

DRIVING GROWTH 

# New Product Development

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RESEARCH  
& INNOVATION  
FOUNDATION

## ▶ What is NPD

- A formalized process for turning ideas into products and services.



# ▶ Common Stages and Gates

Idea > Screen > Design > Development > Test > Launch > Post-launch

Concepts

Projects

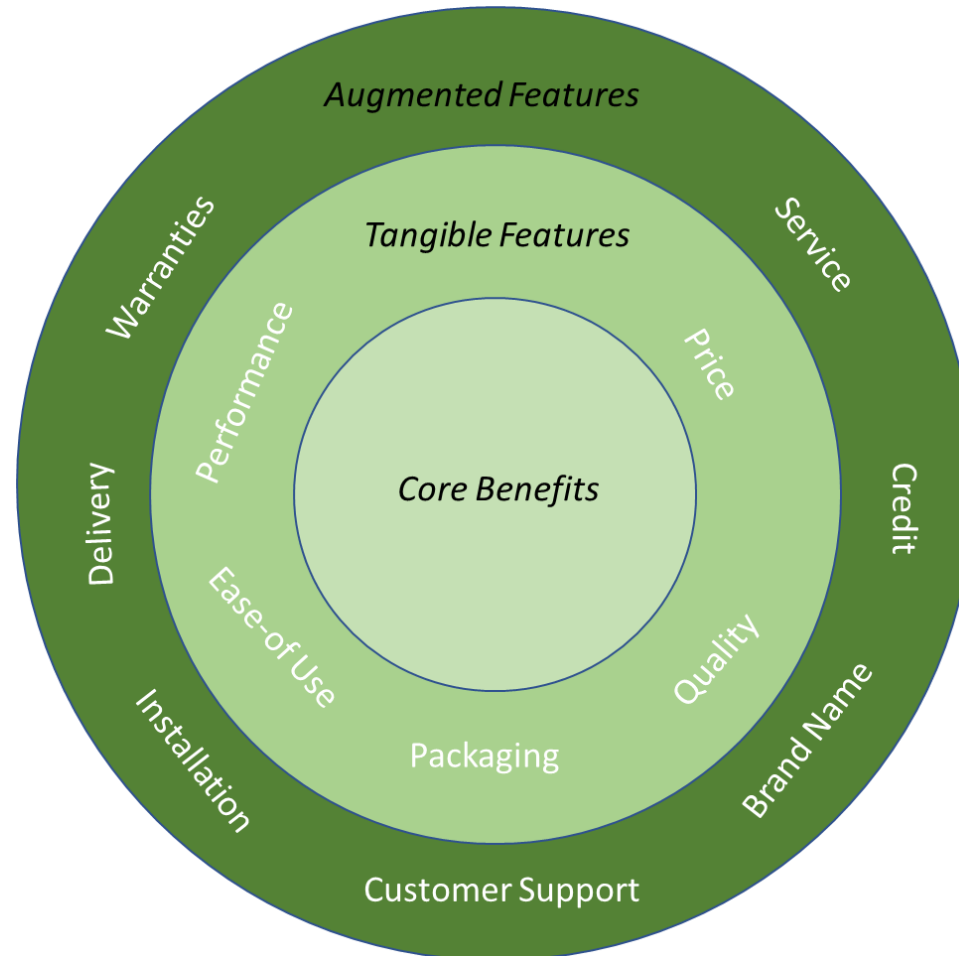
Prototypes

Products

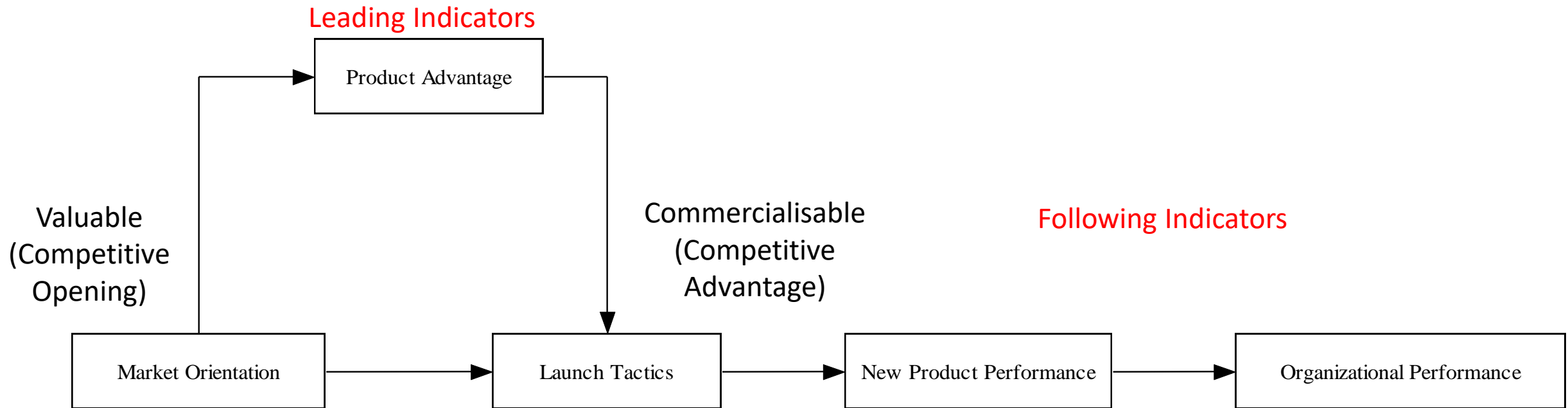
Improvements

Time

# ▶ The Goal is to Create a Product or Service with Value for the Customer and for You

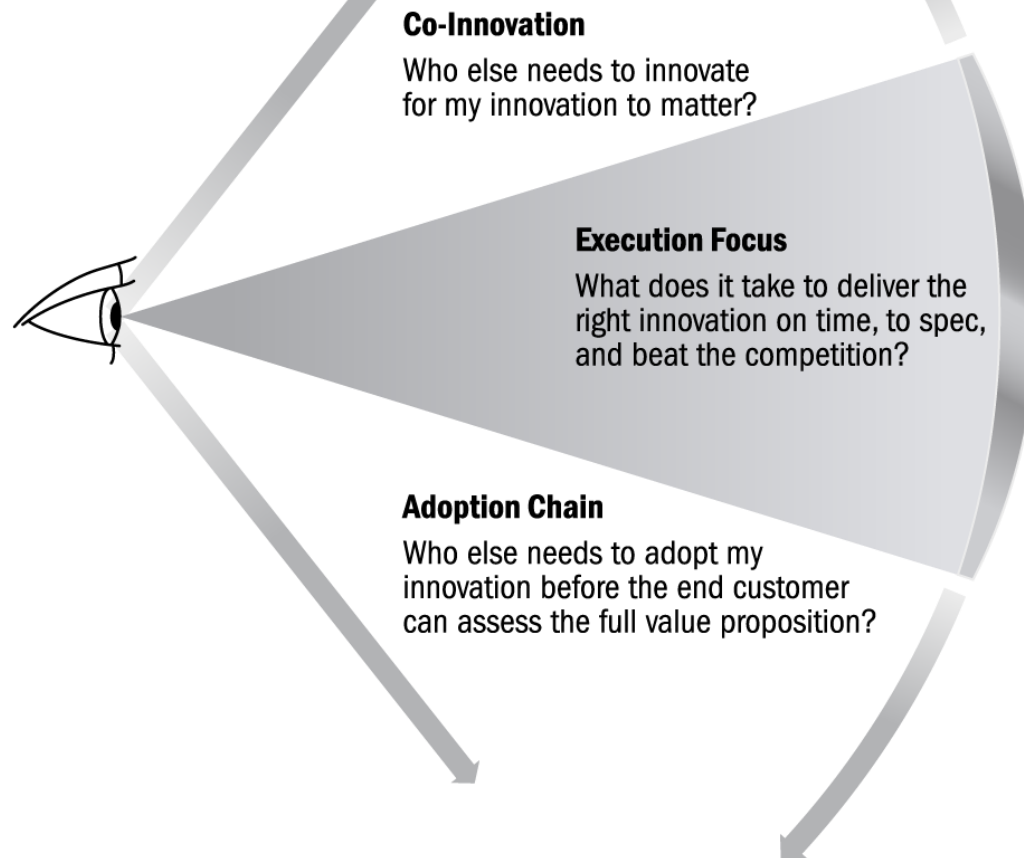


