Lisbon School of Economics & Management
Universidade de Lisboa

Master in Innovation and Research for Sustainability

Evaluation and Management of R&I Projects

Module III: Assessing R&D and Innovation Projects

Lecture 5: Evaluating R&D+I Projects

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2024

Summary for today

Module I: Introduction to R&D+I Management

Lecture 1: Crafting an R&D+I Strategy

- Overview of R&D + Innovation: Its importance and impact
- Exploring Innovation Types: Understanding the diversity in innovation

Lecture 2: Applying R&D+I Management

- Developing R&D+I Capabilities: Techniques to enhance innovation
- Implementing R&D+I: Strategies for effective teamwork and innovation

Module II: Project Lifecycle in R&D and Innovation

Lecture 3: R&D+I Project Fundamentals: From Conception to Market

- Project Initiation: Scope definition and scientific and technical merit
- Project Planning: Strategy development, identifying challenges, and risk assessment

Lecture 4: R&D+I Project Fundamentals: From Conception to Market

- Project Execution: Leading RD&I teams, fostering creativity, managing change, and overseeing project progress.
- Project Closure: Capturing lessons learned and assessing project impact on value creation.

Module III: Assessing R&D and Innovation Projects

Lecture 5: Evaluating R&D+I Projects

- Value proposition and value capture process
- Core definition and evaluation elements: Understanding the fundamentals in project assessment – from technology to investment appraisal criteria
- Decision making process: Approaches for project selection and handling incomplete data

Lecture 6: Evaluating R&D+I Projects

- Design a business model: phase analysis, investment phases, accounting outcomes, and impact prediction considering both financial outcomes and social impact
- Financial Metrics: Discussing profitability, cost of capital, and their roles in economic and financial assessments
- How to define a Minimum Viable Product

Lecture 7: Evaluating R&D+I Projects

- Risk Management: Techniques for analyzing and mitigating project risks
- Funding mechanisms for Academia & Corporate

Lecture 8, 9: Real-World Applications

- Analysis of a R&D+I evaluation case study to illustrate concepts

Module IV: R&D+I Portfolio Management

Lecture 10: Optimizing R&D+I Contributions to Strategic Objectives

- Aligning R&D projects with strategic goals beyond financial metrics

Lecture 11: Performance Metrics for R&D and Innovation

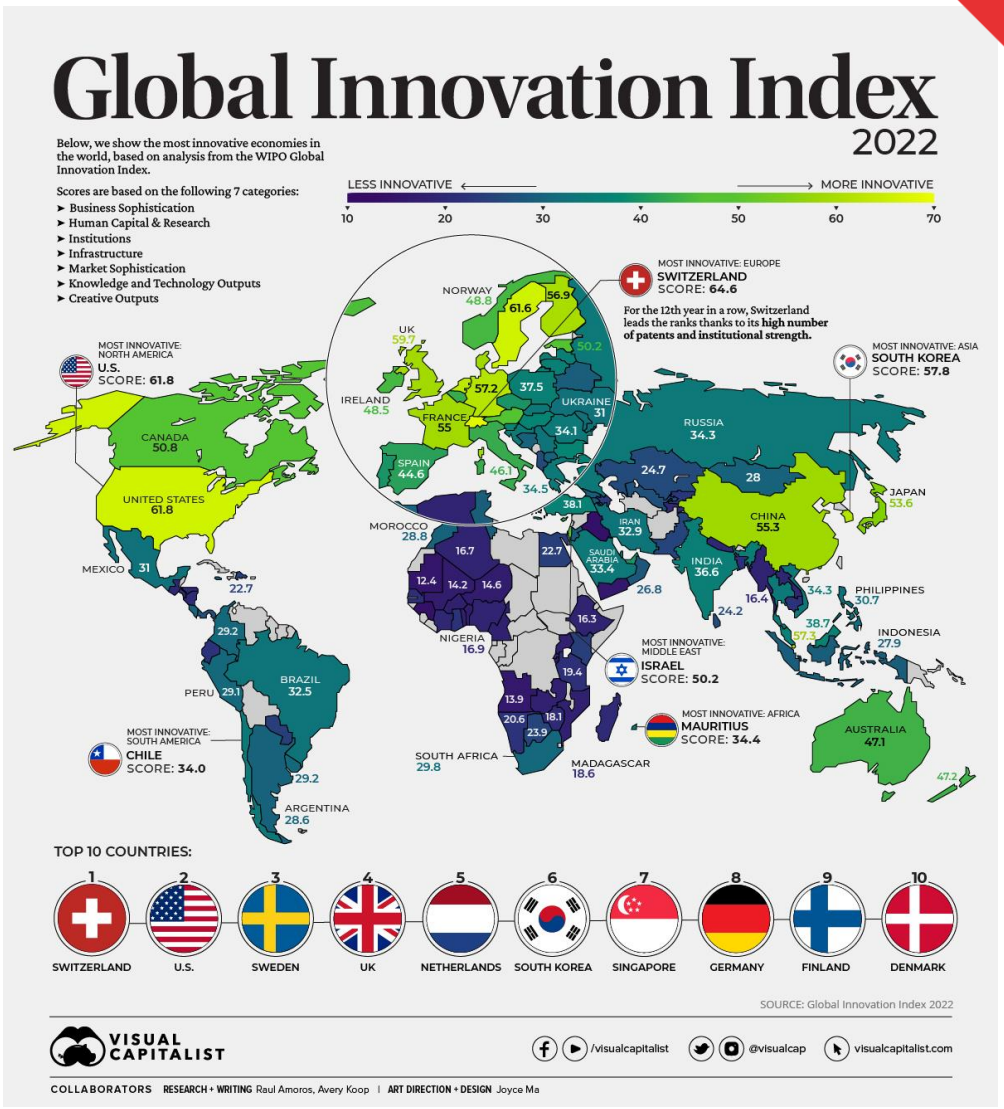
- Evolution of Performance Measurement Systems: Historical perspective and current trends
- Comparative Analysis of R&D Measurement Approaches

