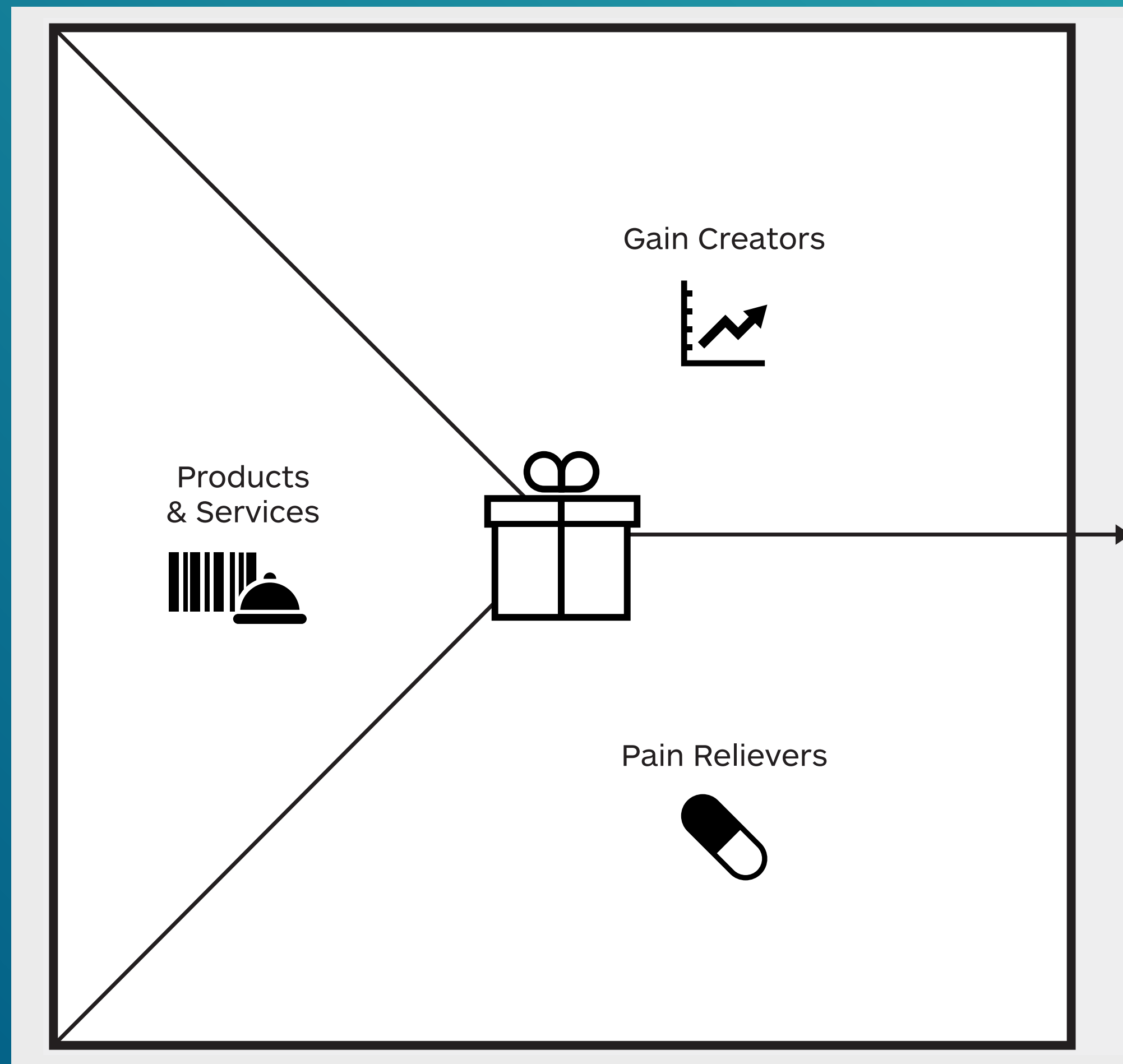