January 29, 2024

The DVF Framework
A collection of models

Dubberly Design Office

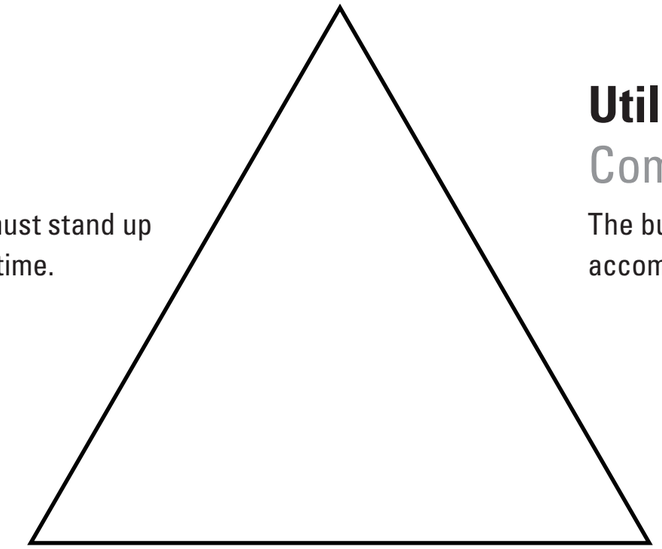
PART ONE

The DVF Framework

1

Vitruvius asserted that a building or other structure must exhibit three qualities: Firmitas (solidity), utilitas (commodity), venustas (beauty)

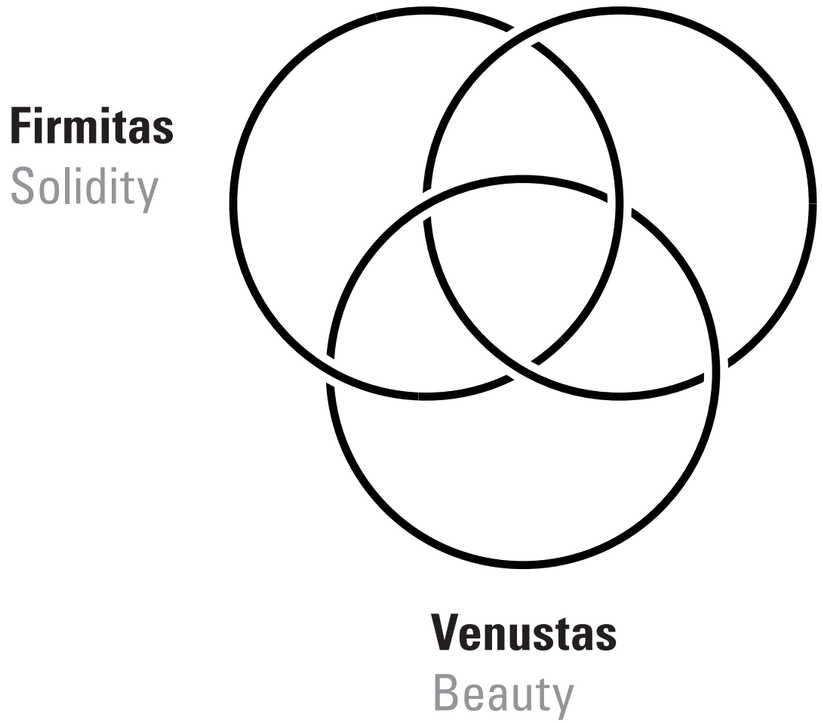
Firmitas
Solidity
The building must stand up to nature and time.



Utilitas
Commodity
The building must accommodate its users.

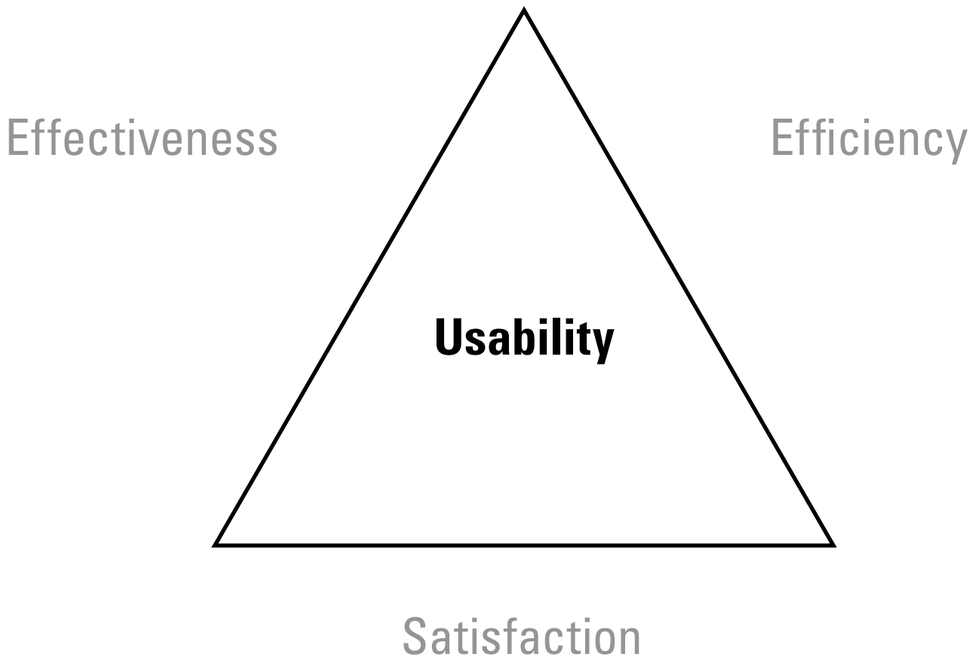
Venustas
Beauty
The building must delight its users.

This model has also been conceptualized as Borromean rings; if one ring is removed, the other two fall apart.

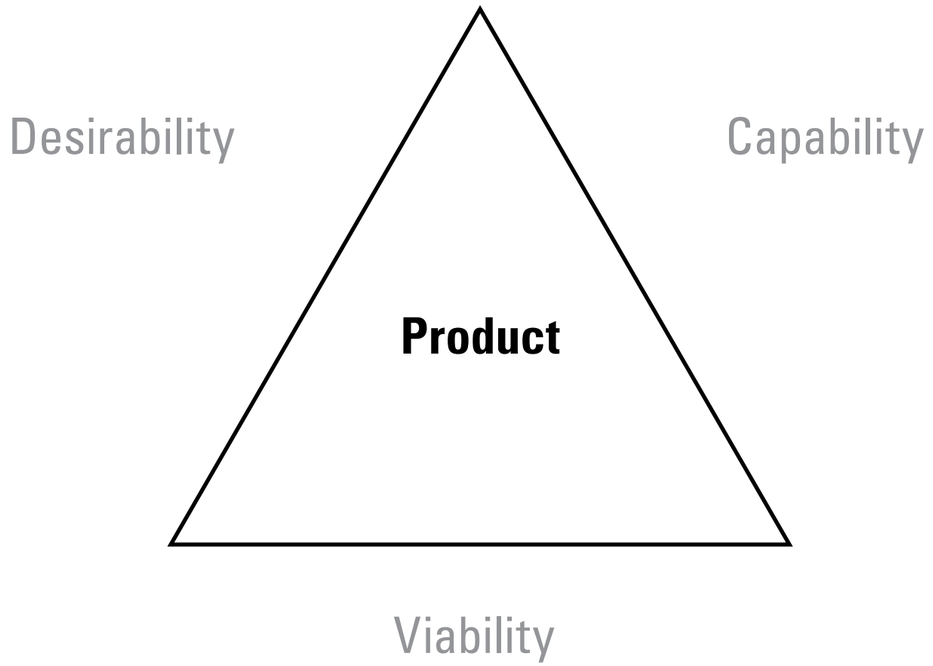


The ISO 9241 defines usability as

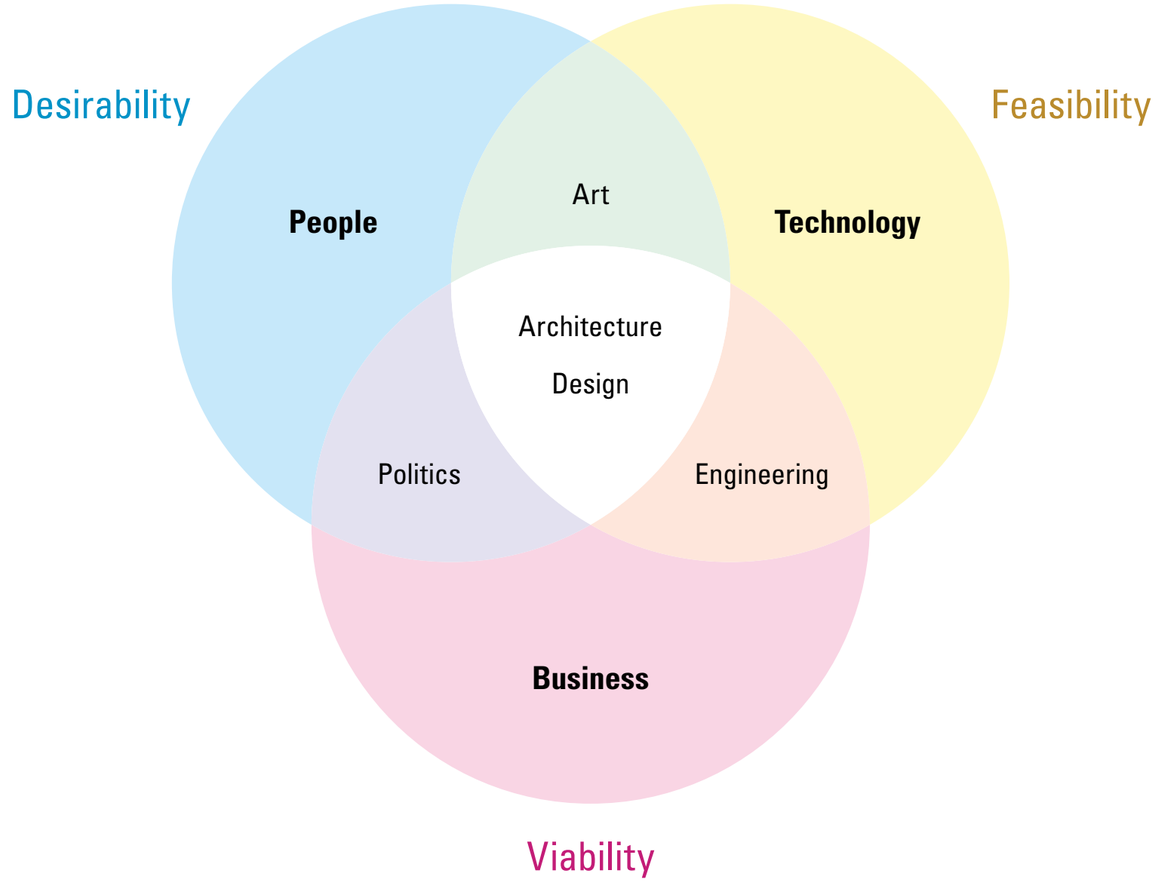
“the extent to which a product can be used ... with effectiveness, efficiency, and satisfaction”



Larry Keeley proposed a similar model for high-technology businesses.



Alan Cooper further builds upon this model as a Venn diagram — with people, technology, and business as the necessary components.

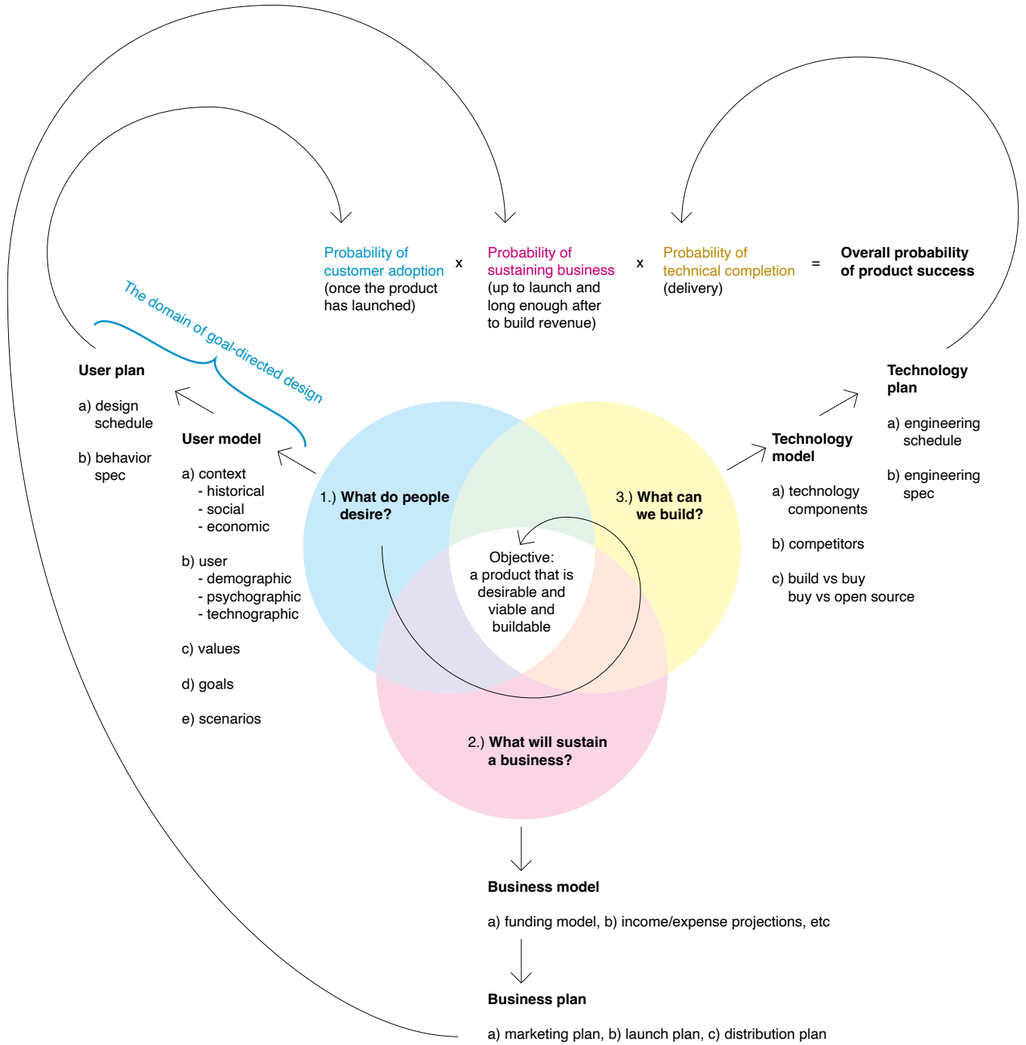


PART TWO

DVF in DDO work

2

Alan Cooper and the Goal Directed Design Process



http://www.dubberly.com/articles/alan-cooper-and-the-goal-directed-design-process.html

Alan Cooper and the Goal Directed Design Process

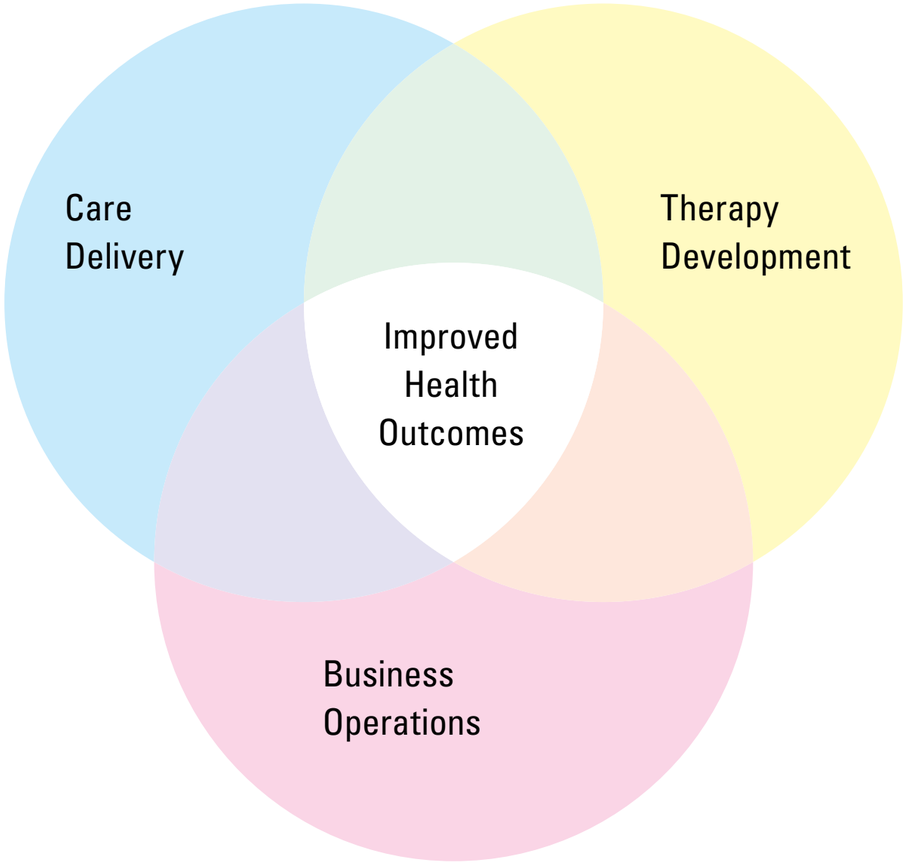
Novell emphasized technology and gave little attention to desirability. This made it vulnerable to competition.