Lecture 12: Real-World Applications and Case Studies

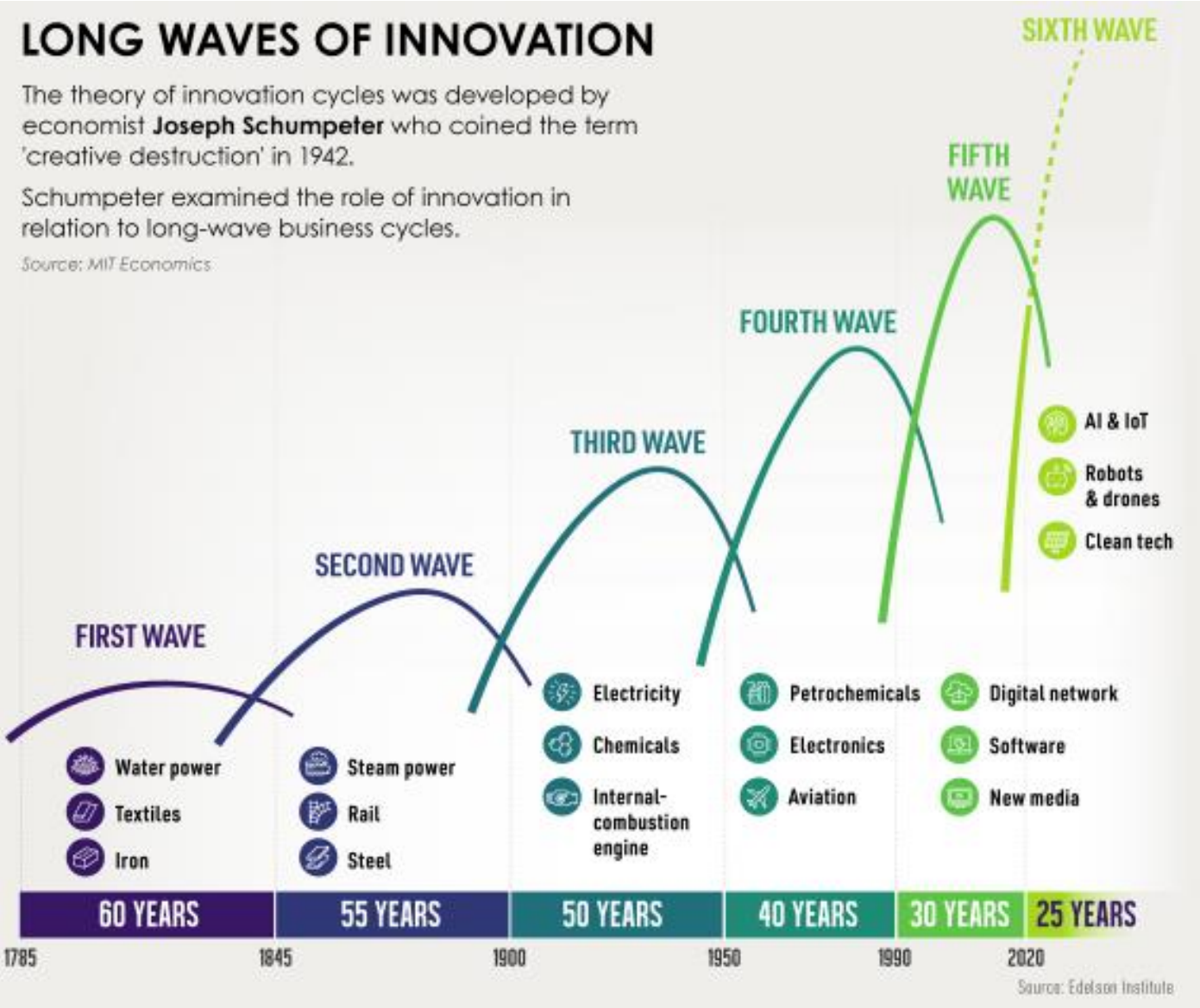
- In-depth discussion & analysis of R&D+I case studies to how to manage a R&D+I portfolio

What is value in Innovation?

What is value in Innovation?



What is value in Innovation?

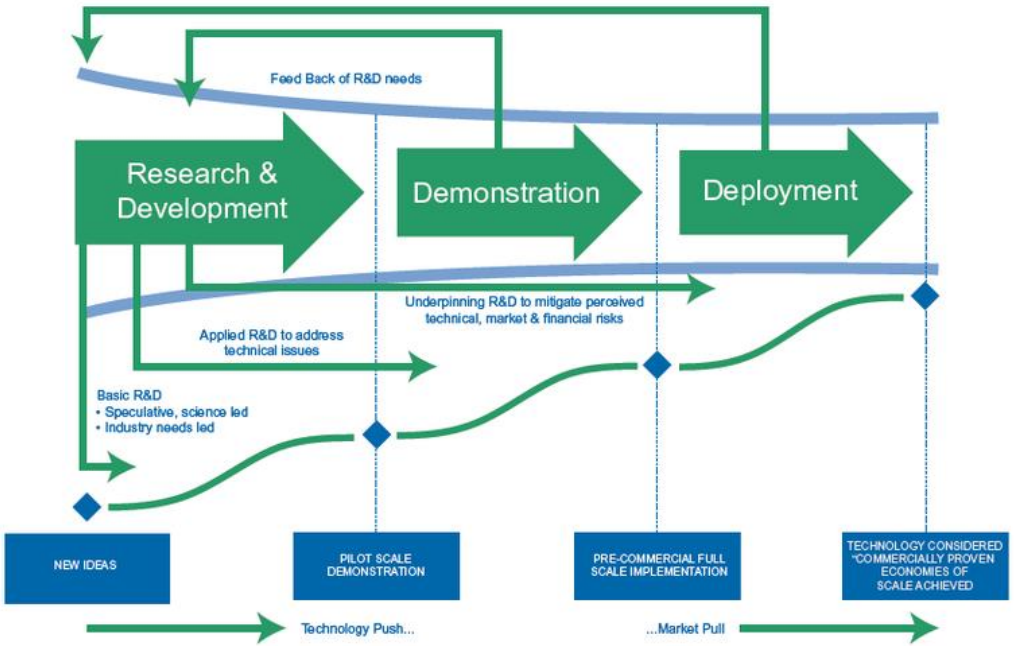


What is value in Innovation?

Innovation: the linear model

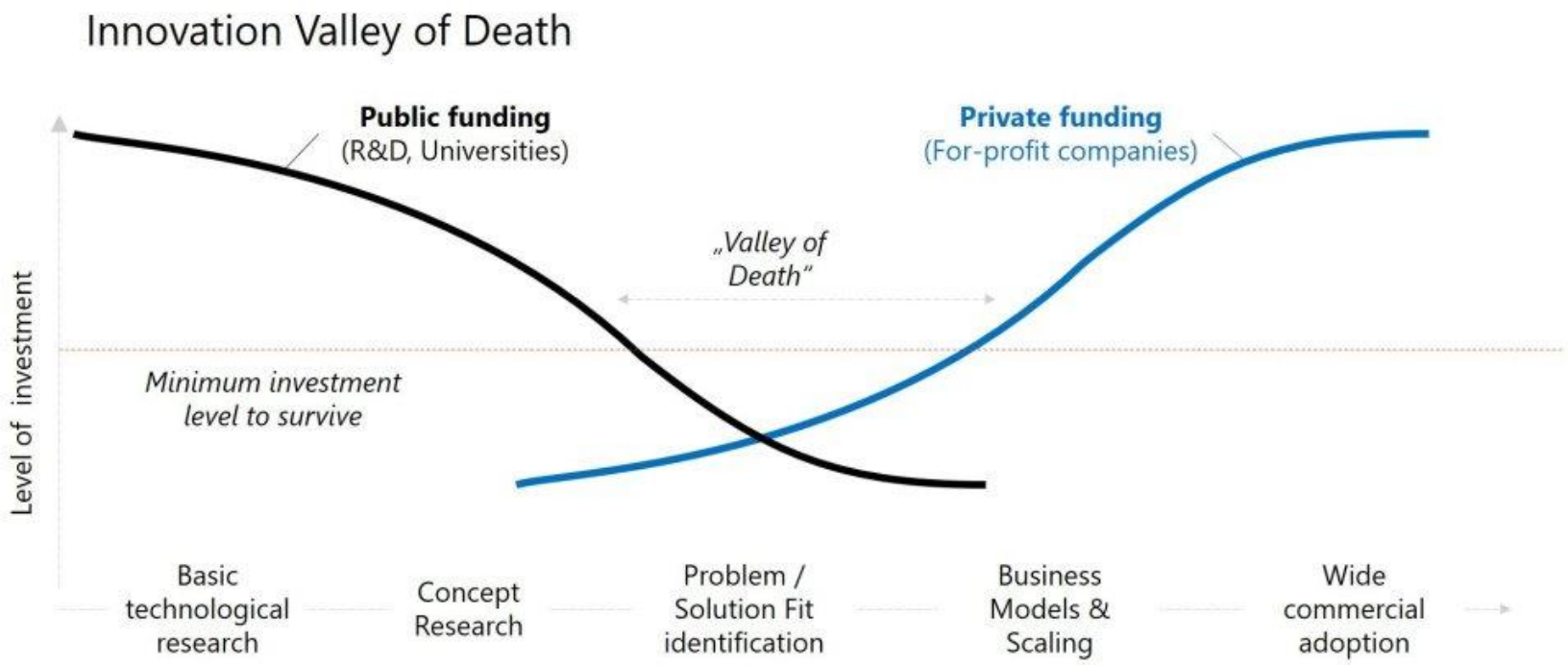
What is value in Innovation?