# ▶ Value for the Customer is How you Create Value for Your Company





# ▶ But You Have to Manage Risks to Create Value for the Company





# ► Management of Risks

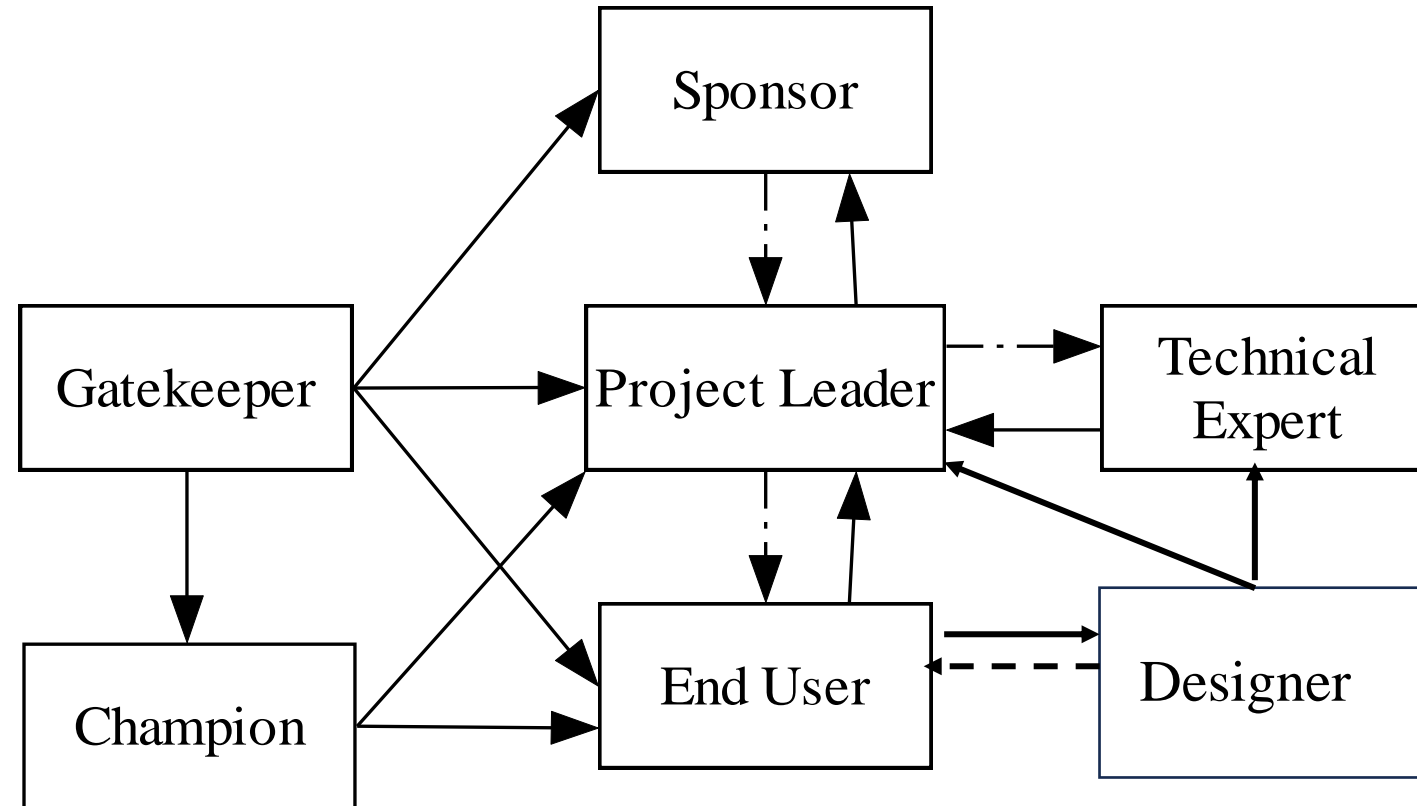
Presence of Prior Experience, Skills, Knowhow, and Education

Time and  
Money  
Impact

| Significance/<br>/Likelihood of<br>/ Occurance | High                            | Low                             |
|--|---------------------------------|---------------------------------|
| High   | Avoid                           | Mitigate<br>(Contingency Plans) |
| Low  | Mitigate<br>(Contingency Plans) | Accept<br>(Muddle Through)      |



# ► Critical for Risk Reduction is the Team





## ▶ **Gates are Where You Manage Risks**

- 1) Are you on-track to develop a product or service with sufficient value for customers and end-users that they will acquire it and use it?
- 2) Do you have the skills, capabilities, capacities, resources, and intellectual property rights to conduct the next step successfully and within the budget and schedule?
- 3) If you complete NPD, will the product or service create value for the company developing the product or service, in the form of desired profits and/or other net benefits?