Apple emphasized desirability but has made many business blunders. Never-the-less, it is sustained by the loyalty its attention to users creates.

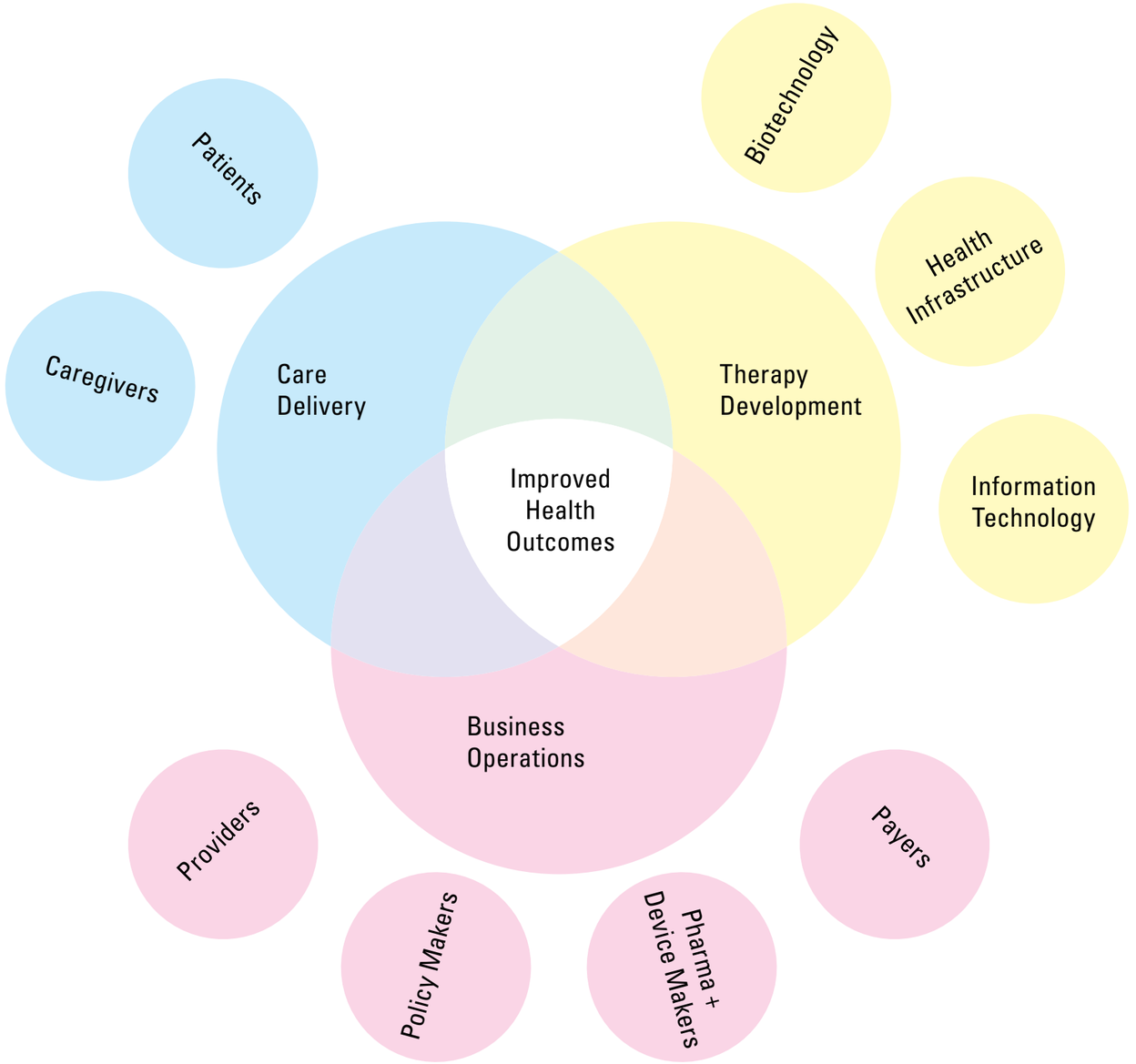
Microsoft is one of the best run businesses ever, but it has not been able to create highly desirable products. This provides an opening for competitors.

http://www.dubberly.com/articles/alan-cooper-and-the-goal-directed-design-process.html

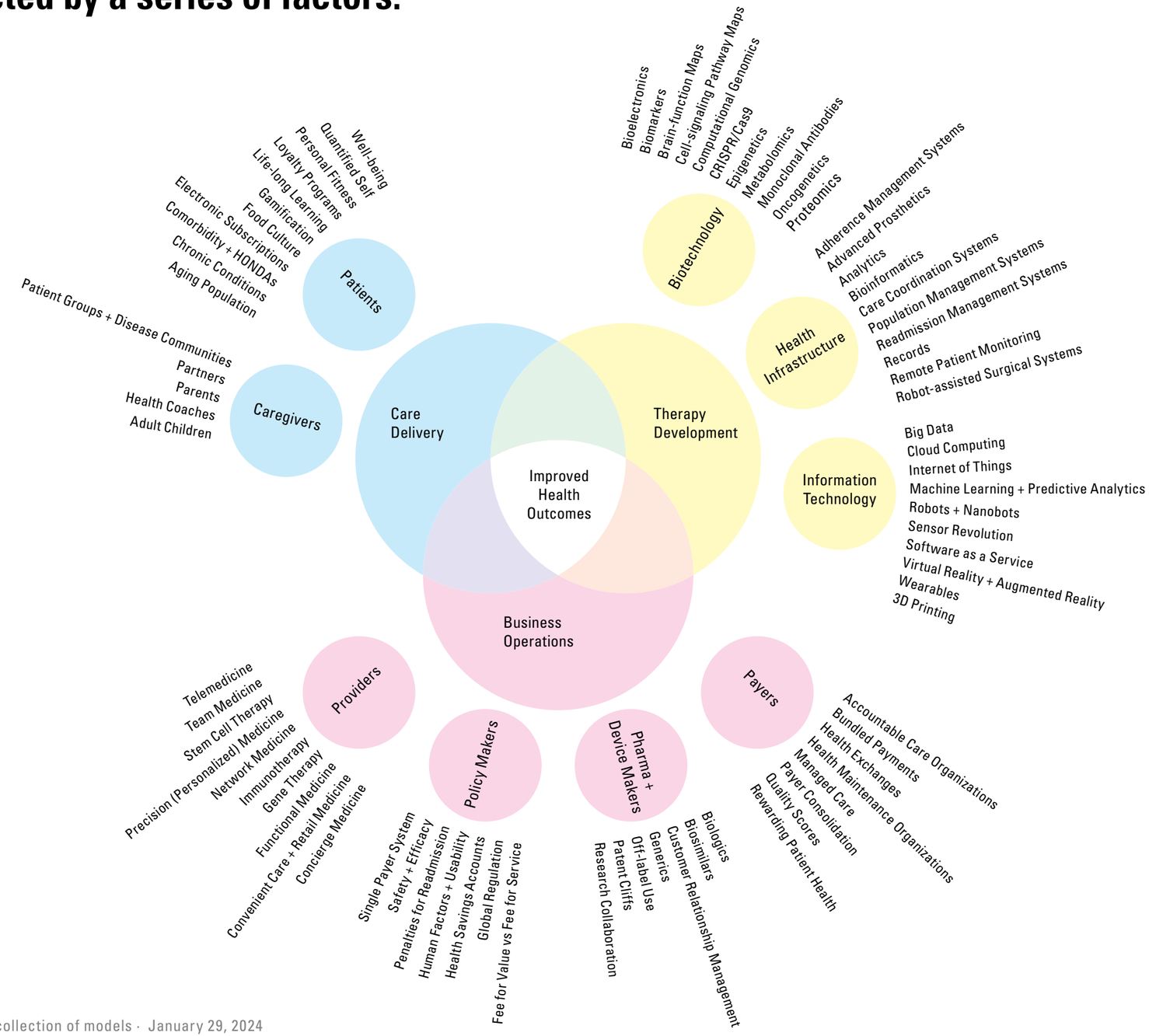
The Balanced Innovation Model might be applied to the healthcare industry.



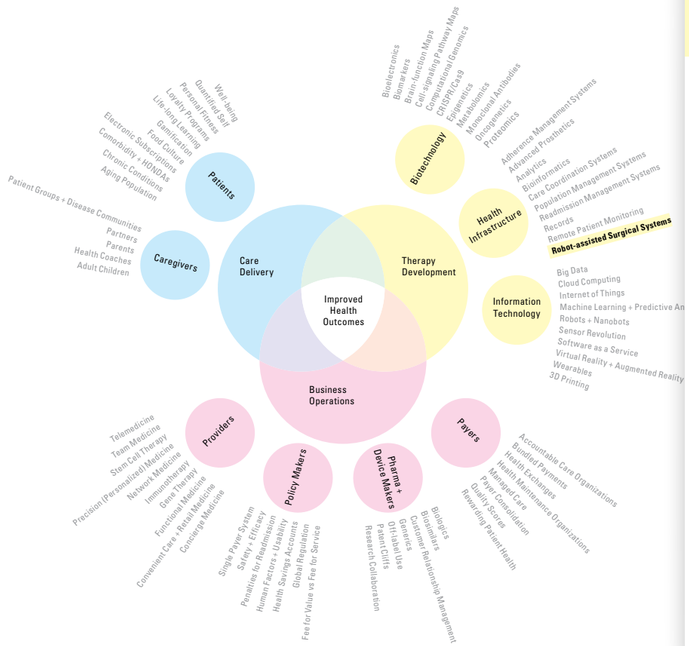
Each of these categories can be divided into segments.



Each segment is affected by a series of factors.



Each factor has its own card, including a description, for example...



21 **Buildability Factors**
Health Infrastructure

Robot-assisted Surgical Systems

Also called computer-assisted surgery. Often supports minimally-invasive procedures (reducing incision size, thus reducing pain, infection risk, and healing time). A surgeon uses a computer to control tools; the surgeon may be in the same room as the patient or in a remote location. Robot-assisted systems may provide better control of instruments than is available in manual surgery.

Cards can be mixed and matched to describe innovations.

e.g., Aprecia Pharmaceuticals

First 3D printed drug—Epilepsy drug Spritam

31 **Buildability Factors**
Information Technology

3D Printing

A method of computer-controlled manufacturing in which tiny drops of a building material (typically plastic, starch, or in some cases metals) are laid down in rows and layers, with layer added upon layer, gradually building up a larger structure. 3D printing enables objects to be custom fitted to individuals. Experiments have replaced typical printing materials with cells, enabling the "printing" of ears, kidneys, livers, etc.

e.g., GSK + Google

GSK and Verily Life Sciences LLC form Galvani Bioelectronics to enable the research, development, and commercialization of bioelectronic medicines.

70 **Usability Factors**
Patients

Chronic Conditions

A chronic disease is one lasting 3 months or more, by the definition of the U.S. National Center for Health Statistics. Chronic diseases cannot be prevented by vaccines or cured by medication, nor do they just disappear. Chronic diseases tend to become more common with age. The leading chronic diseases in developed countries include (in alphabetical order) arthritis, cardiovascular disease such as heart attacks and stroke, cancer such as breast and colon cancer, diabetes, epilepsy and seizures, obesity, and oral health problems. Each of these conditions plague older adults in the US (and other developed nations).

46 **Viability Factors**
Pharma + Device Makers

Research Collaboration

Innovation in pharma is sparking new partnerships in academia and industry. Pharma is looking for different forms of cooperation all along the value chain, from traditional licensing agreements to strategic alliances to public-private partnerships or open innovation models. In future, pharma companies may find themselves as hubs at the center of a network of collaborators and suppliers, focusing internally on their core competencies which might include medicinal chemistry, clinical trial execution, and sales and marketing.

1 **Buildability Factors**
Biotechnology

Bioelectronics

A new scientific field that could one day result in a new class of medicines that would not be pills or injections but miniaturized, implantable devices. The devices could be programmed to read and correct the electrical signals that pass along the nerves of the body, including irregular or altered impulses that can occur in association with a broad range of diseases. The hope is that through these devices, disorders as diverse as inflammatory bowel disease, arthritis, asthma, hypertension and diabetes could be treated.

22 **Buildability Factors**
Information Technology

Big Data

In 2012, IBM estimated that the world creates 2.5 exabytes of data each day; more recent estimates range to 5 exabytes per day. Domo, a business intelligence agency, reports YouTube users share 400 hours of new video every minute. Data from physical sensors and digital events (e.g., clicking a web link) creates massive traces, which can be analyzed for patterns and used to forecast change.

e.g., Bayer + Nintendo

Connecting DIDGET (Bayer's glucometer for diabetic children) to Nintendo's gaming system devices to promote consistent blood sugar testing.

70 **Usability Factors**
Patients

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74 **Usability Factors**
Patients

Gamification

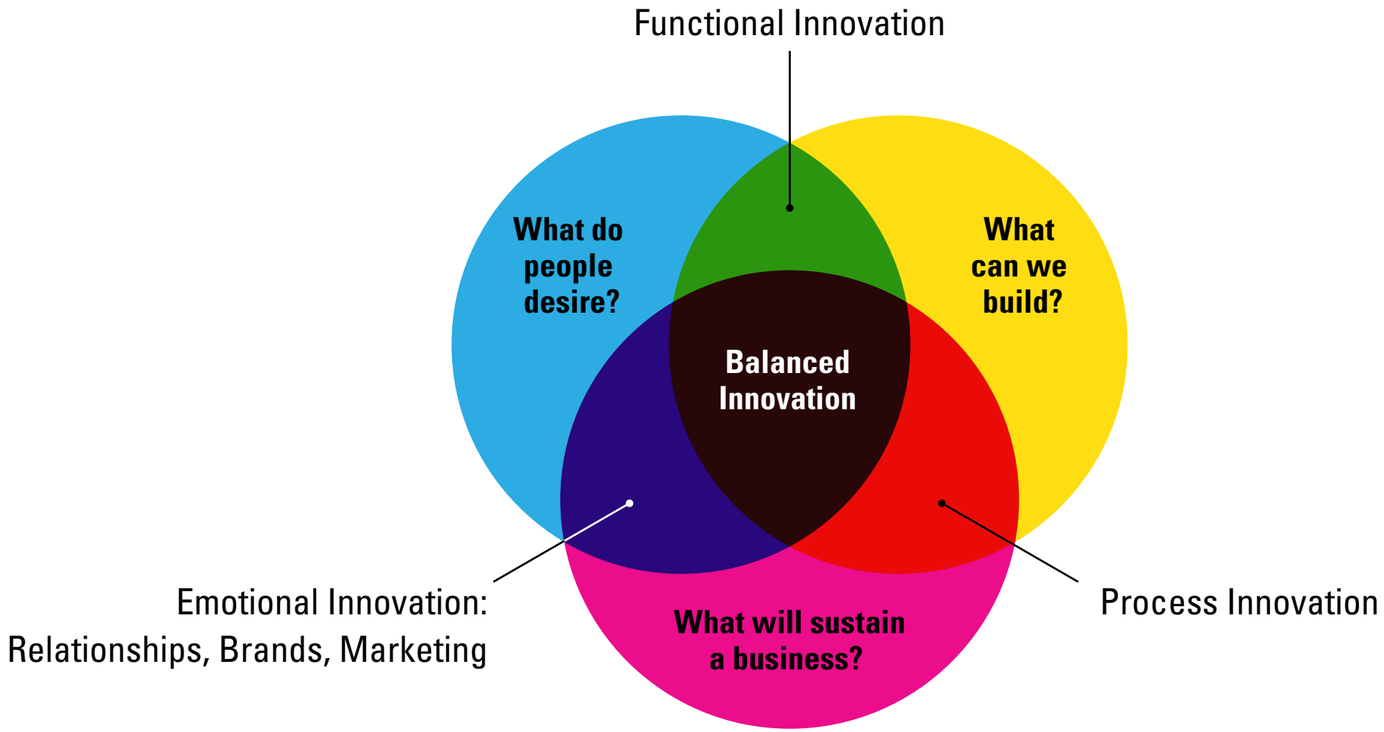
Gamification—mixing self-monitoring and entertainment—is gaining popularity as providers continue to look for creative ways to engage and motivate their patients. It isn't yet clear whether this approach is yielding the type of traction and adoption that will ultimately lead to sustainable patient behavior modifications and improved health outcomes. Elements behind gamification include status, milestones, competition, rankings, social connectedness, immersion reality, and personalization. Successful gamification strategies motivate patients to receive ongoing feedback, reminders, and status updates about their progress in caring for their own health.