Innovation: the linear model



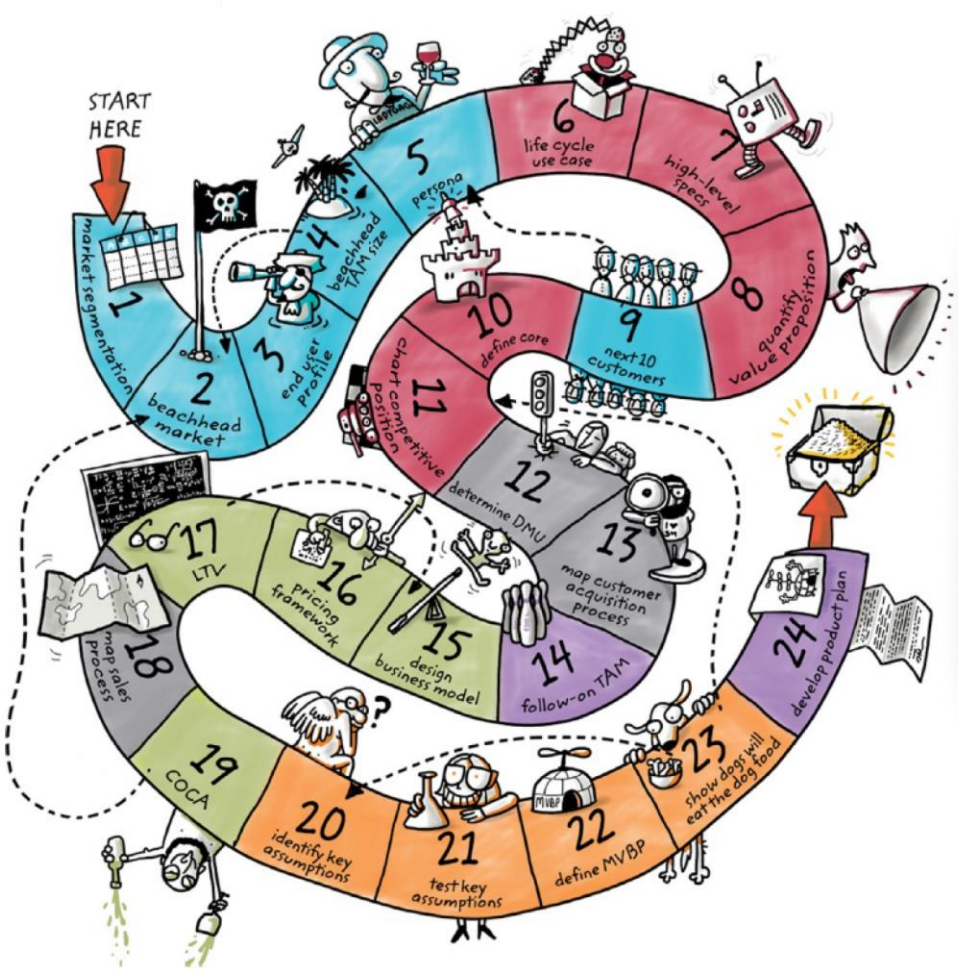
The non-linear innovation process (Energy Research Partnership, 2007)

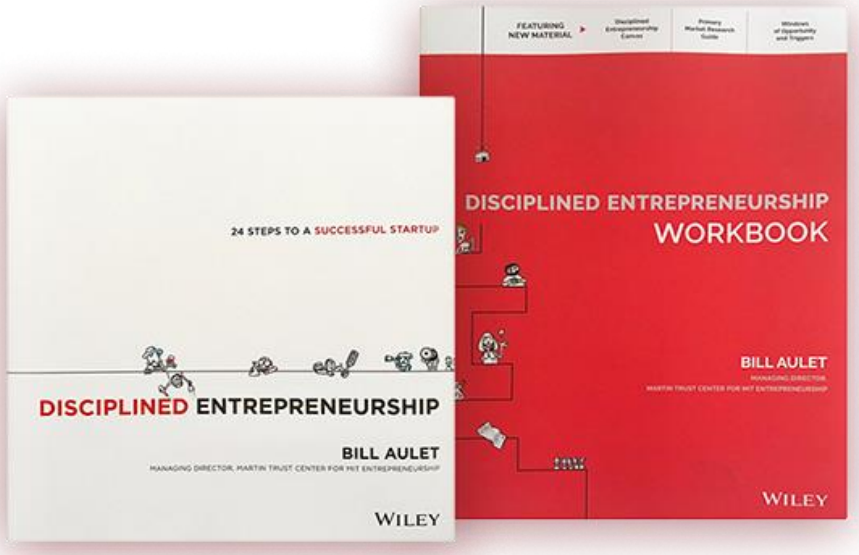
What is value in Innovation?



Value proposition and value capture

The concept of Entrepreneurship

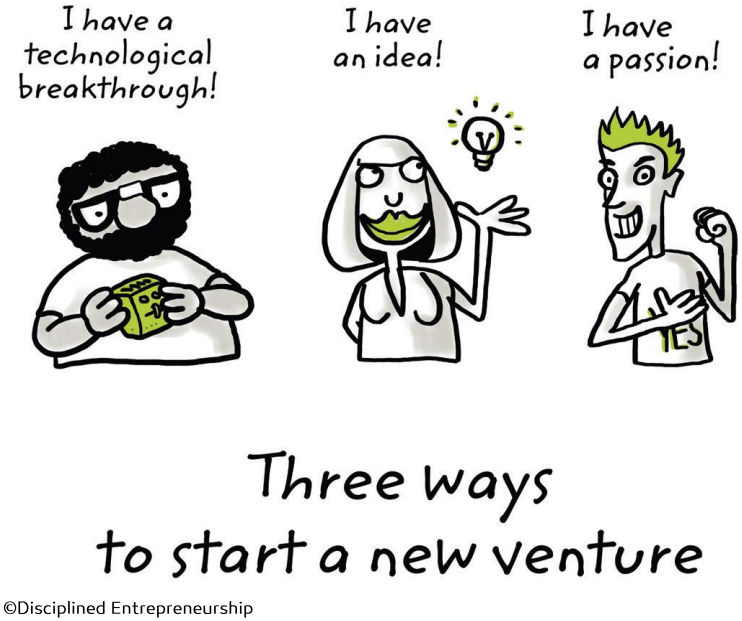




Disciplined Entrepreneurship by Bill Aulet

Value proposition and value capture

How do I get started? Reason for entering



Market Pull

1. What
   - General problem that is solved
2. Urgency
   - Nice to have
   - Critical Problem
   - Game changer – new market opportunities
3. Why us
   - What is our competitive advantage
4. Motivation
   - Willingness to put on the hard work