# ▶ Gates End with Go/NoGo Decisions

Go 😊

**NoGo!!!!**

*Do you modify what you are doing or abandon this NPD initiative?*

- A. Review Project Charter**
- B. Review Action Plan**
- C. Review Relevant Data**
- D. IF NECESSARY: Review Business Model Canvas or equivalent**

## Business Model Canvas

### Key partners

- \* Remarkable Biofuels LLC for organisms and know-how
- \* Vendor for sensors
- \* Vendor for software
- \* Regulatory and certification consultants
- \* Delivery service for overnight or up to three day delivery for shipping organisms and parts
- \* Government agencies funding sustainable energy, farm vitality, and waste reduction for financial support for customers
- \* Investors and banks for working capital
- \* University or research institute for next generation proprietary organisms, sensor/software systems, and other improvements or related products

### Key activities

- \* Obtain certifications and approvals
- \* Assembling mini-refineries
- \* Raising organisms
- \* Delivering, installing, and training
- \* Service and remote operations/monitoring/maintenance
- \* Making, marketing, and selling/licensing products and services

### Key resources

- \* License for organisms
- \* Core staff with biological and sensor/software and automation technical expertise
- \* Marketing, sales, support, installations and training and other staff for direct contact with customers
- \* Quality assurance lab
- \* Organism lab
- \* Assembly factory
- \* Test sites
- \* Web and telecom infrastructure
- \* Distributors and retail outlets
- \* Local and on-site repair personnel
- \* Working capital

### Value proposition

- \* Reduced energy expense
- \* Quick payback of initial investment
- \* Energy independence
- \* Biomass flexible; abundant feedstock
- \* Easy to use, including remote operation/monitoring/maintenance if desired
- \* Domestically produced and supported

### Customer relationships

- \* On-going partnership to leverage consumables and support options modelled on infinitely repeating games in game theory
- \* Collegiality built by sales engineers and installer/trainers
- \* Heavy use of social media and electronic communications to stay in touch

### Channels

- \* Trade associations and trade publications
- \* Social media with emphasis on YouTube and other multimedia; content also available on company website
- \* Phone, email and other owned one-to-one channels
- \* Sale representatives
- \* Demos in cooperation with government agencies and agricultural extension agents and with beta testers

### Customer segments

- \* Mid-sized and large farms
- \* Agricultural cooperatives and storage (e.g. grain elevators)
- \* Towns, cities, and companies collecting biomass waste
- \* Military bases
- \* Licensees for new technology we might develop and patent

### Cost structure

- \* Variable costs: parts and components to be integrated; organism mats; assembly labor, delivery and associated labor; video production; energy and other utilities
- \* Fixed costs: factory; organism farm/clean room; core technical, customer support, marketing, installation/training, and managerial staff; telecom infrastructure; analytical lab; regulatory compliance; legal fees; amortization; taxes; interest; insurance, repair and maintenance; R&D and NPD; advertising and promotion
- \* Semi-variable: click-through advertising, webstore; supplemental staff as needed - network economies in social media marketing.
- \* Initial estimate of ratio of variable to fixed costs to semi-variable: 3 to 1 to 0.5