39 **Viability Factors**
Payers

Rewarding Patient Health

Pay-for-performance programs are being designed (by multiple players in healthcare) to reward patients directly for achieving evidence-based health goals. Rewards take the form of points for gift cards or products, discounts on gym memberships, health options at local restaurants, and discounts towards co-payments for doctor's visits, procedures, and medications. Offering incentives to patients for reaching health goals has the potential to foster a stronger partnership between doctors and patients and improve health outcomes.

Balanced innovation motivates the “design thinking” movement.

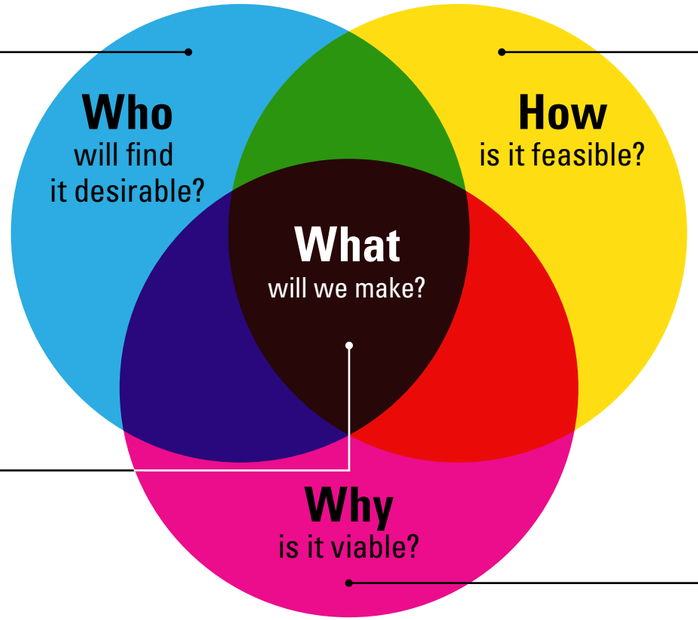


Another take: “The Innovation Dashboard”

Who will have their aspirations satisfied?

Modes of Experience:

- Physical
- Cognitive
- Social
- Emotional
- Cultural



How do we organize key activities?

- Invention
- Design
- Production
- Marketing
- Logistics
- Branding
- Channel

What will we make?

Systems, platforms, touchpoints:

- People
- Objects
- Environments
- Messages
- Services

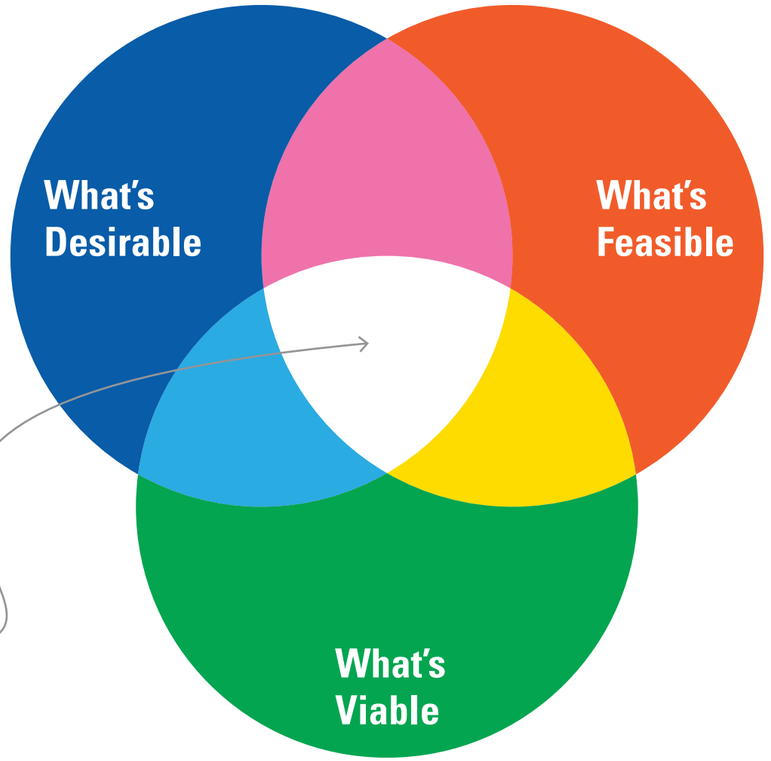
Why will this create value?

- Differentiated or Cost
- Focus or General
- Margin or Share
- Portfolio

A key tenet is that Edge Computing deployments must be Desirable-Viable-Feasible (DVF) to be successful, which means integrating design-business-technology.

Edge improves each leg of the DVF 'triangle' model.*

Edge increases relevance at each touchpoint — recognizing people, remembering histories, and understanding context — thereby enabling highly personalized, almost magical experiences for both customers and employees.

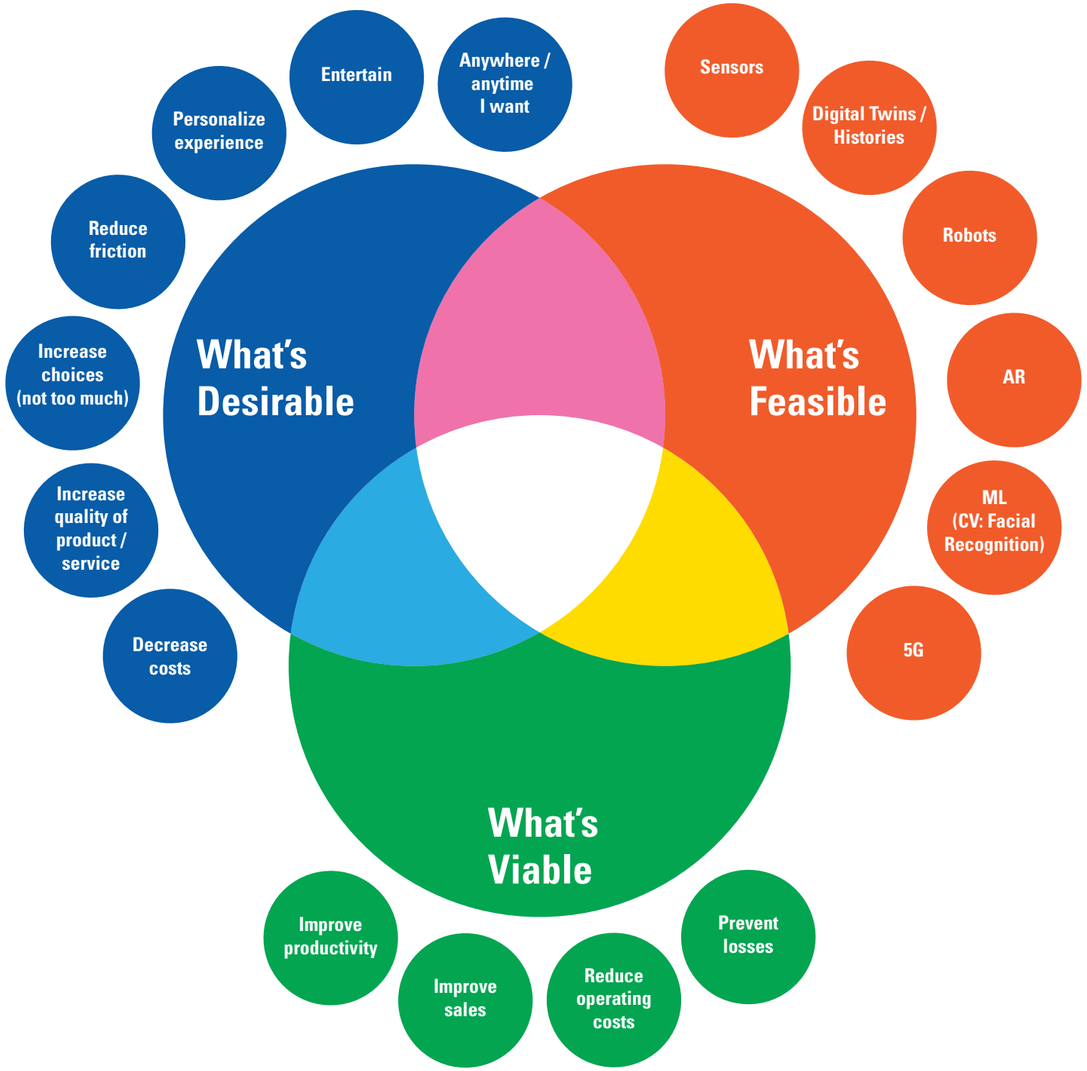


Edge increases up-time (improving reliability), reduces latency (improving responsiveness), and minimizes use of bandwidth (lowering data-transmission costs and improving sustainability).

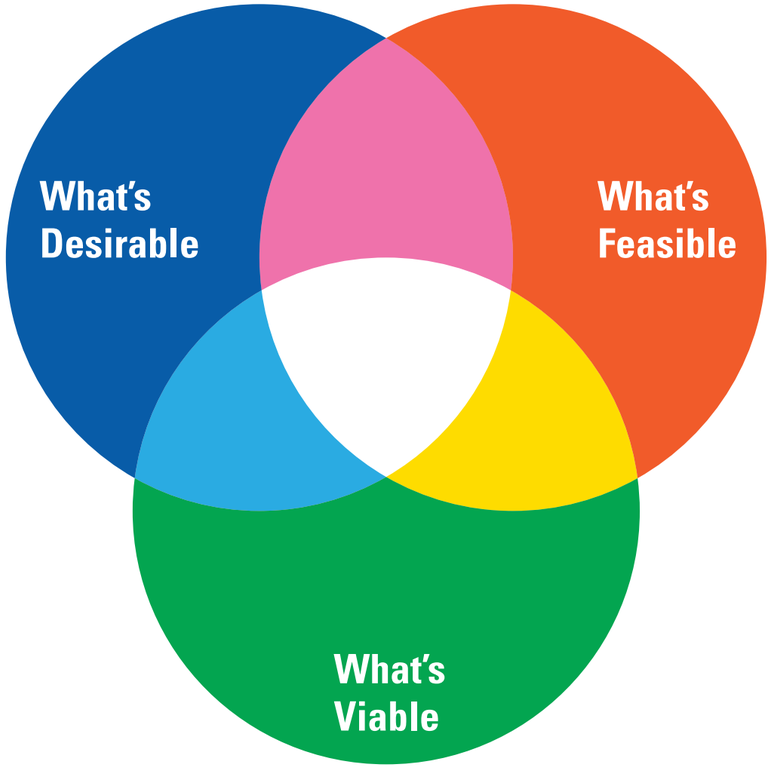
*At the intersection is what's Desirable and Viable and Feasible (DVF), simultaneously satisfying the requirements and constraints of each.

Edge provides the right data and decisions, when and where they are needed, ensuring value at affordable prices.

The DVF framework can be further divided into sub-categories.

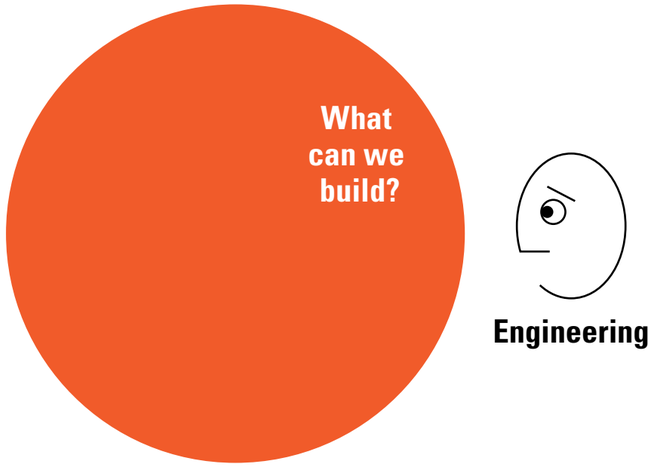


DVF solutions must also be sustainable across time.



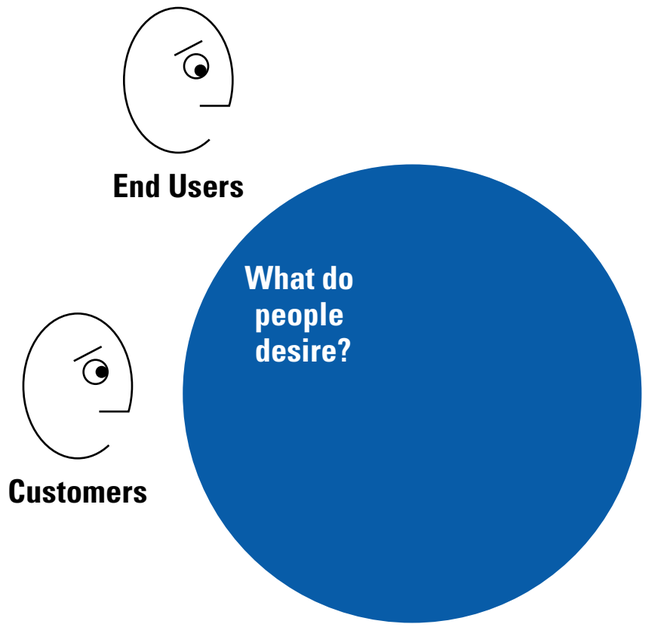
Time

Engineers tend to focus on technology.

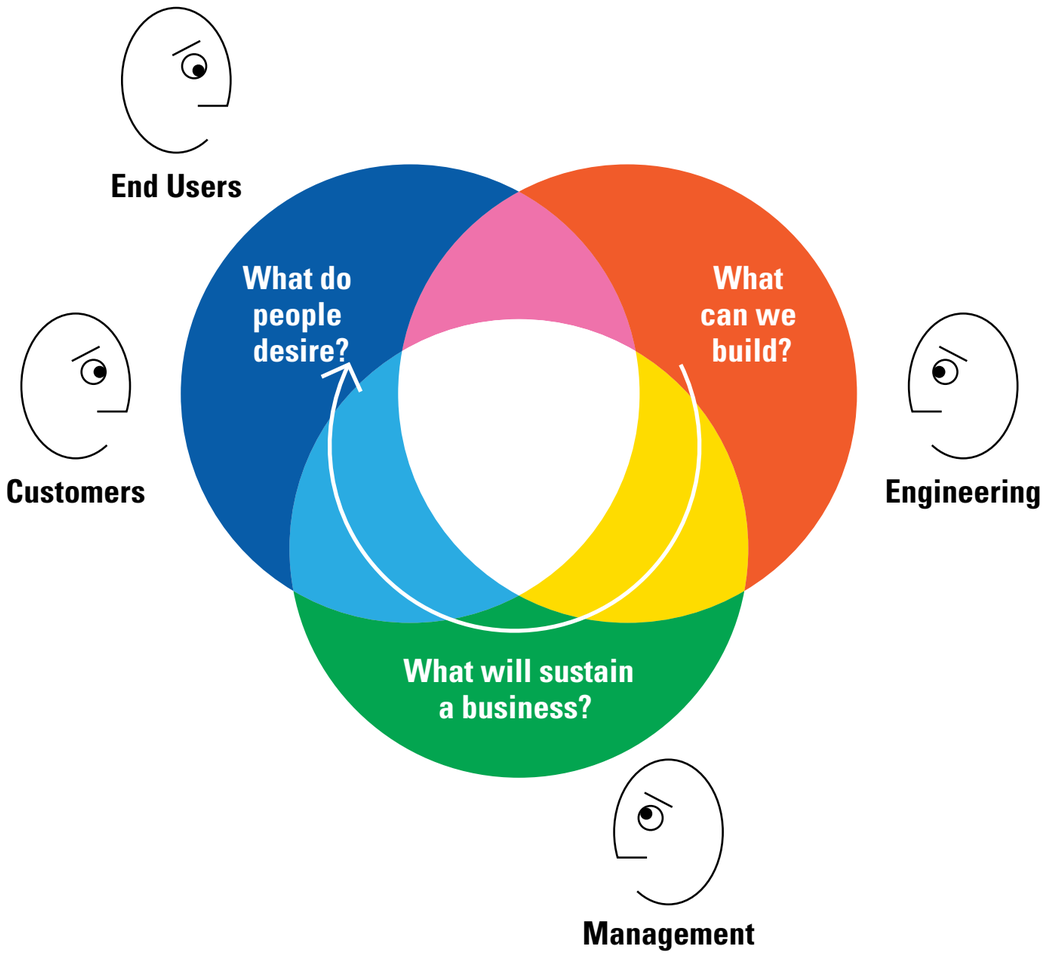


Managers tend to focus on making money.