Value proposition and value capture

How do I get started? Reason for entering

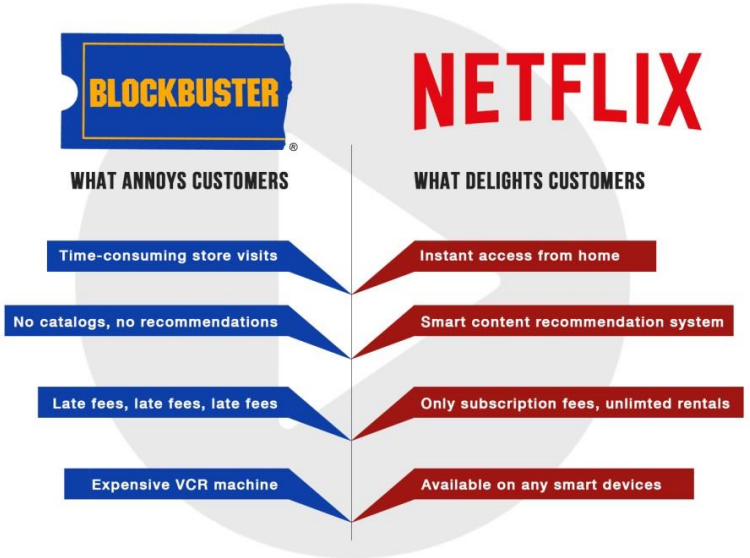
Technology Push

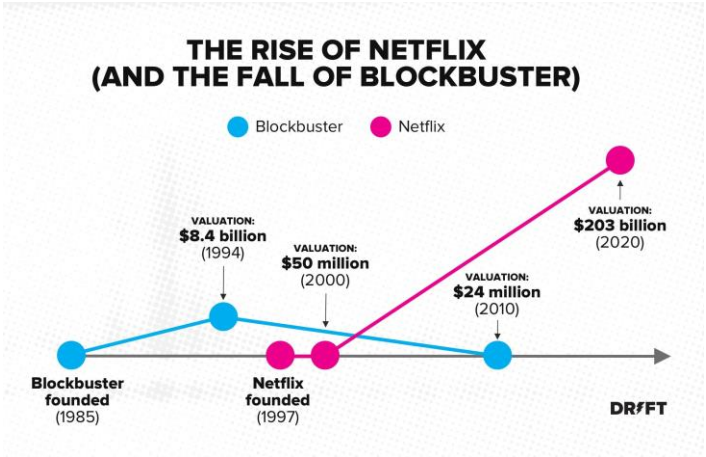
1. What
   Description of the invention
2. Why us
   What is our advantage
3. Alternative Comparison
   Will this be relevant
4. Motivation
   Willingness to put on the hard work

Value proposition and value capture

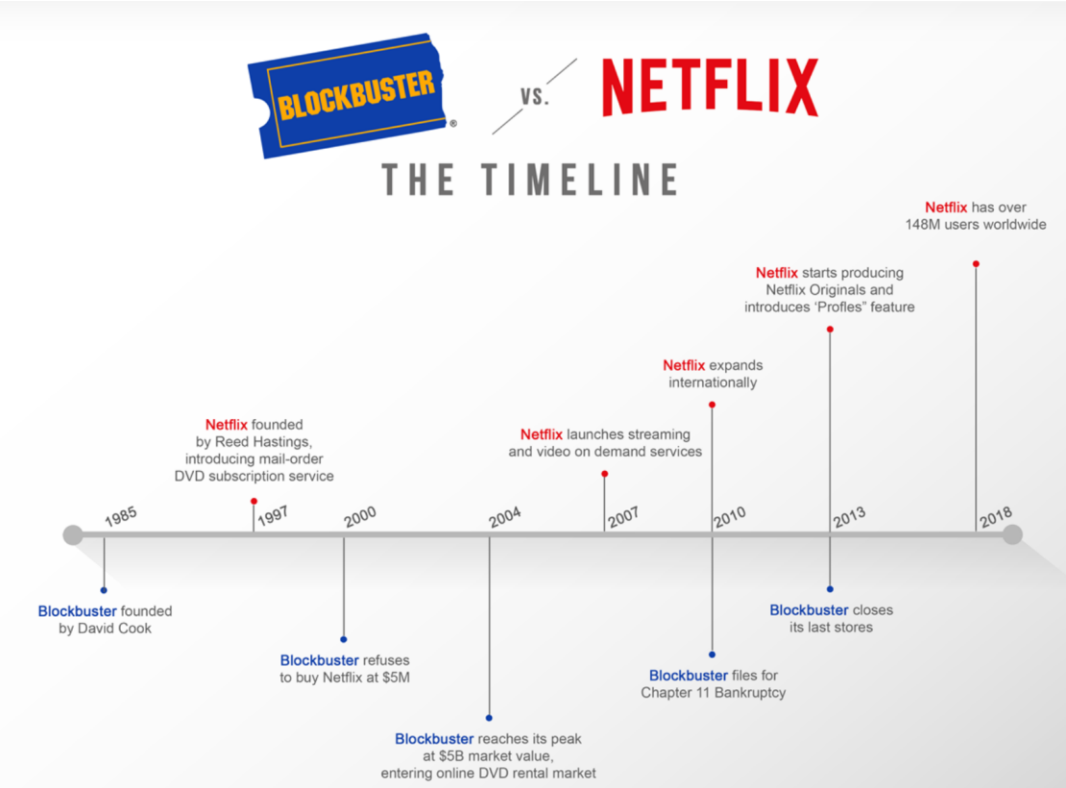
Dollar Shave Club

Value proposition and value capture





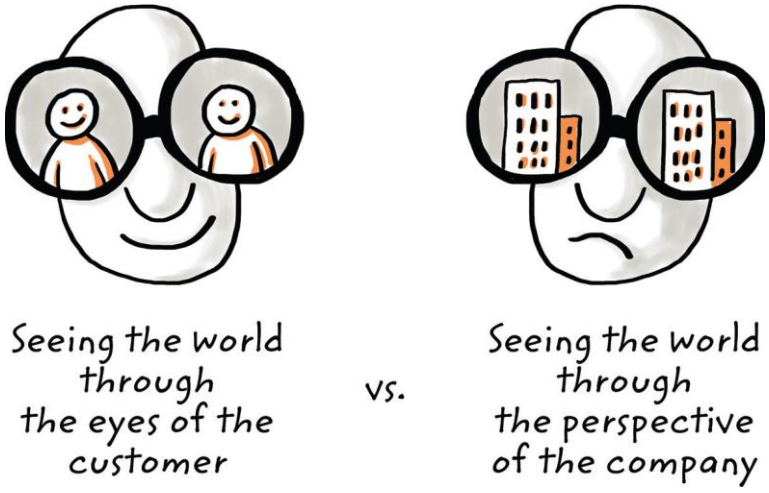
drift.com



strategyjourney.com

Value proposition and value capture

What is your market? Segmentation, beachhead and persona



Market Research

Primary Market Research - direct interaction with potential customers or stakeholders to gather specific and relevant information

Secondary Research - information from sources other than direct interactions with customers. Top-down" approach based on industry reports, government data, or other sources

Qualitative research – exploratory to gain a deeper understanding of a topic through open-ended, in-person interviews

Quantitative research - structured approach to gather specific data, often aimed at validating or refuting hypotheses generated during the qualitative phase.