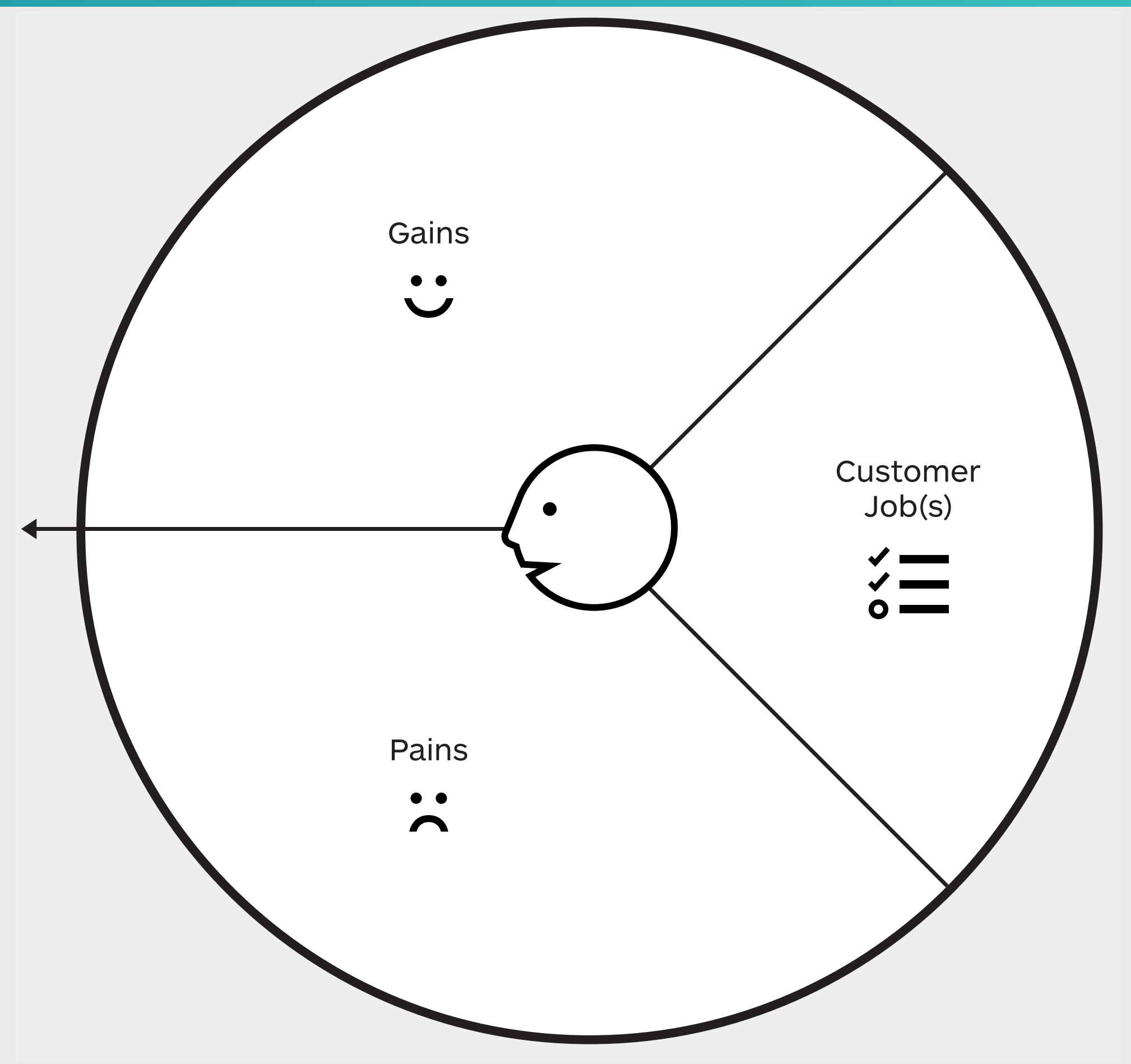
Gain Creators