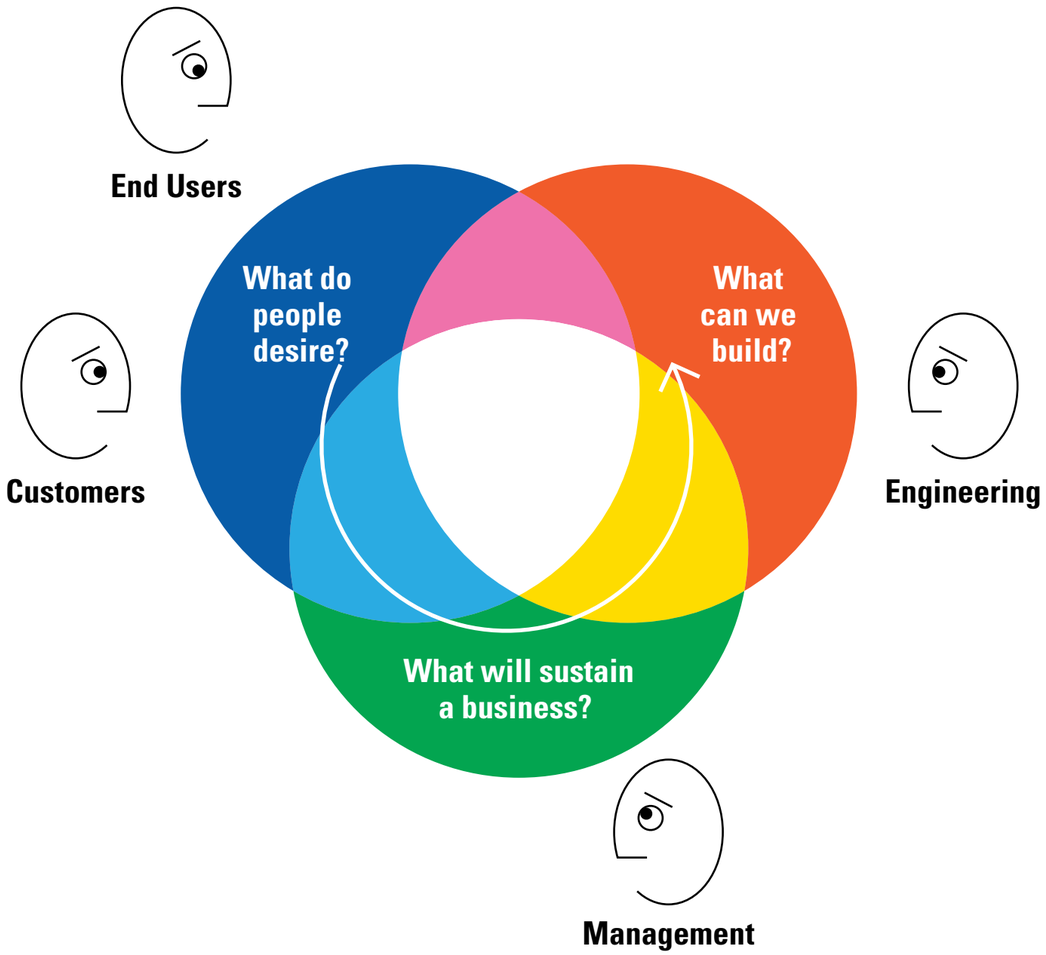
Designers tend to focus on users and their goals.



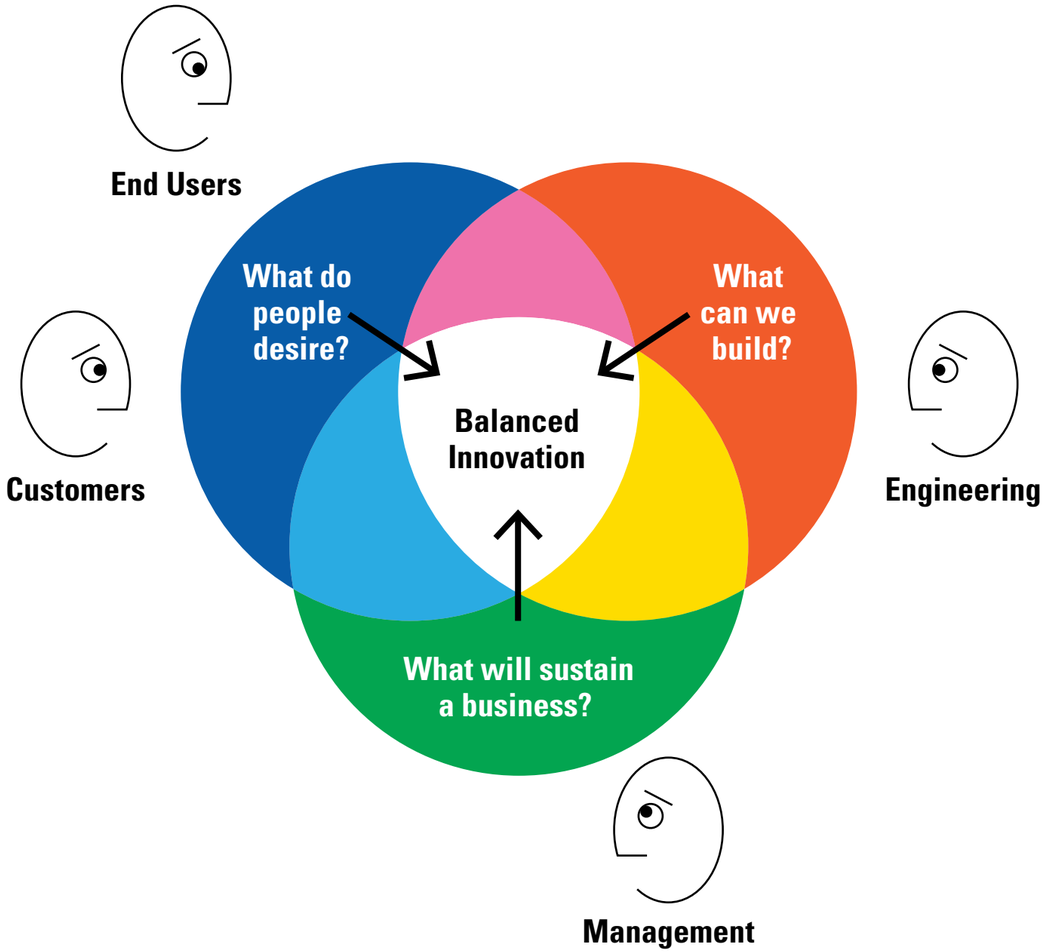
Sillicon Valley often starts with technology.



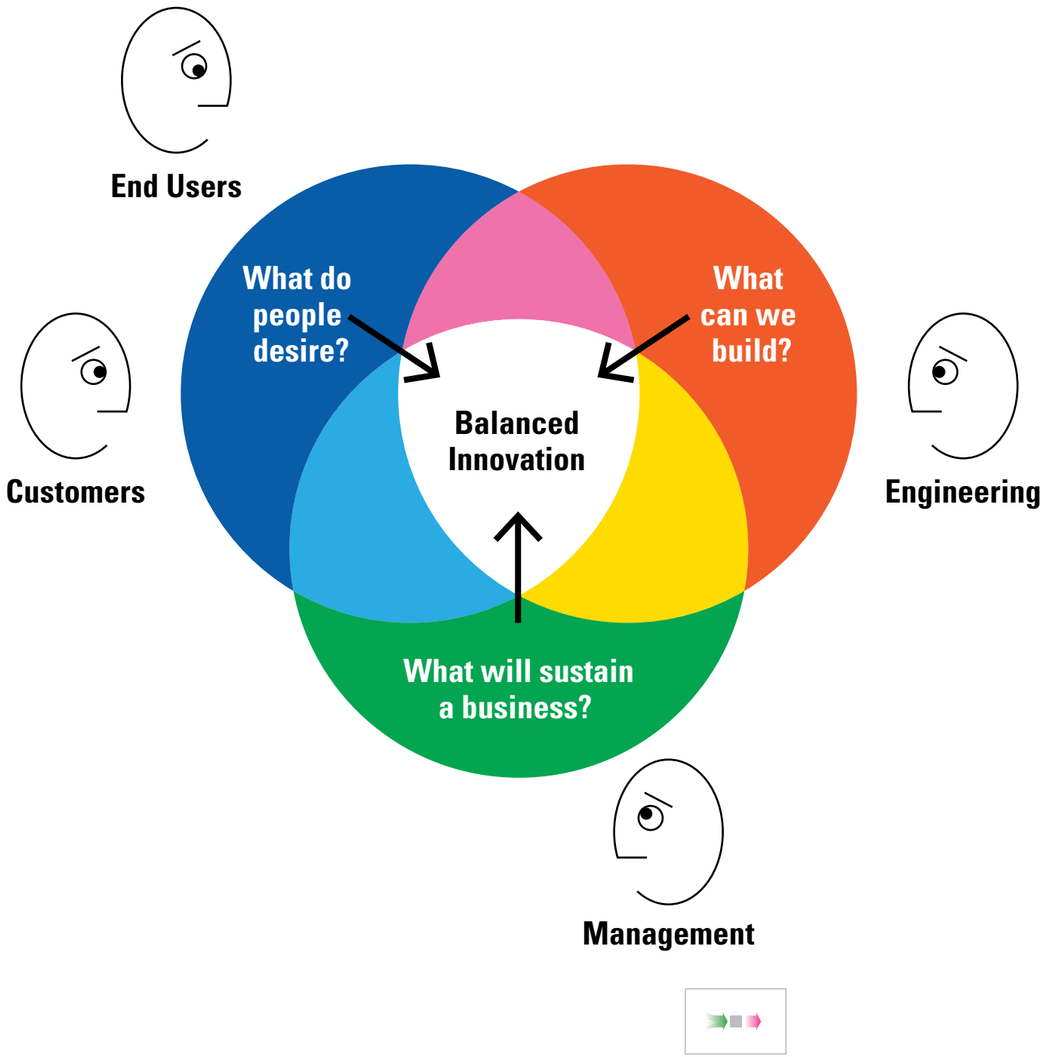
Starting with user needs might be better.



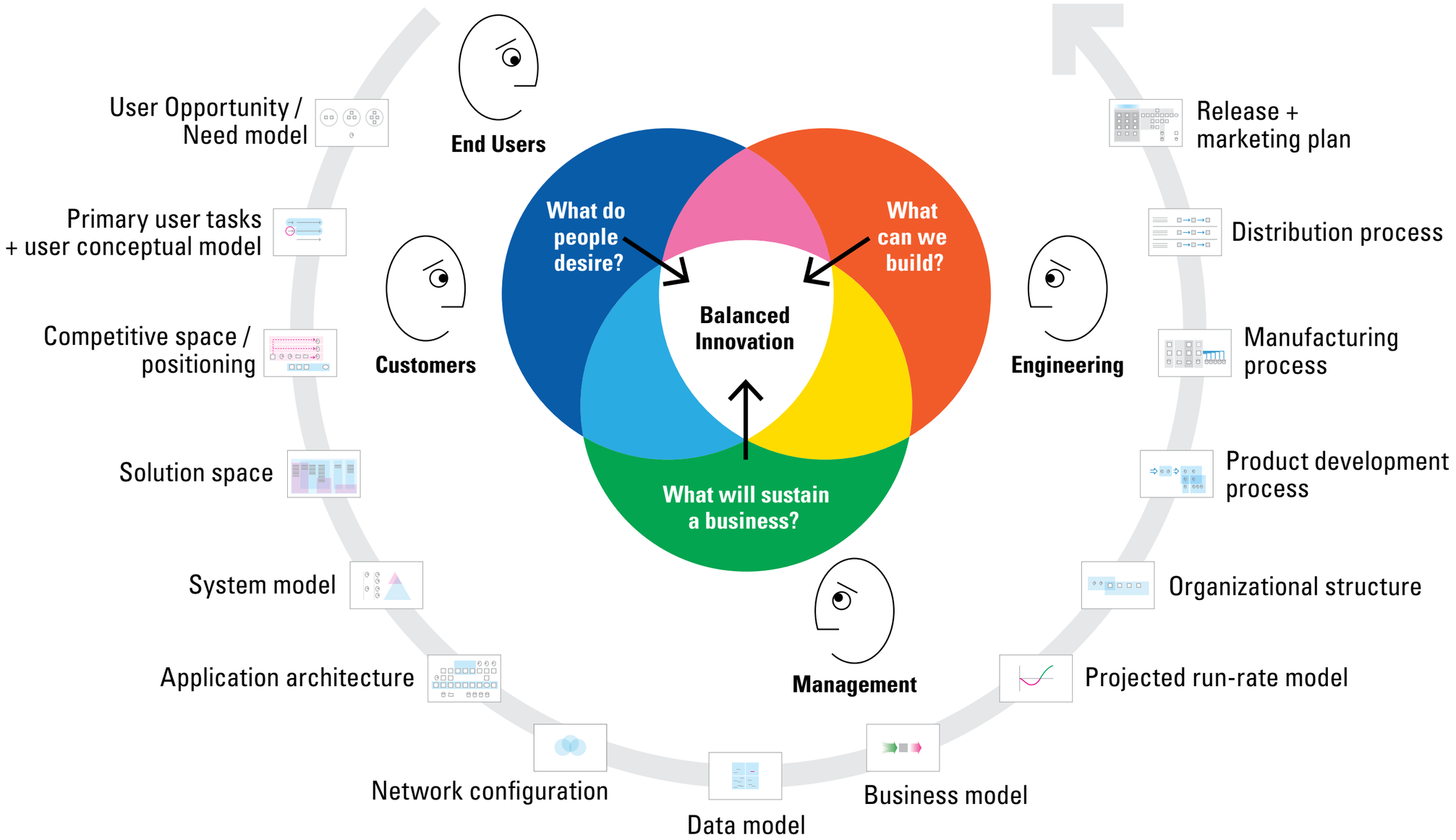
The challenge is optimizing all three simultaneously.



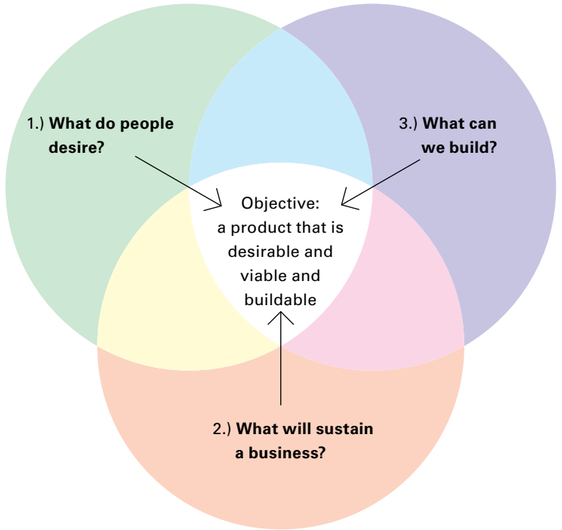
Models support the process, e.g., a business model.