Value proposition and value capture

Value proposition and value capture

What is your market? Segmentation, beachhead and persona

End User Profile

Demographics: Quantifiable data such as gender, age, income, geographic location, and education level help identify and filter target end users.

Psychographics: Classifying population groups based on psychological variables like attitudes, values, and fears. Understanding end users' aspirations, heroes, and behaviors rooted in beliefs provides deeper insights than demographics alone.

Proxy Product: Examining products already purchased by end users reveals their current behaviors and preferences. (e.g., owning a hybrid car may indicate an interest in environmental impact, hence potential interest in products like solar panels).

Watering Holes: Gathering places where end users exchange information, facilitating word-of-mouth marketing. (e.g., conferences and online platforms).

Day in the Life: Composite narrative based on observations and conversations with multiple end users, known as the Persona. This narrative vividly portrays a typical day in the shoes of the target audience, grounding the team in real-life experiences.

Biggest Fears and Motivators: Identify the primary concerns and driving forces of end users beyond their potential product-related needs.

Value proposition and value capture

Exercise 4

Politicians and their teams are extremely aware of "end voter" profiles. Pick two candidates who are competing directly against each other in a current or recent election, and try to define each candidate's "base," their core group of voters, which is analogous to a Beachhead Market.

In doing so, look at the candidates' contrasting messages and images and notice how they reassure and attract these people to the candidate.

	Candidate 1:	Candidate 2:
Demographics of base:		
Psychographics of base:		
"Proxy products"—what things do members of the base actually do in their lives that demonstrate they might be inclined to support the candidate?		
What watering holes do members of the base frequent?		
What is the biggest fear or motivator of their base?		

Value proposition and value capture

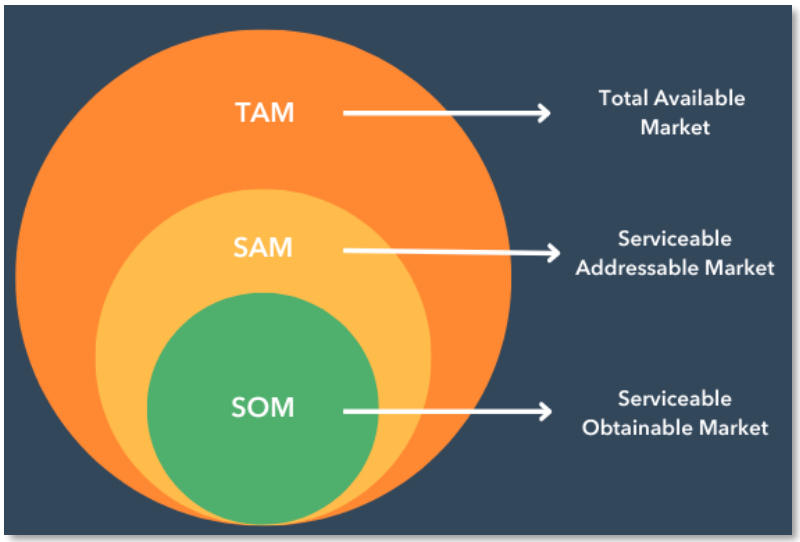
What is your market? Segmentation, beachhead and persona

Market Definition

Total Addressable Market (TAM): Total market for your product (100% of the market for type of product you sell - e.g., all coffee drinkers in Portugal)

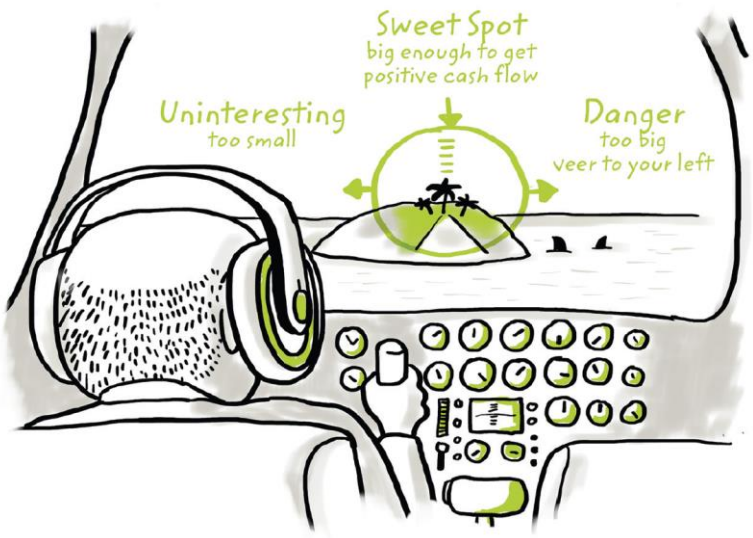
Serviceable Addressable Market (SAM): Portion of the market you can reach based on your business model (100% of the market you could actually sell to - e.g., all coffee drinkers on-campus)

Serviceable Obtainable Market (SOM): Percentage of SAM you can actually reach (what you most probably reach – beachhead market)



Value proposition and value capture

What is your market? Segmentation, beachhead and persona



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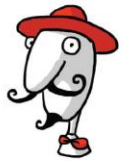
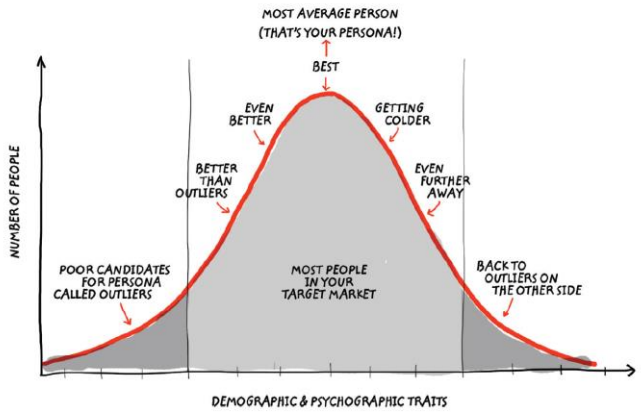
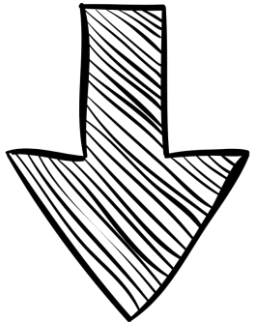




Beachhead Market – "the place where you land". Small market segment you can control until your company has sufficient resources to enter other markets.



Persona– similar to your end user but much more in depth resulting in a clear picture of what your target is representing the customer or company to which you are solving a problem

Downside? No one can fully represent you target end user.

Value proposition and value capture

Value Creation

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Product Description – Clear and simple description of what it does. Don't overpromise – you want underpromisse and overdeliver because this is an innovative approach. Challenges will be there for new products and approaches.