Products & Services

Pain Relievers

Customer Segment

Gains

Customer Job(s)

Pains

ENTREPRENEURSHIP

"THE RELENTLESS PURSUIT OF OPPORTUNITY WITHOUT REGARD TO RESOURCES CURRENTLY CONTROLLED"

– HOWARD STEVENSON

HARVARD BUSINESS SCHOOL

STARTUP

"A temporary organization whose goal is to identify a viable business model"

- Steve Blank

The Business Model Canvas

Key Partners 🔗

Who are our Key Partners?
Who are our key suppliers?
Which Key Resources are we acquiring from partners?
Which Key Activities do partners perform?

MOTIVATIONS FOR PARTNERSHIPS
Optimization and economy
Reduction of risk and uncertainty
Acquisition of particular resources and activities

Key Activities ✔

What Key Activities do our Value Propositions require?
Our Distribution Channels?
Customer Relationships?
Revenue streams?

CATERGORIES
Production
Problem Solving
Platform/Network

Key Resources 🏭

What Key Resources do our Value Propositions require?
Our Distribution Channels? Customer Relationships?
Revenue Streams?

TYPES OF RESOURCES
Physical
Intellectual (brand patents, copyrights, data)
Human
Financial

Value Propositions 🎁

What value do we deliver to the customer?
Which one of our customer's problems are we helping to solve?
What bundles of products and services are we offering to each Customer Segment?
Which customer needs are we satisfying?

CHARACTERISTICS
Newness
Performance
Customization
"Getting the Job Done"
Design
Brand/Status
Price
Cost Reduction
Risk Reduction
Accessibility
Convenience/Usability

Customer Relationships ❤

What type of relationship does each of our Customer Segments expect us to establish and maintain with them?
Which ones have we established?
How are they integrated with the rest of our business model?
How costly are they?

EXAMPLES
Personal assistance
Dedicated Personal Assistance
Self-Service
Automated Services
Communities
Co-creation

Channels 🚚

Through which Channels do our Customer Segments want to be reached?
How are we reaching them now?
How are our Channels integrated?
Which ones work best?
Which ones are most cost-efficient?
How are we integrating them with customer routines?

CHANNEL PHASES
1. *Awareness*
   How do we raise awareness about our company's products and services?
2. *Evaluation*
   How do we help customers evaluate our organization's Value Proposition?
3. *Purchase*
   How do we allow customers to purchase specific products and services?
4. *Delivery*
   How do we deliver a Value Proposition to customers?
5. *After sales*
   How do we provide post-purchase customer support?

Customer Segments 👥

For whom are we creating value?
Who are our most important customers?

Mass Market
Niche Market
Segmented
Diversified
Multi-sided Platform

Cost Structure 🏷

What are the most important costs inherent in our business model?
Which Key Resources are most expensive?
Which Key Activities are most expensive?

IS YOUR BUSINESS MORE
Cost Driven (leanest cost structure, low price value proposition, maximum automation, extensive outsourcing)
Value Driven (focused on value creation, premium value proposition)

SAMPLE CHARACTERISTICS
Fixed Costs (salaries, rents, utilities)
Variable costs
Economies of scale
Economies of scope

Revenue Streams 💰

For what value are our customers really willing to pay?
For what do they currently pay?
How are they currently paying?
How would they prefer to pay?
How much does each Revenue Stream contribute to overall revenues?

TYPES
Asset sale
Usage fee
Subscription Fees
Lending/Renting/Leasing
Licensing
Brokerage fees
Advertising

FIXED PRICING
List Price
Product feature dependent
Customer segment dependent
Volume dependent

DYNAMIC PRICING
Negotiation (bargaining)
Yield Management
Real-time-Market

Social Business Model Canvas

Social Innovation Lab

Key Resources

What resources will you need to run your activities? People, finance, access?

Partners + Key Stakeholders

Who are the essential groups you will need to involve to deliver your progamme? Do you need special access or permissions?

Key Activities

What programme and non-programme activities will your organisation be carrying out?

Type of Intervention

What is the format of your intervention? Is it a workshop? A service? A product?

Channels

How are you reaching your beneficiaries and customers?