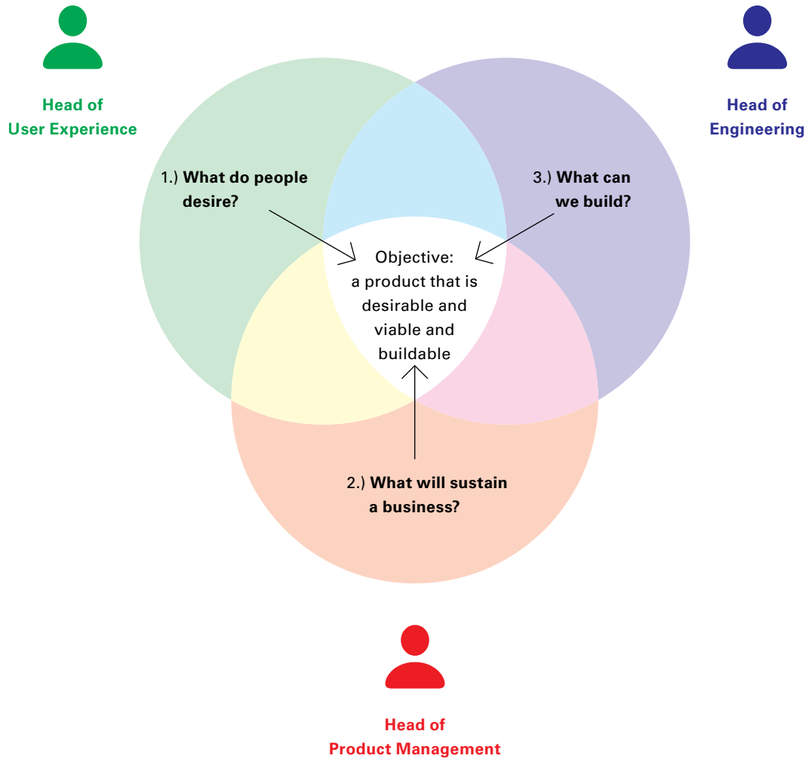
Design literacy requires familiarity with many models.



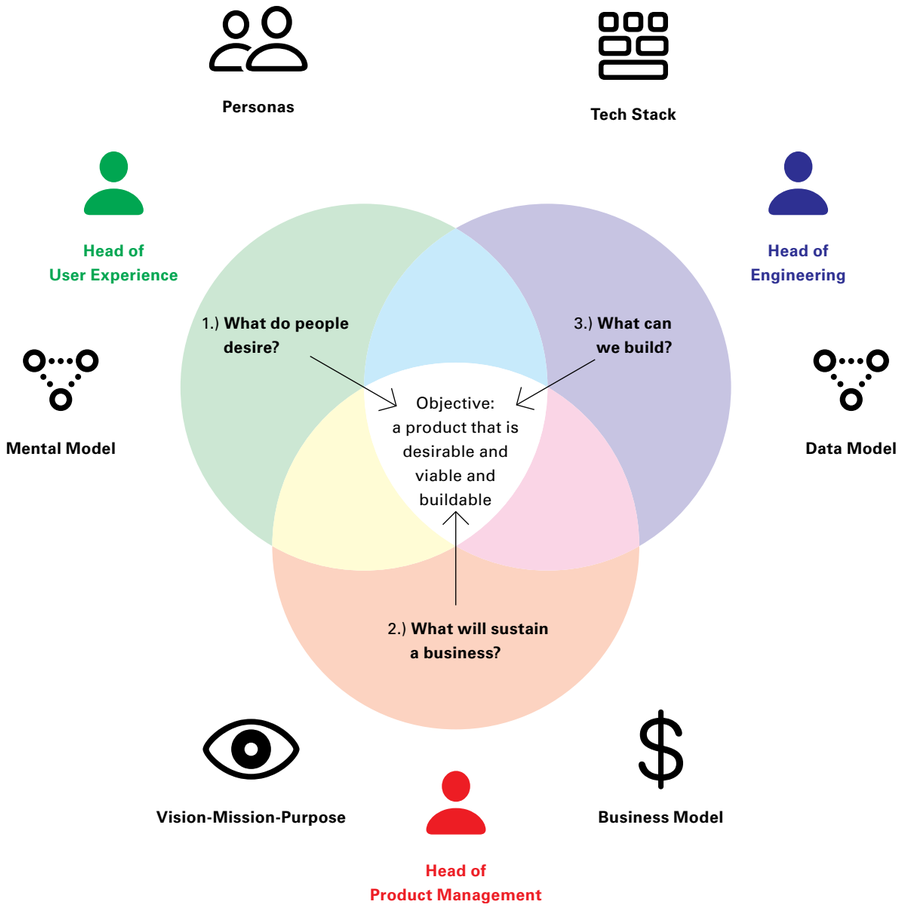
Successful products balance desirability, viability, and feasibility.



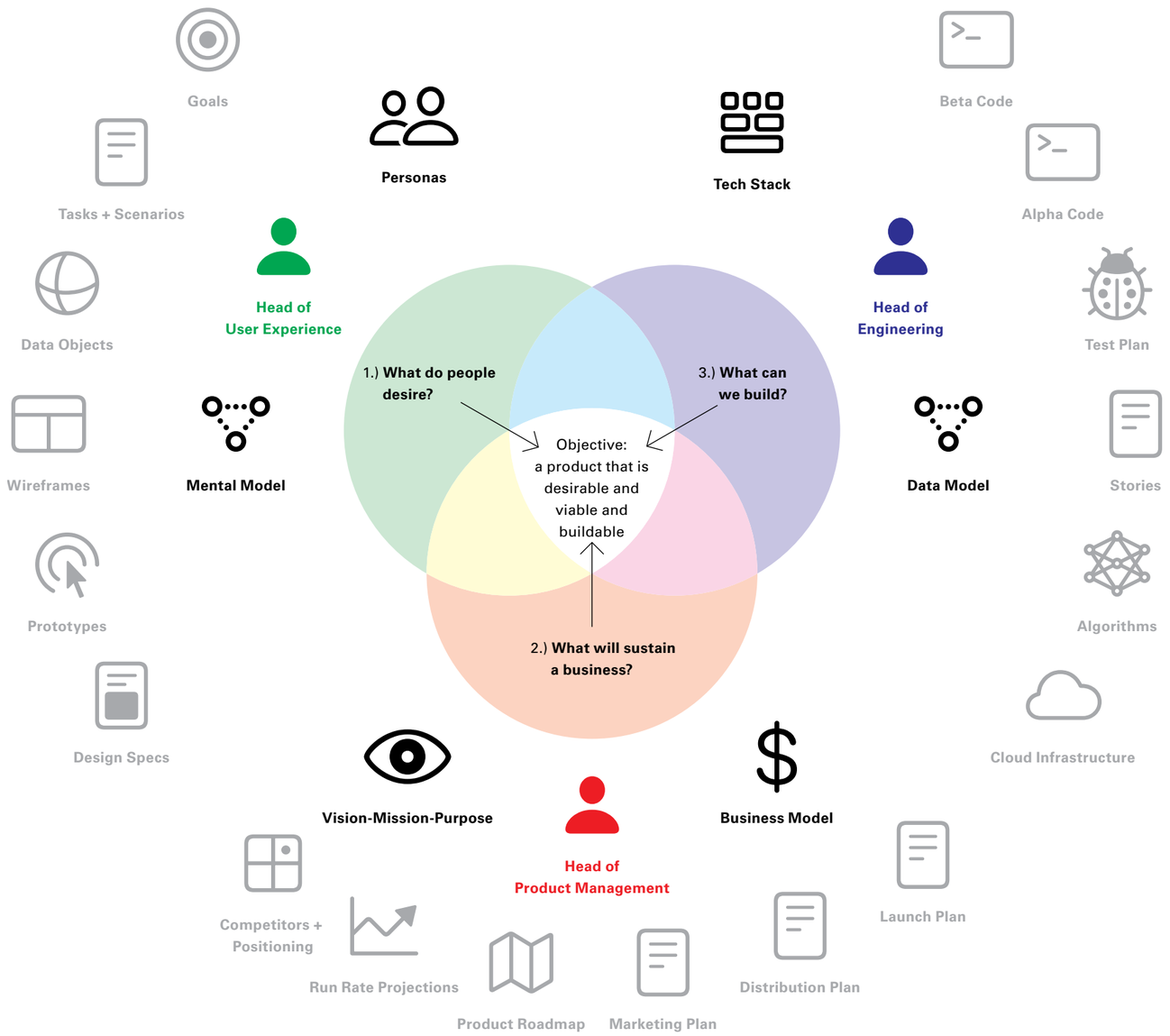
Managers are responsible for each factor.



Managing these factors requires shared mental models.

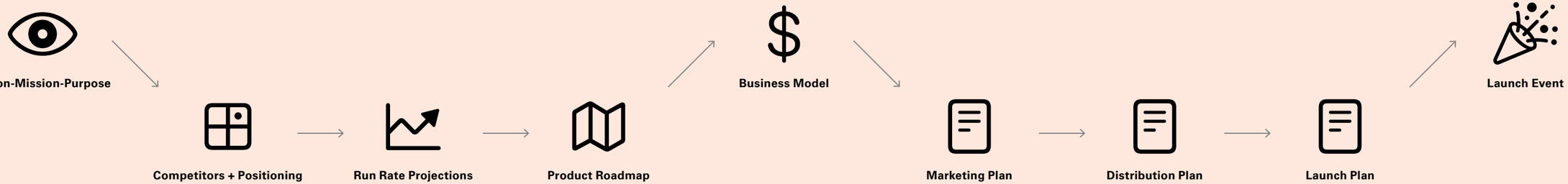


The models are part of a larger set of product knowledge.



A minimum set of business artifacts include:

Head of Product Management
What will sustain a business?



Identify pain points or opportunities. Form a hypothesis — some 'concept' about improving things.

What are others doing? Where do we fit it? Do we add value?

Chart income and expenses. Plan for disruptions.

Sequence of future features and releases.

How will we make money? Will it sustain?

How will we describe the product to end-users?

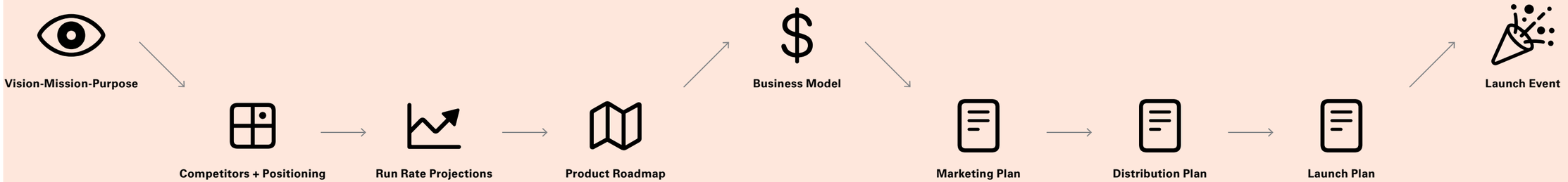
How will we deliver the product to end-users?

What's required to launch the product?

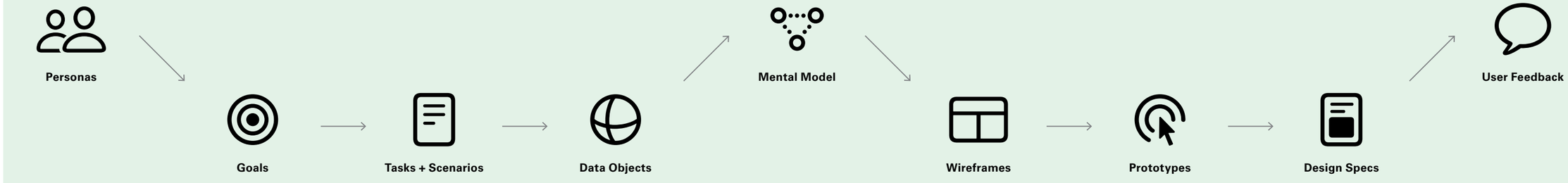
Coordinated communications on product launch, i.e., product, marketing, support, engineering, management, etc.

A minimum set of design artifacts include:

Head of Product Management
What will sustain a business?



Head of User Experience
What do people desire?



Define the likely user (or users if different types of actors are involved).

Describe the goals of each persona.

Describe how the personas will achieve their goals, i.e., what are their scenarios-of-use or use-cases?

Identify the 'data objects' that they will interact with.

Construct the data objects into node-link pairs. Include the relations between objects, append actions users can take on the data objects, and add any properties to the data objects.

Sketch the scenarios as 'wireframe' screens in a series that makes up a 'flow'.

Wireframes and flows can be used in early 'usability tests' with users to gather feedback and iterate.

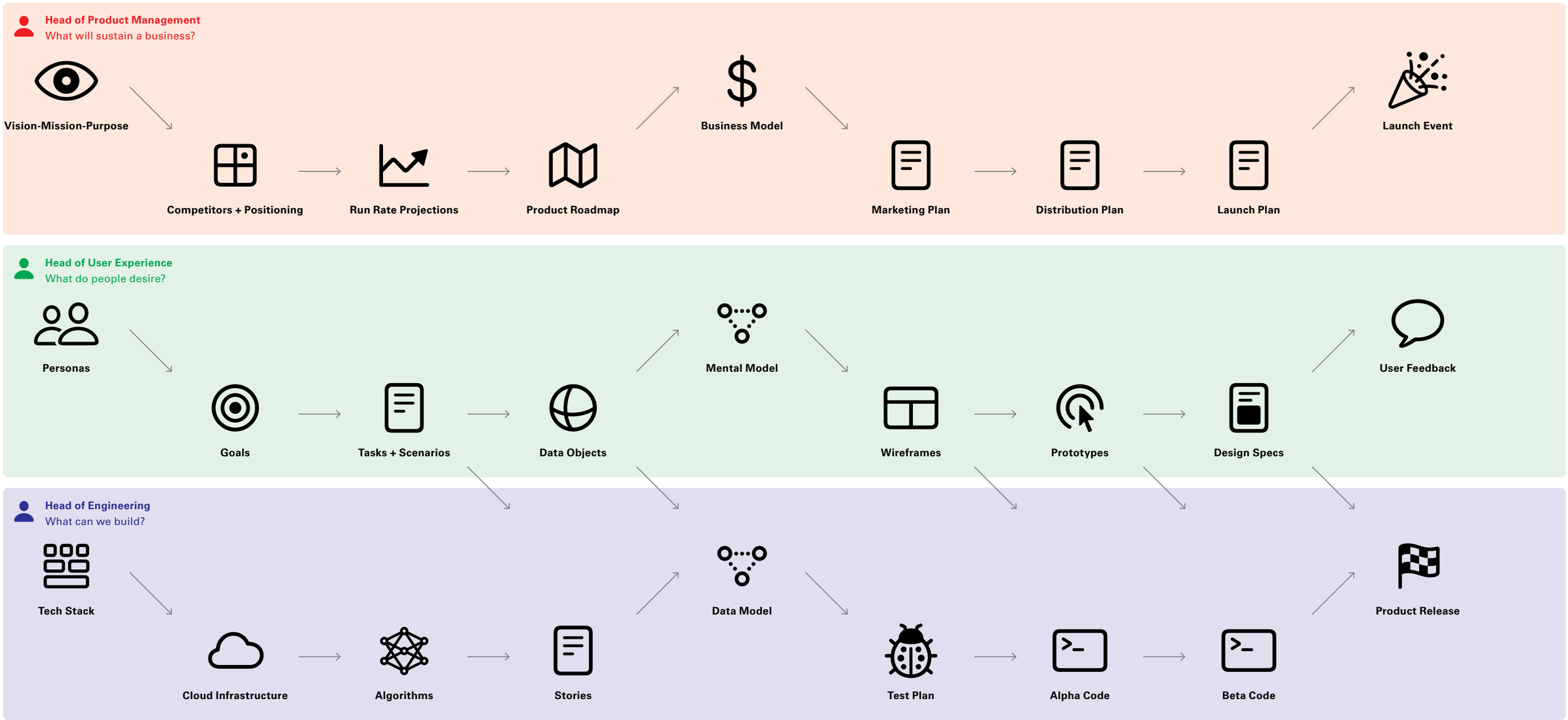
Connect the wireframes into interactive prototypes, including animations and transitions, which are closer to how end-users will experience the product.