Quantifiable value – How faster is can be? What are the implications of this and the resulting value? Not only how much money it will make but also the impact in the industry, society

Important to consider externalities (e.g., social impact, reputation)

Understanding the Job

Core definition and evaluation elements

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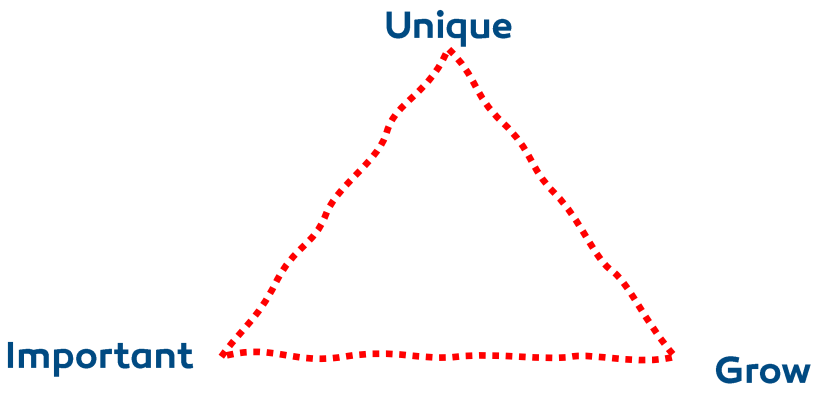
Competitive Advantage

- Define understand and protect
- Grow
- Core = “special sauce” extremely difficult to replicate

- **Unique**: This asset will be difficult for anyone else to replicate

- **Important:** This asset ties directly to your ability to produce something your target customer values very highly

- **Grow:** To be a strong Core, it should increase in strength over time relative to competitors.



Core definition and evaluation elements

Examples of Core

Network Effect: The company/product with the most users becomes the most valuable (e.g., eBay, LinkedIn, Facebook, etc). Failure to recognize and leverage the network effect, can result in losing market share to competitors.

Customer Service: Prioritizing exceptional customer service enables high customer retention rates and efficient customer acquisition. This requires a strong organizational commitment and consistent execution.

Lowest Cost: Developing skills, processes, and volumes to outcompete others on cost is a potential core strategy. Walmart exemplifies this approach, as do many Asian companies, particularly in the clean energy sector. Achieving economies of scale often facilitates this strategy, although it may serve as an entry point for companies before transitioning to other competitive factors. (e.g., Honda entered the U.S. market as a low-cost provider but shifted to its core capability of building quality motors).

User Experience (UX): UX prioritizes the development and continual improvement of the organization leading to top talent recruitment, operational prioritization, and a culture of excellence (e.g., Apple's success stems from its commitment to delivering an exceptional user experience across its products).

Core definition and evaluation elements

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Intellectual Property (IP):

- Common starting point for identifying core
- Effectiveness varies by industry
- Vital in specific sectors
- Limited impact in other industries - patents alone may not ensure success
- Capability often more valuable than patents

Fast Innovation Culture:

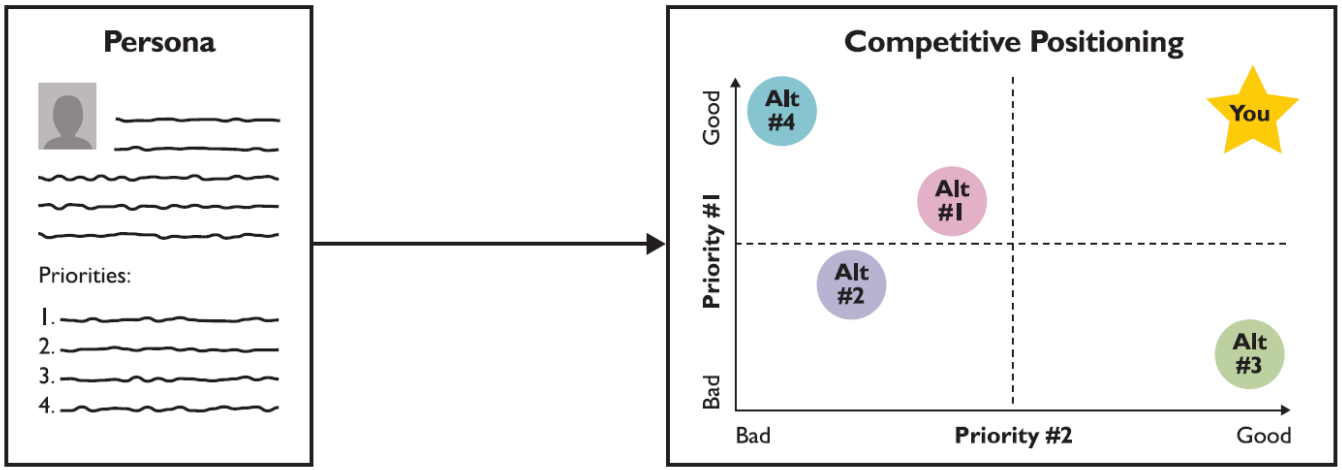
- Some companies gain advantage by innovating rapidly
- Initial advantage can translate into sustained growth
- Difficult to maintain as a unique core when scaling
- Smaller competitors may surpass innovation pace
- Typically used as a motivator and temporary advantage rather than a sole core

Innovation as Motivator:

- Important for all businesses regardless of core.
- Rapid innovation alone may not guarantee lasting success
- Businesses should seek additional core elements for sustained competitiveness

Core definition and evaluation elements

Exercise 5

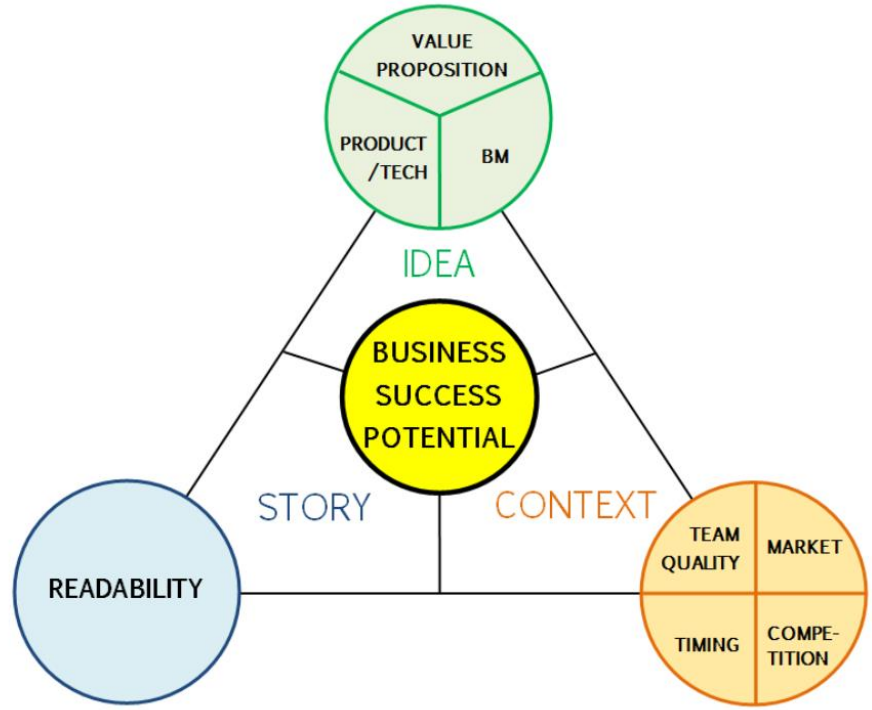


SAMSUNG

- Choose a company and do some market research
- Define a "persona" and its <u>two main</u> priorities
- Plot the position of the company you choose and answer:
  - What is your position relative to your competitor?
  - Are you in the upper right corner?
    - No - What could you do to be there?
    - Yes – What's in your core that enables you to be there?