Segments

Beneficiary

Customer

Who are the people or organisations who will pay to address this issue?

Value Proposition

Social Value Proposition

Impact Measures

How will you show that you are creating social impact?

Customer Value Proposition

What do your customers want to get out of this initiative?

Cost Structure

What are your biggest expenditure areas? How do they change as you scale up?

Surplus

Where do you plan to invest your profits?

Revenue

Break down your revenue sources by %

Inspired by The Business Model Canvas

The Mission Model Canvas

Key Partners 🔗	Key Activities ✔	Value Propositions 🎁	Buy-in & Support ❤	Beneficiaries
	Key Resources 🏭		Deployment 🚚	

Mission Budget/Cost 🏷	Mission Achievement/Impact Factors 🏔

DESIGNED BY: Strategyzer AG & Steve Blank
The makers of Business Model Generation and Strategyzer

Strategyzer
strategyzer.com

CUSTOMER DISCOVERY
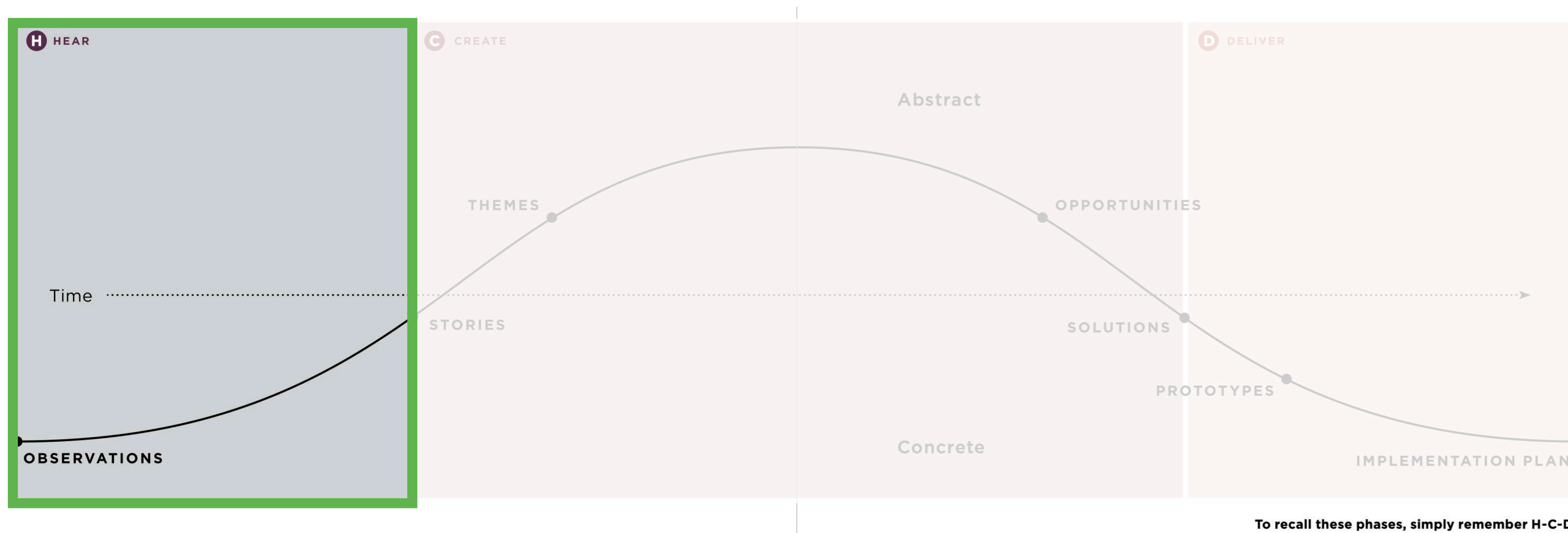
QUALITATIVE / ETHNOGRAPHIC RESEARCH

▸ Understand a person and how they experience a problem

▸ Small-n — focus is not on generalizability

▸ Observation + structured interviews

▸ Themes and stories