Prototypes can also be used in 'usability tests' with users.

Document the interaction and visual design in detailed specifications. Include context, rationale, assumptions, decisions, and open issues.

Gather feedback on the product at time of launch. Feedback may be received from many channels, e.g., annecdotal, reviews, social media, etc.

A minimum set of technology artifacts include:



Choose which technologies to build upon.
e.g., LAMP (Linux Apache MySQL Python)

Choose cloud hosting environments.
e.g., AWS, Azure, Google, Shopify, Stripe, etc.

Develop AI/ML algorithms.

Break down the user scenarios into small technical 'stories'. Enter stories into the issue tracking software.

Construct the data objects into node-link pairs, often called an Entity Relationship Diagram (ERD).

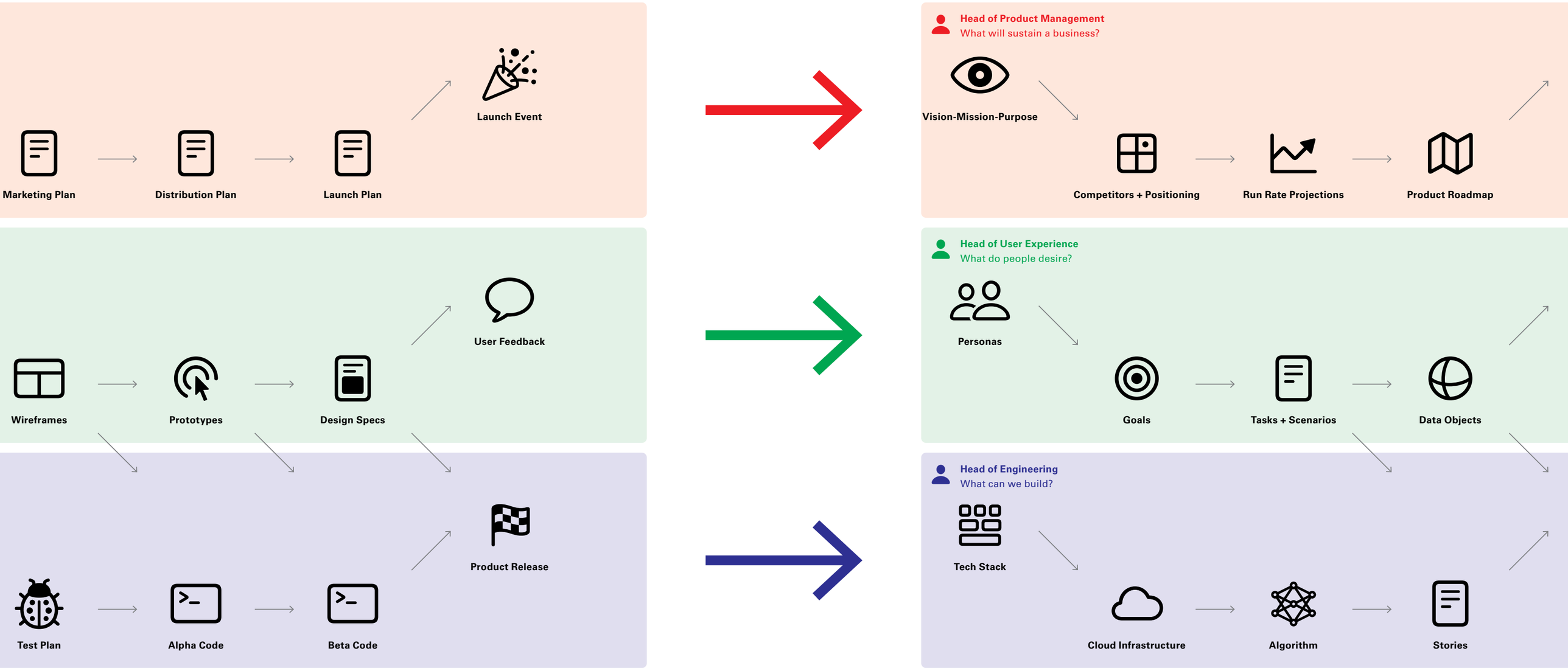
Develop an automated test plan for the front-end UI and back-end code.

Complete stories to reach milestone.

Complete stories to reach milestone.

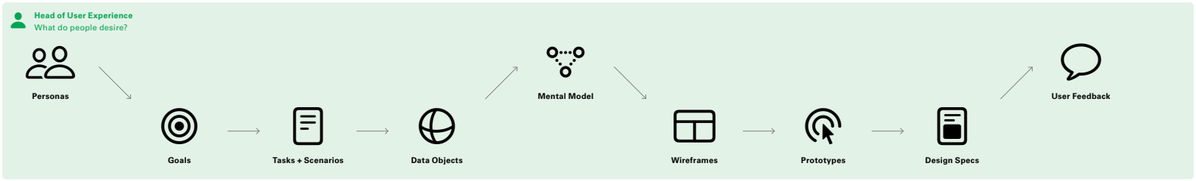
Push code from 'staging' to 'production' servers.

One product launch starts another cycle, refining product-market fit.



A row represents the scope of a single product,
e.g., an insulin pump.

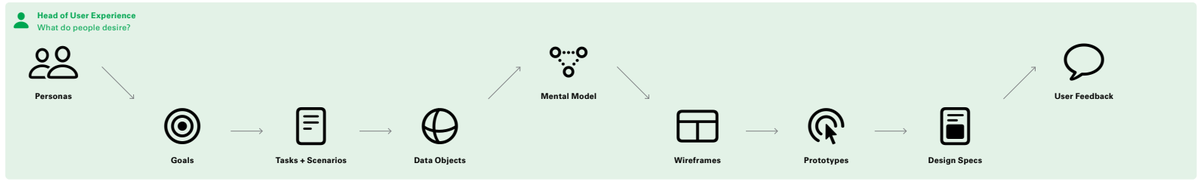
Insulin Pump



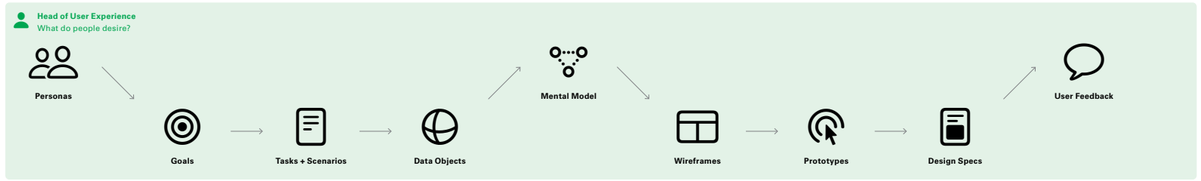
Products often exist in a an ecosystem,

e.g., an insulin pump + patient controller app + HCP cloud portal.

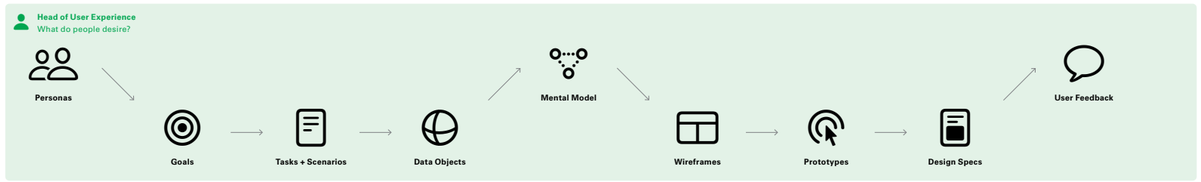
Insulin Pump



Patient Controller App

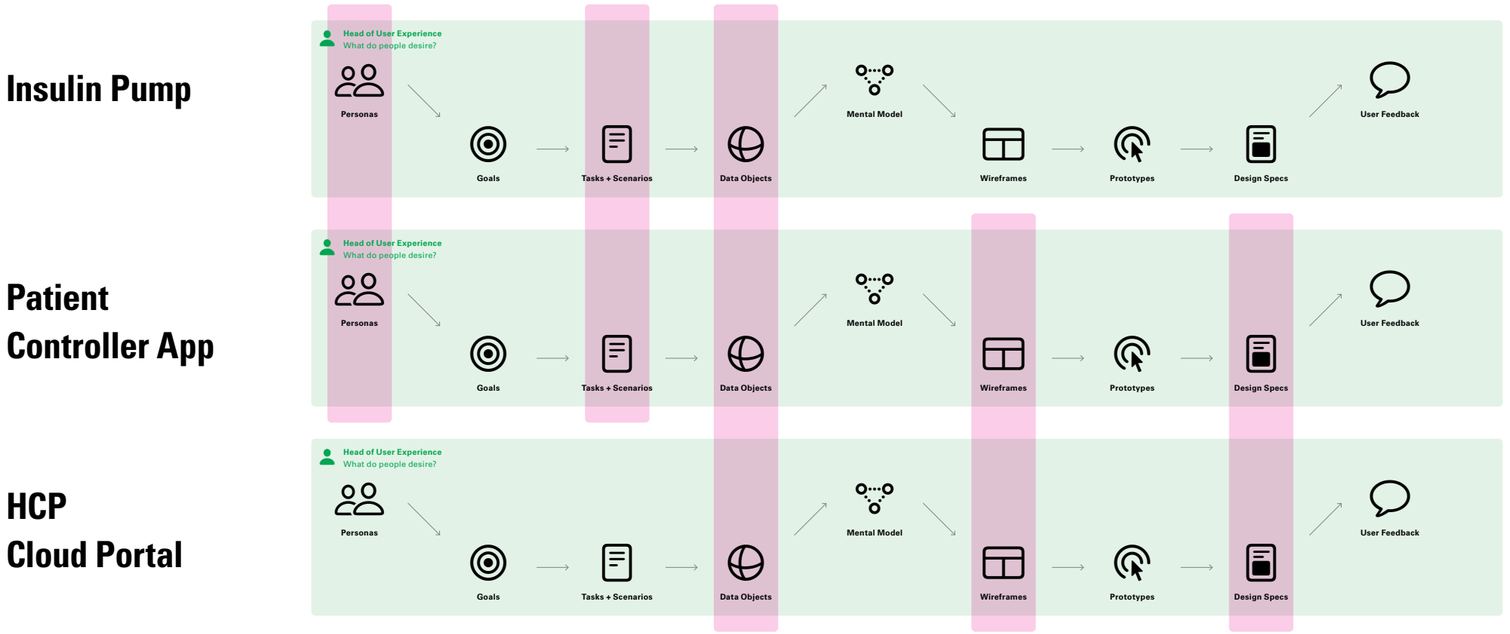


HCP Cloud Portal

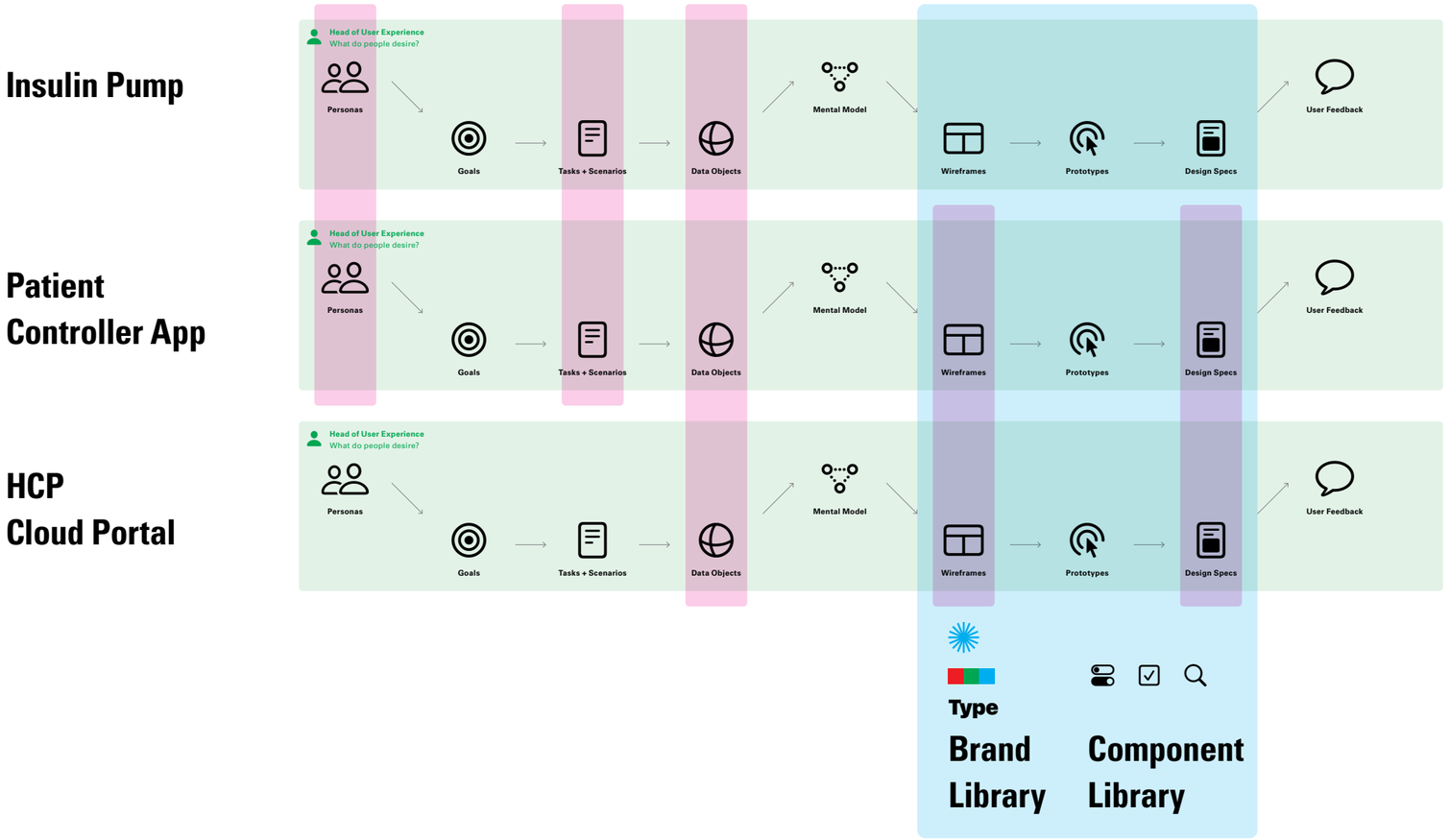


Models may shared between products, leading to some efficiencies,

e.g., personas may be shared between the insulin pump + patient controller app.



A design system may be centrally managed and applied to all products,
leading to brand + UI/UX consistency across touchpoints.