Core definition and evaluation elements

From Technology to Economics



ISC Framework – Barros, 2016

ISC Algorithm (Idea, Story and Context)

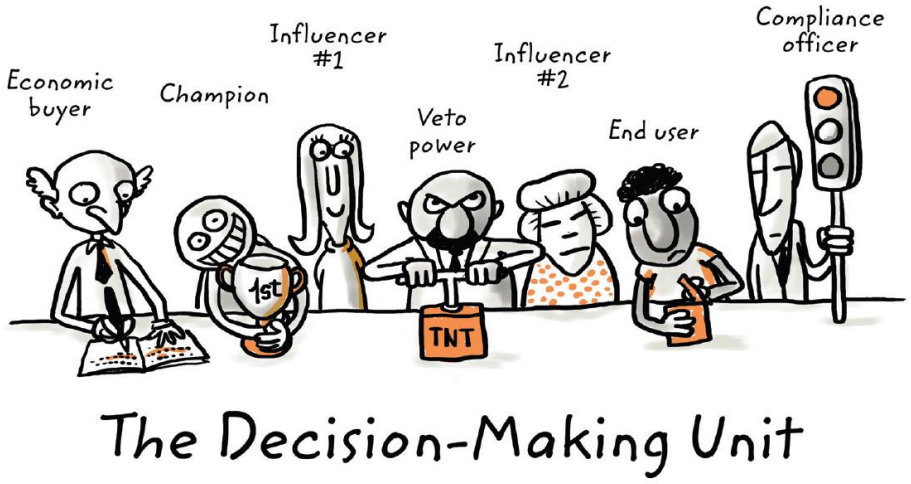
Built to help entrepreneur understanding what investors look for in a start-up, allowing to understand how the business model is performing.

The algorithm depends on entrepreneurs answers on a set of variables based on the proposed business model and expected outcomes

+ regulation

Assessment weights			
	I - IDEA		
	Value Proposition Test (15%) *Good business model yields value propositions that are compelling to their customers - in terms of innovation within the market*	**Answers and Points**	**References**
	1- Value proposition innovation:		
	Our products/services are very innovative in relation to our competitors	▪ Totally disagree (1) ▪ ... ▪ Totally agree (5)	
	Our solution generates a new customer segment in our market	▪ Totally disagree (1) ▪ ... ▪ Totally agree (5)	
	We are using entirely new distribution channels	▪ Totally disagree (1) ▪ ... ▪ Totally agree (5)	Clauss (2016); Kap Strömberg (200
	Our relationship with customers is very novel in relation to our competitors	▪ Totally disagree (1) ▪ ... ▪ Totally agree (5)	
	2- Likelihood of customer adoption		

Decision Making Process



Best product = not enough to win business

End user: The person whose use of the product creates value for the customer.

Primary economic buyer: The person who will pay for your product and will determine whether the value the customer gets from the product is worth the cost

Champion: The person who advocates for your product. This is the person who gets the process going and hopefully keeps it going until it is concluded

These roles reside in actual real people and not general, unspecific organizations.

Many of these roles may exist in the same person, which is common in consumer product sales.

Decision Making Process

Opportunity and Triggers for project selection

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Internal Conditions

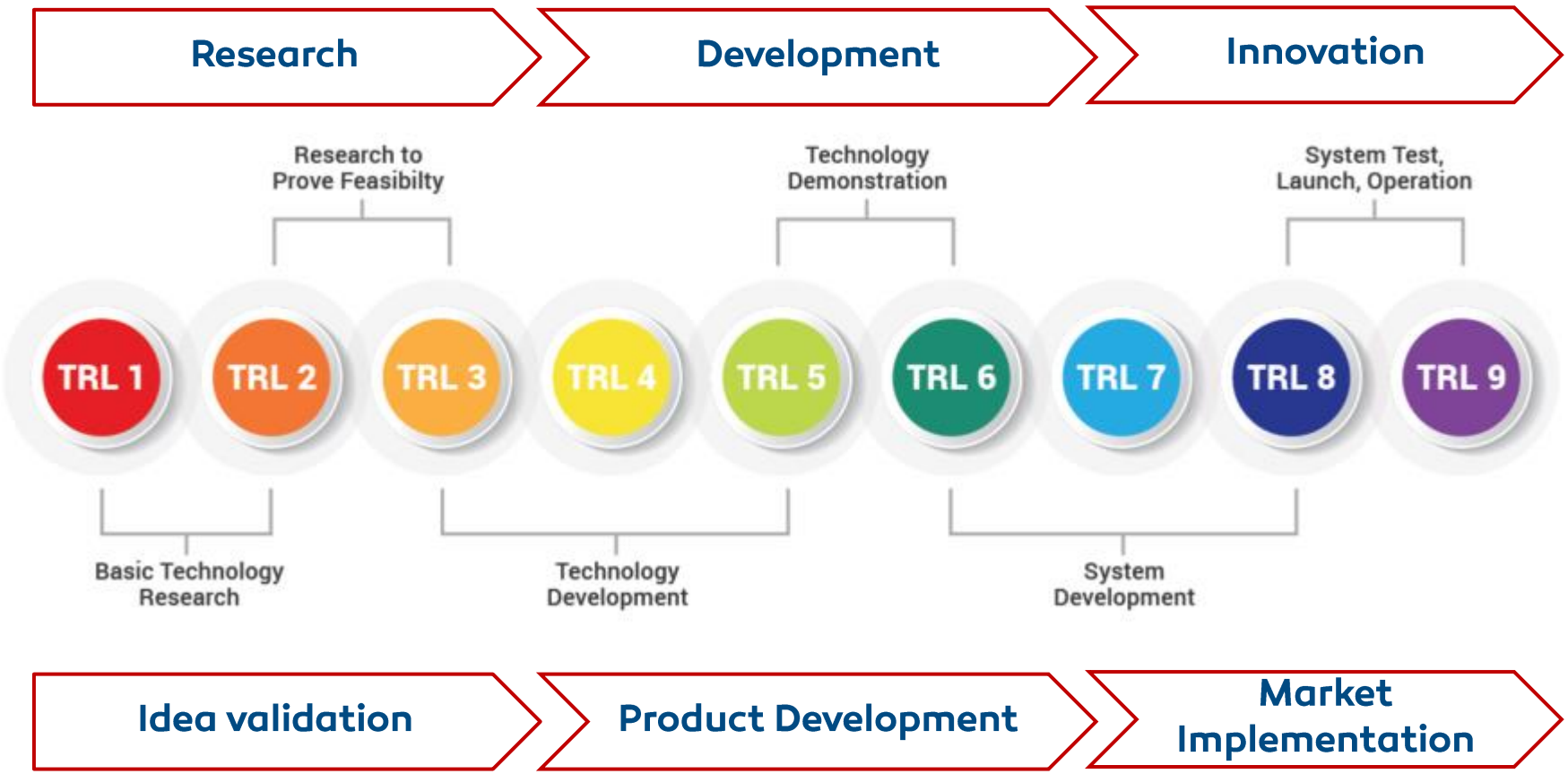
- Product and/or technology
- Business model
- Quality of management
- Performance to Date
- Involved stakeholders - Partnerships and investors
- Valuation

External Conditions

- Addressable market
- Competition and barriers to entry
- Willingness to pay
- Financial and market conditions