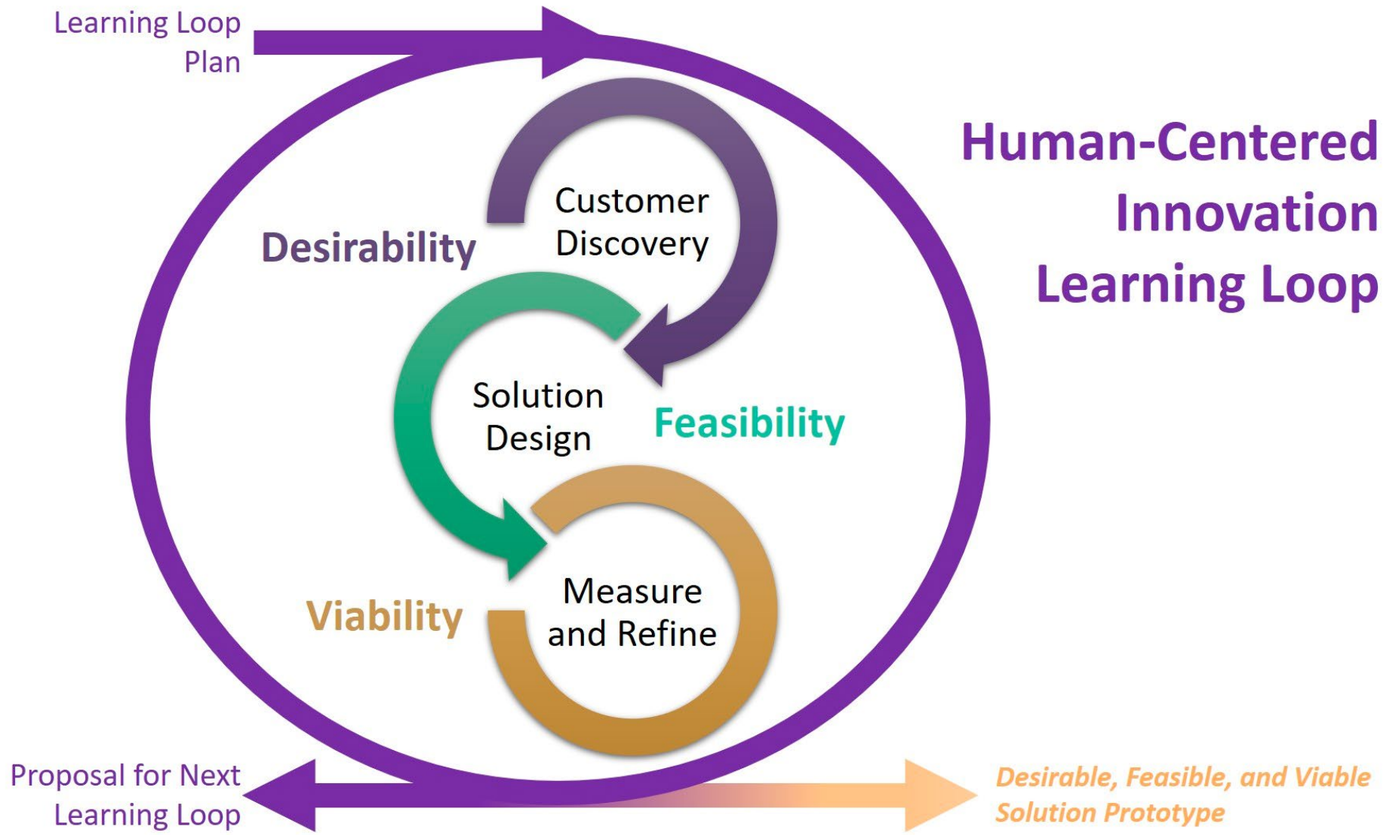


PART THREE

Other variations on the DVF Framework

3

‘An introduction to discovering your Human-Centered Innovation sweet spot’



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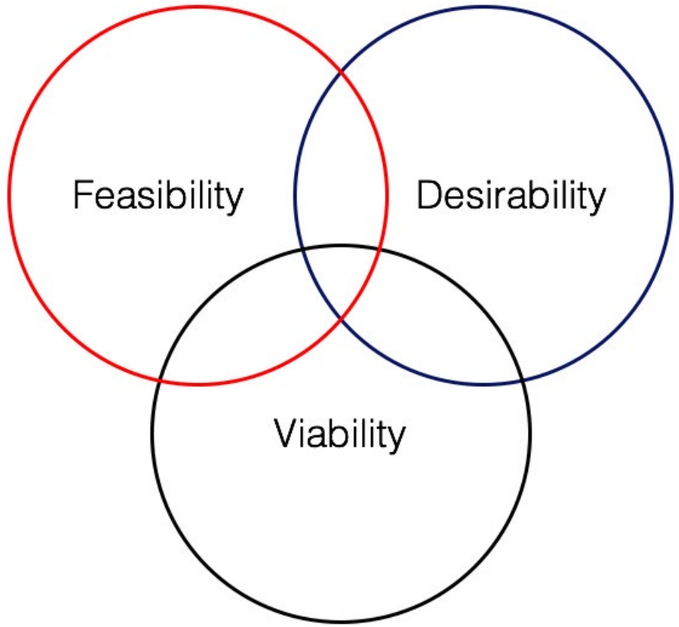
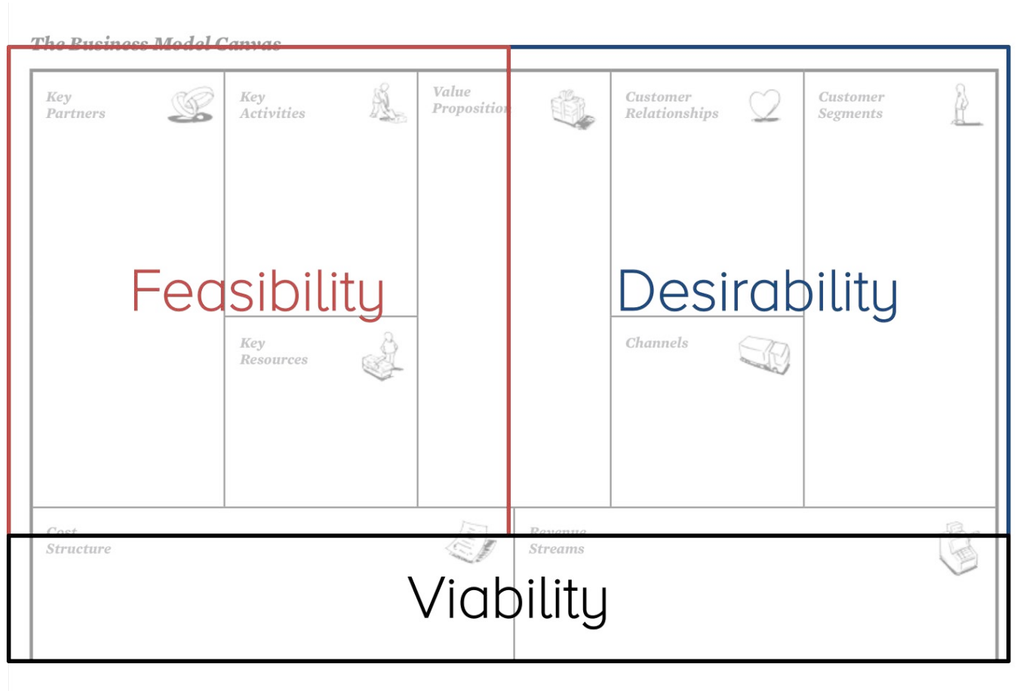
Isaac Jeffries

‘Three Lenses of Innovation’





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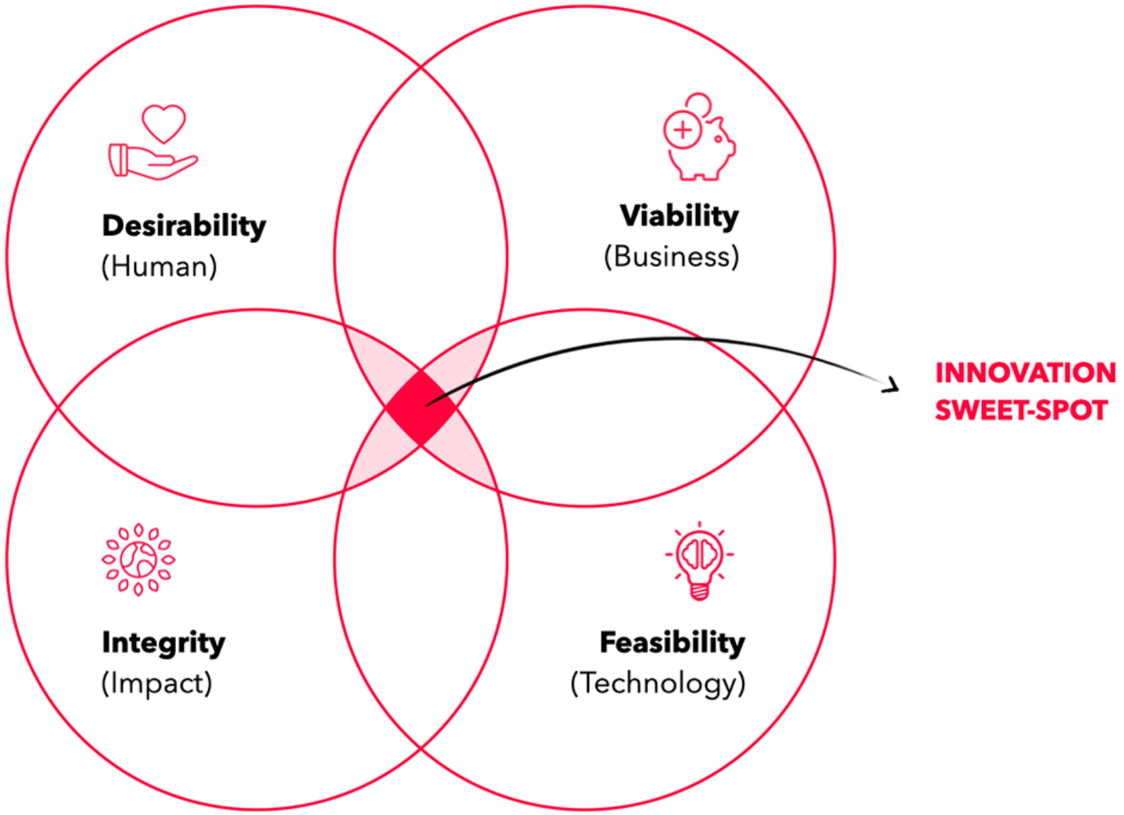
‘How to hit the innovation sweet spot and why it’s not all that straightforward’



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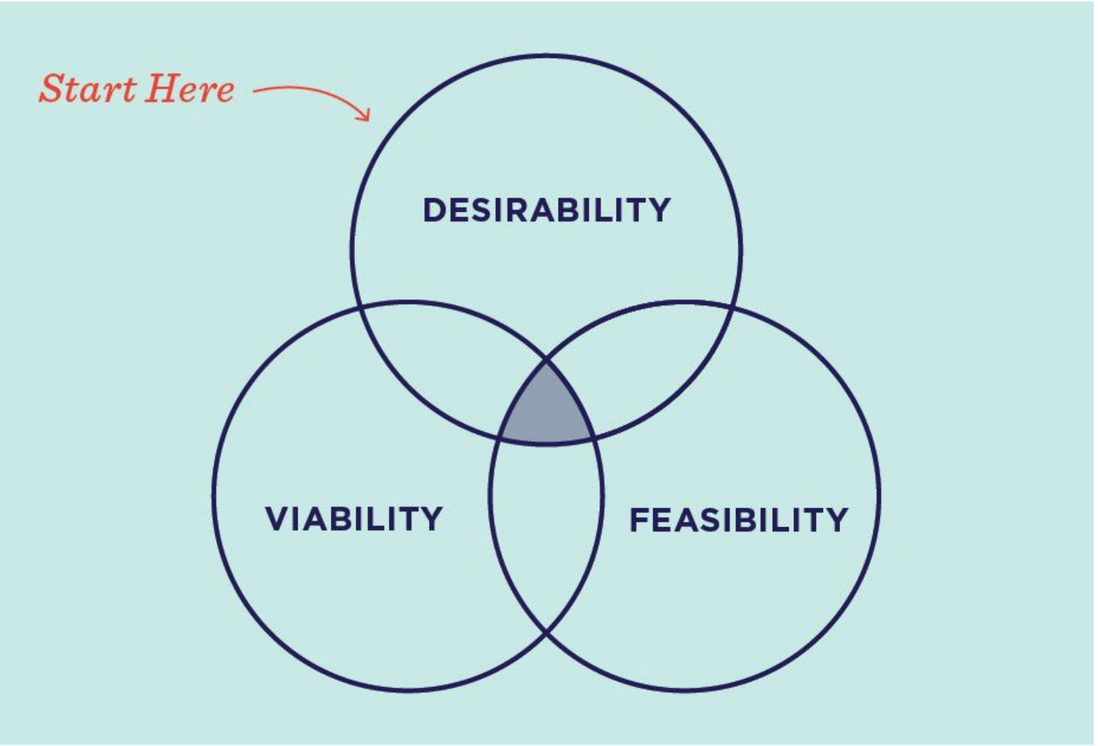
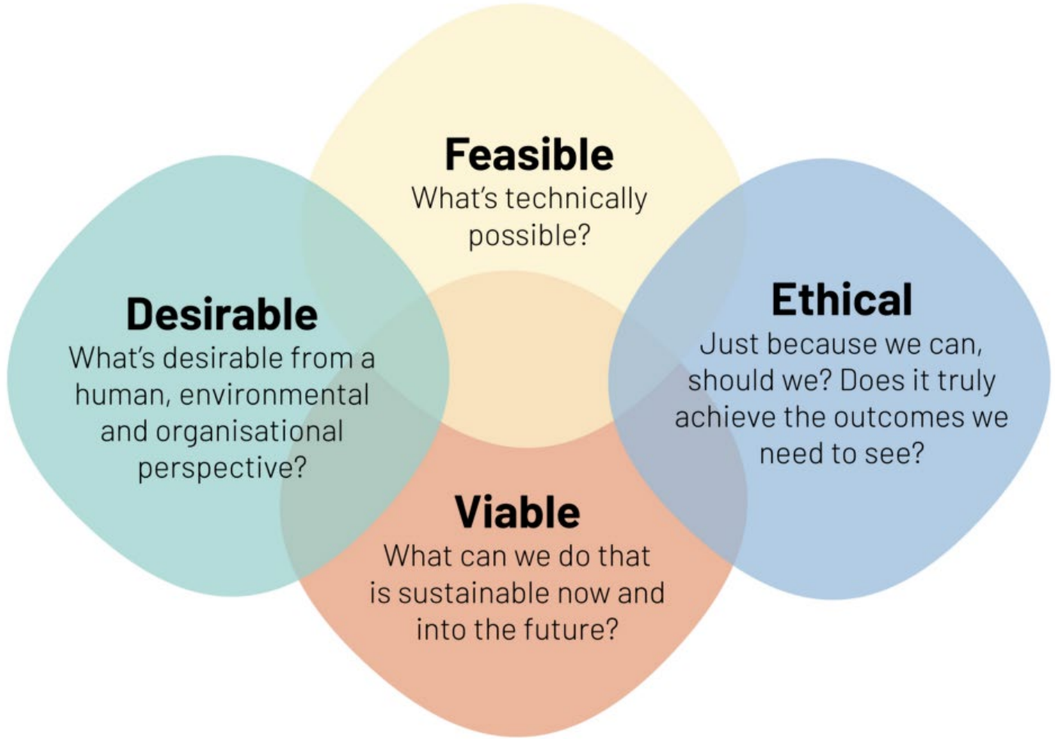
Alexandra Almond

‘Designers, we need to talk about Desirable, Viable, Feasible’





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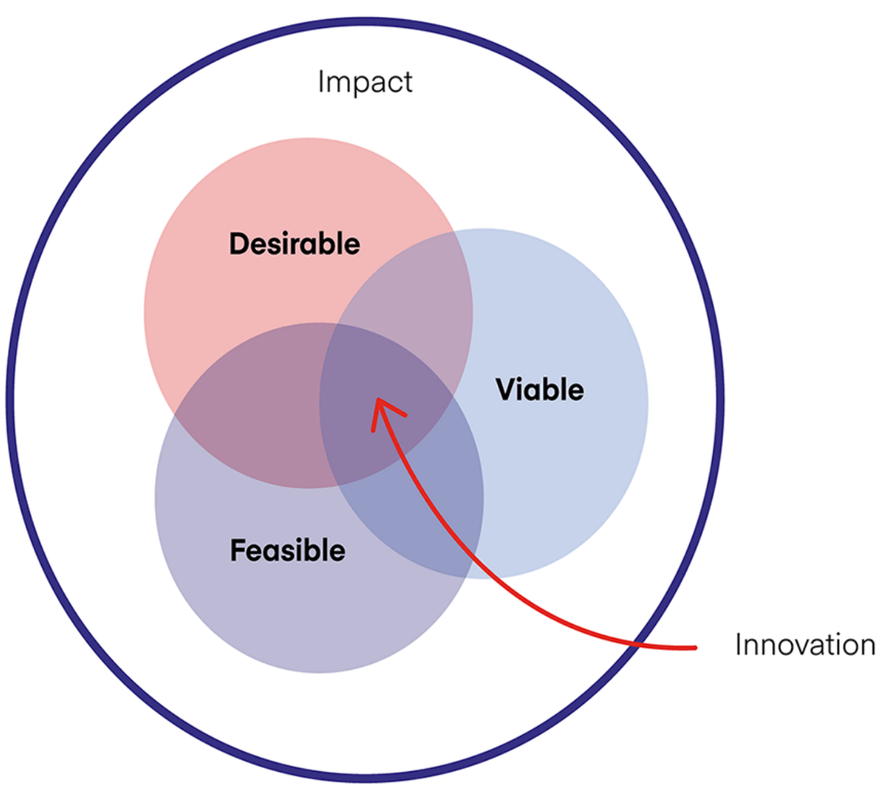
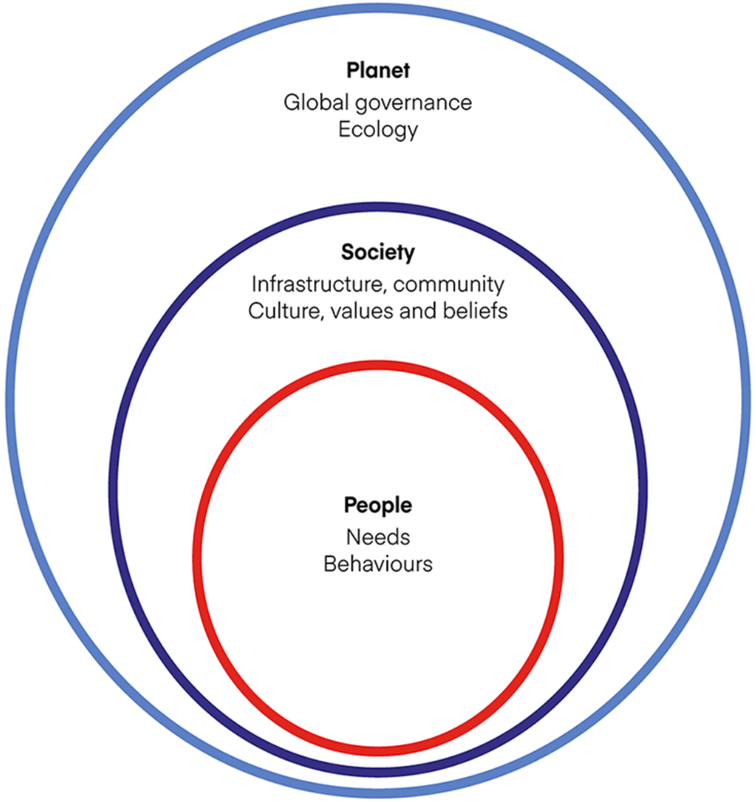
‘Co-creating a Sustainability Strategy’





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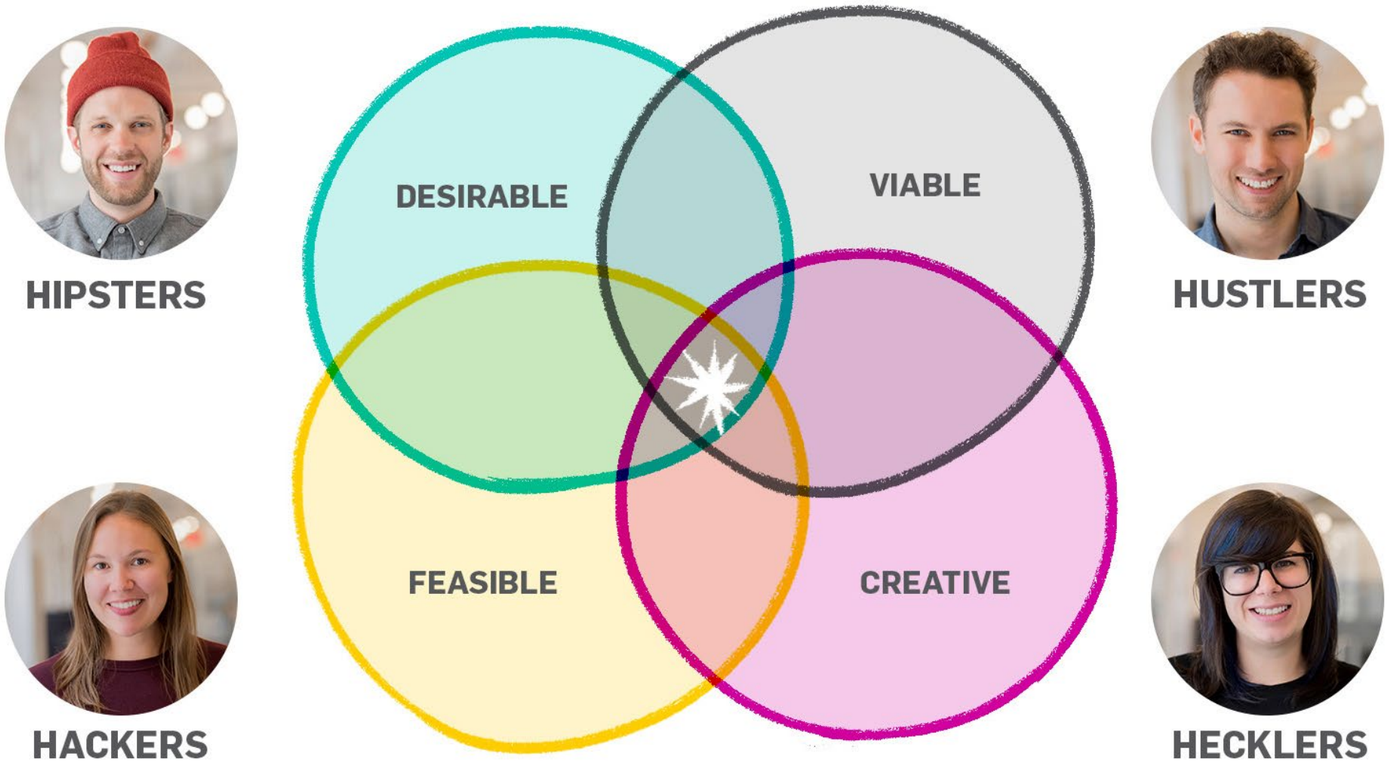
Jason Cha

‘3 Ways to customize a design sprint for any project’



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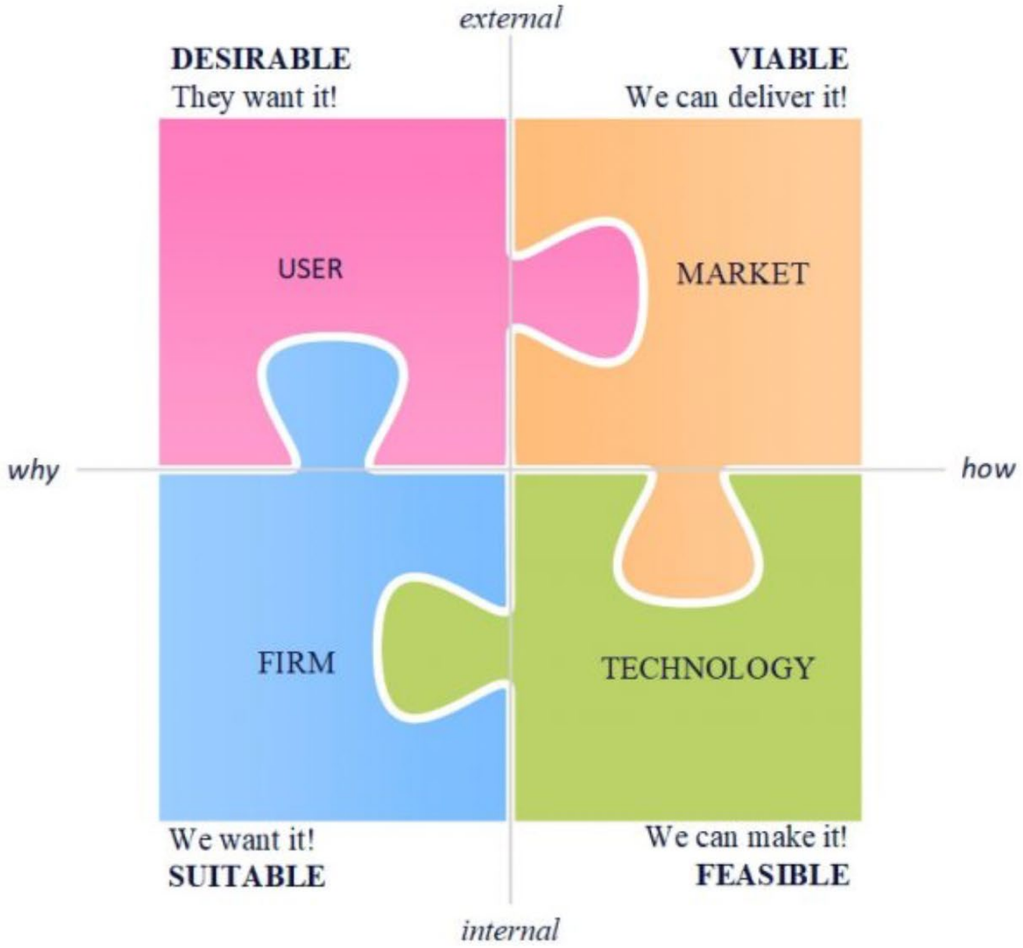
‘Four dimensions of successful innovation’



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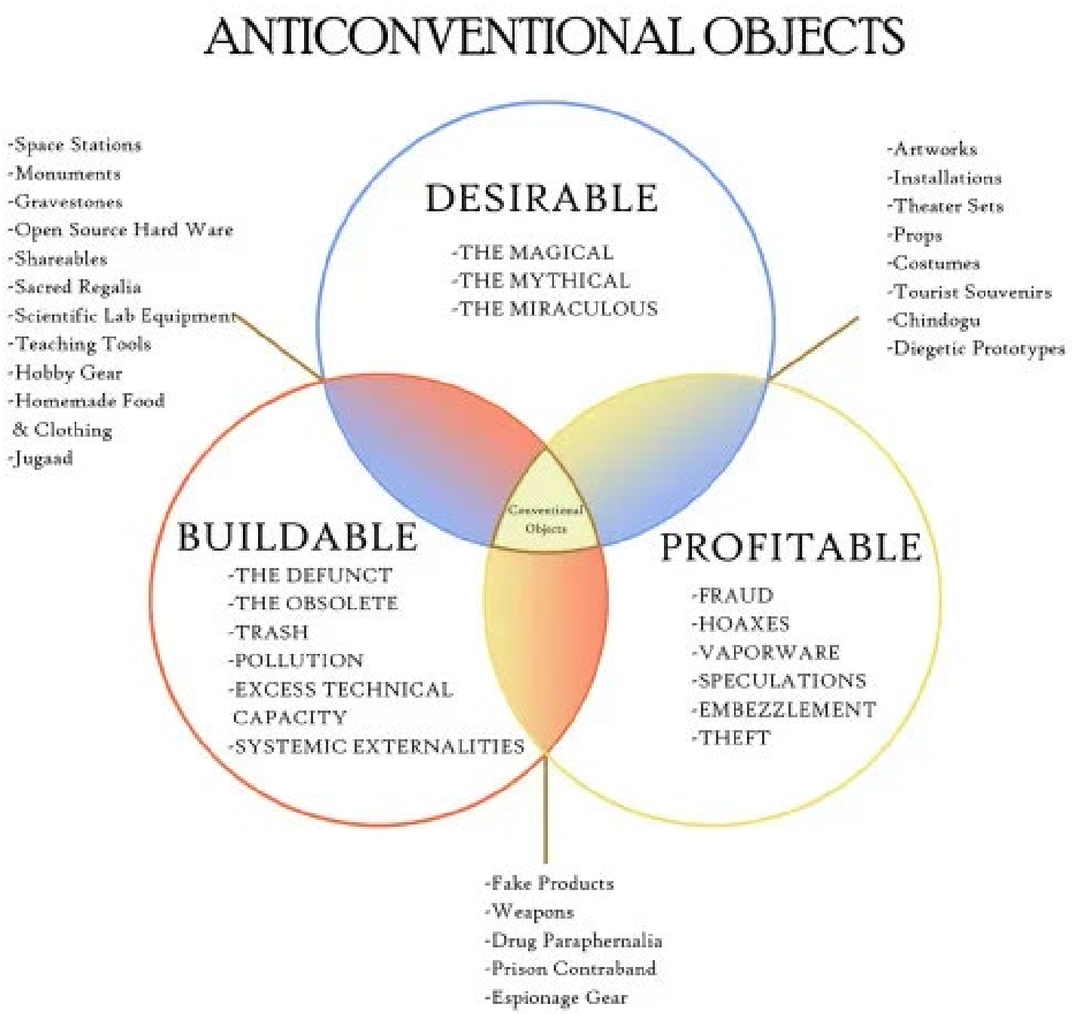
Bruce Sterling

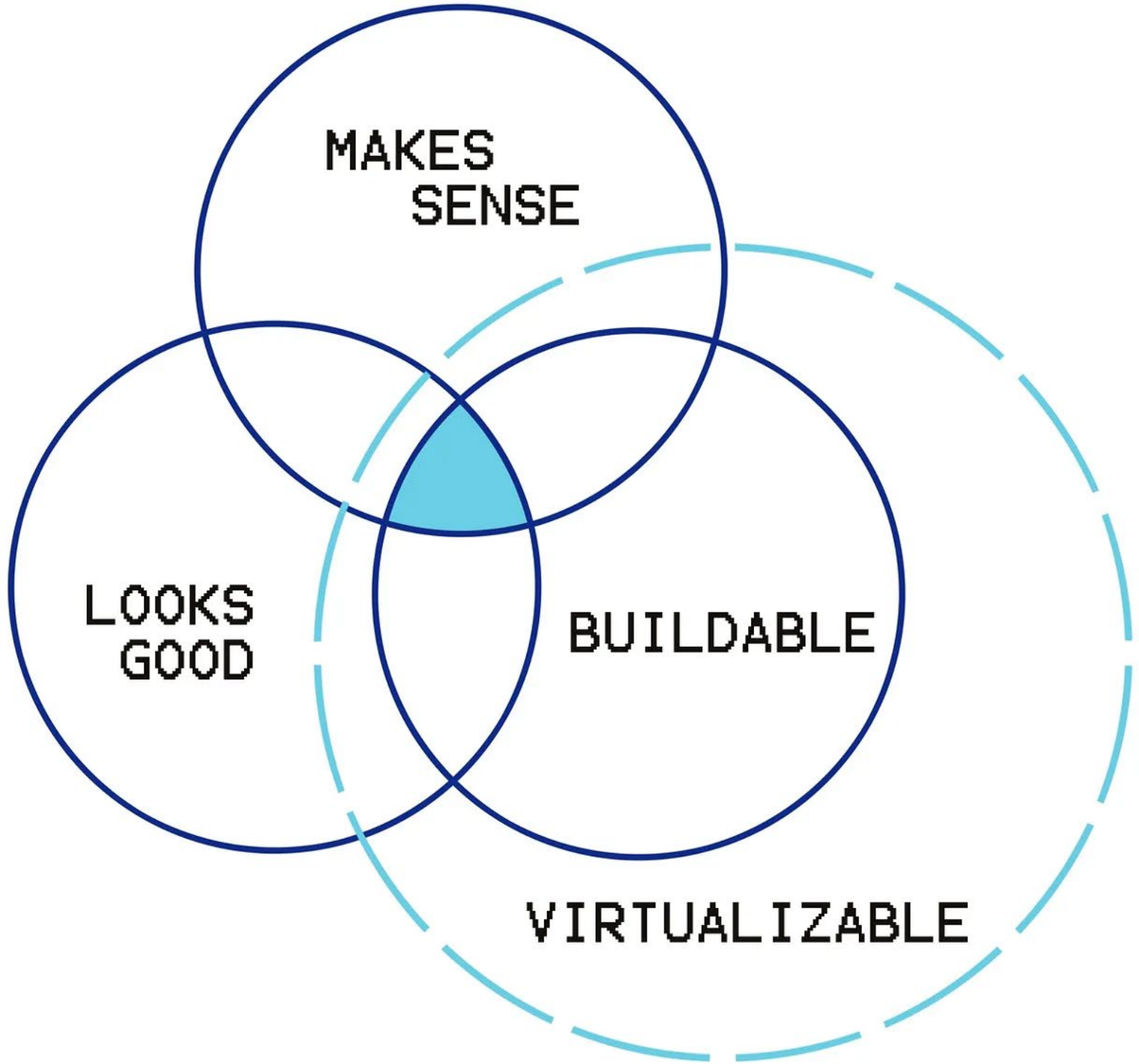
Anticonventional objects



https://bruces.medium.com/design-fiction-theory-67be4e506f1

Bruce Sterling

Design Fiction Theory



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