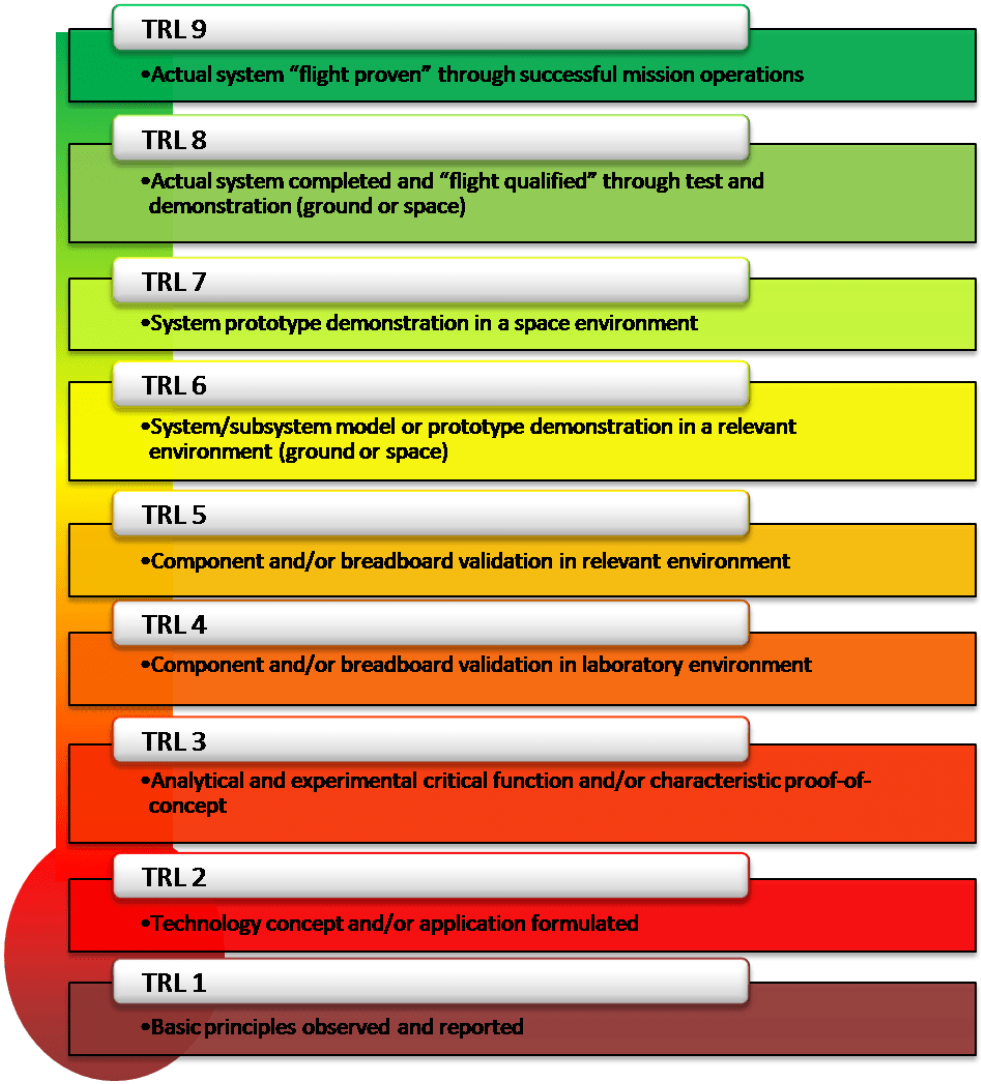
Decision Making Process

Project Evaluation Process



Decision Making Process

Project Evaluation Process



When a technology is at TRL 1, scientific research is beginning, and those results are being translated into future research and development.
TRL 2 occurs once the basic principles have been studied and practical applications can be applied to those initial findings. TRL 2 technology is very speculative, as there is little to no experimental proof of concept for the technology.
When active research and design begin, a technology is elevated to TRL 3. Generally, both analytical and laboratory studies are required at this level to see if a technology is viable and ready to proceed further through the development process. Often during TRL 3, a proof-of-concept model is constructed.
Once the proof-of-concept technology is ready, the technology advances to TRL 4. During TRL 4, multiple component pieces are tested with one another.
TRL 5 is a continuation of TRL 4, however, a technology that is at 5 is identified as a breadboard technology and must undergo more rigorous testing than technology that is only at TRL 4. Simulations should be run in environments that are as close to realistic as possible.
Once the testing of TRL 5 is complete, a technology may advance to TRL 6. A TRL 6 technology has a fully functional prototype or representational model.
TRL 7 technology requires that the working model or prototype be demonstrated in a space environment.
TRL 8 technology has been tested and "flight qualified" and it's ready for implementation into an already existing technology or technology system.
Once a technology has been "flight proven" during a successful mission, it can be called TRL 9.

Decision Making Process

Project Evaluation Process

	Research	Development	Innovation
Specifications	A temporary collaborative effort that includes investigation, to develop new products and/or processes. It involves coordinated efforts across various domains	A temporary proof of concept, verification or demonstration focused coming from laboratory scale to relevant environment	Investment in the production of new products and services capable of upgrading significantly the current processes
Management	Programming, monitoring, and controlling project activities to maximize effectiveness (fulfillment of objectives) and efficiency (minimization of cost and time)	Programming, monitoring, and controlling project so that the project is aligned with market needs and specifications	Similar to investment projects of industrial or commercial nature but distinguished by a greater complexity associated with risk
Resources	Mainly intangible incl. man-hours, equipment, services, marketing, consulting and structure	Tangible incl. developed equipment, developed services, and knowledge capability	Financial capability for market approach. Costs of implementation
Results	Knowledge	Product and/or service at an early stage	Final product and/or service
Metrics	Allocated time, knowledge generation, concept development	Allocated time, concept development stage, return on marketing (reputation), Intellectual property	Industrialization, commercialization, royalties, return on investment
Uncertainty	Very high - Applied methods, costs, project timeline, time to market process, technologic viability	High - Time to market, market conditions and investment criteria (end of project), scalability	Moderate to low - Market conditions, investment criteria, backlog, reputation

Decision Making Process

Project Evaluation Process

	Research	Development	Innovation
Risk Factors	Associated to the invention and creation process	Associated to the concept development, scalability and applicability	Associated to market entry or market creation
Evaluation	Cost perspective – the relation between generated knowledge and its forecasted market value	Revenue perspective – prospective value of the developed product/service	Market perspective – Real economic value by comparison with incumbent solutions
Impact	Knowledge, reputational, social	Concept, reputational, social	Market, financial, social

Externalities of RD&I Projects

- Positive and Negative
- Societal impact
- Investment in the community
- From knowledge to (un)employment

Decision Making Process

Key Takeaways

- Value of Innovation – Non-linear
- Value proposition and value capture
    - Market pull and Technology push
    - What is you market – market research and segmentation
    - Find your end user
    - Define you market and the persona
    - Be quantifiable
- Define you core and consider your evaluation elements
- Find your decision-making unit
- Project evaluation process – from technology to the market
    - Research
    - Development
    - Innovation

Homework

Read

- Disciplined Entrepreneurship: 24 Steps to a Successful Startup. Bill Aulet. ISBN: 978-1-118-72081-3 July 2013 288 Pages. (Step 0)
- Business Model Innovation: Opportunities and Barriers, Henry Chesbrough , Long Range Planning, Volume 43, Issues 2–3, 2010, Pages 354-363, ISSN 0024-6301

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