### Revenue streams

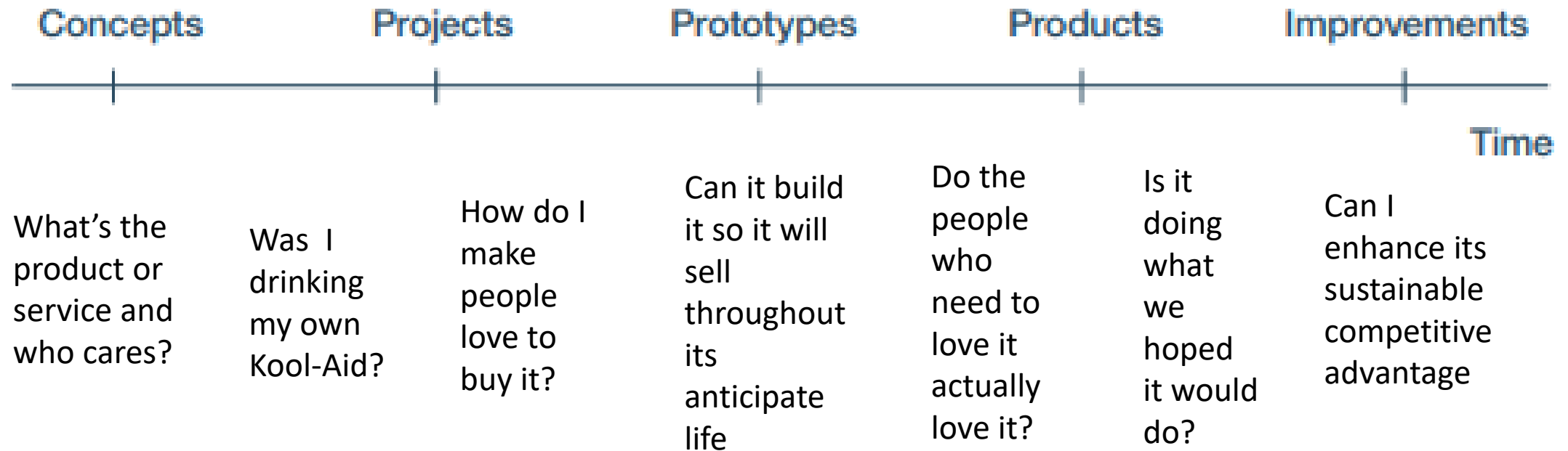
- \* Leases of mini-refineries
- \* Sales of mini-refineries
- \* Sales of organisms on mats, filters, other consumables
- \* Service contracts
- \* Sales of operations and monitoring contracts
- \* Licensing of improvements to those in other markets
- \* Government grants, contracts, and tax incentives

# ▶ Stretch and Discussion



# ▶ What Happens in the Stages?

Idea > Screen > Design > Development > Test > Launch > Post-launch





Idea > Screen > Design > Development > Test > Launch > Post-launch

Concepts

Projects

Prototypes

Products

Improvements

Value  
Architecture

Voice of Customer,  
Competitive Advantage,  
Value Chain  
Freedom to Operate

Specs.  
Interface  
Concurrent Engineering

Applied  
Research &  
Development  
Alpha Testing  
In-Vitro Testing

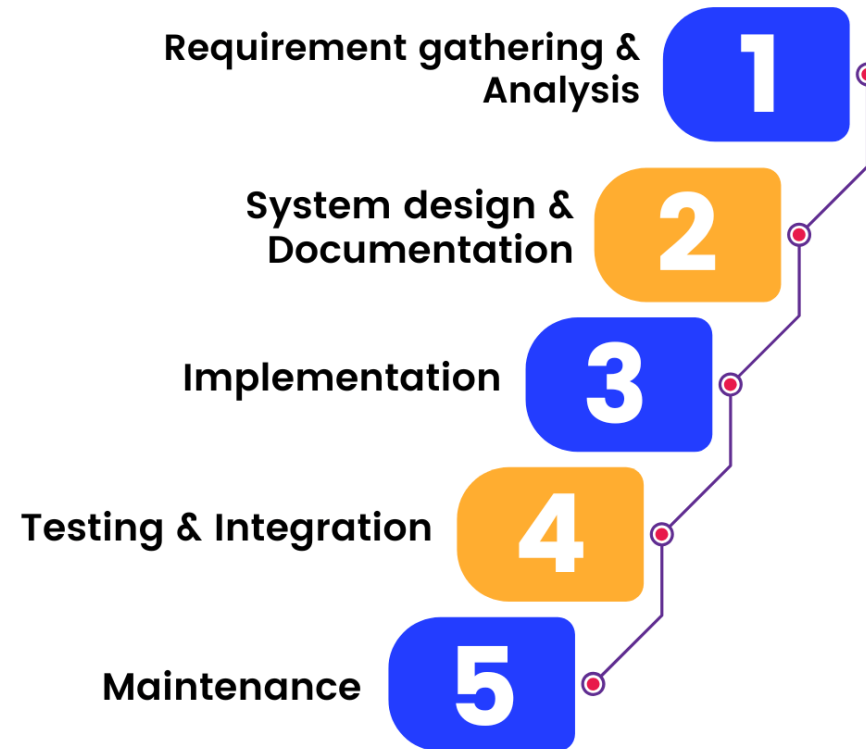
Beta Testing  
MPV  
Regulatory Compliance  
Standards Certification  
Phase 1 & 2 Clinical Trails  
Sell and Support

Iterate

RISK

Time

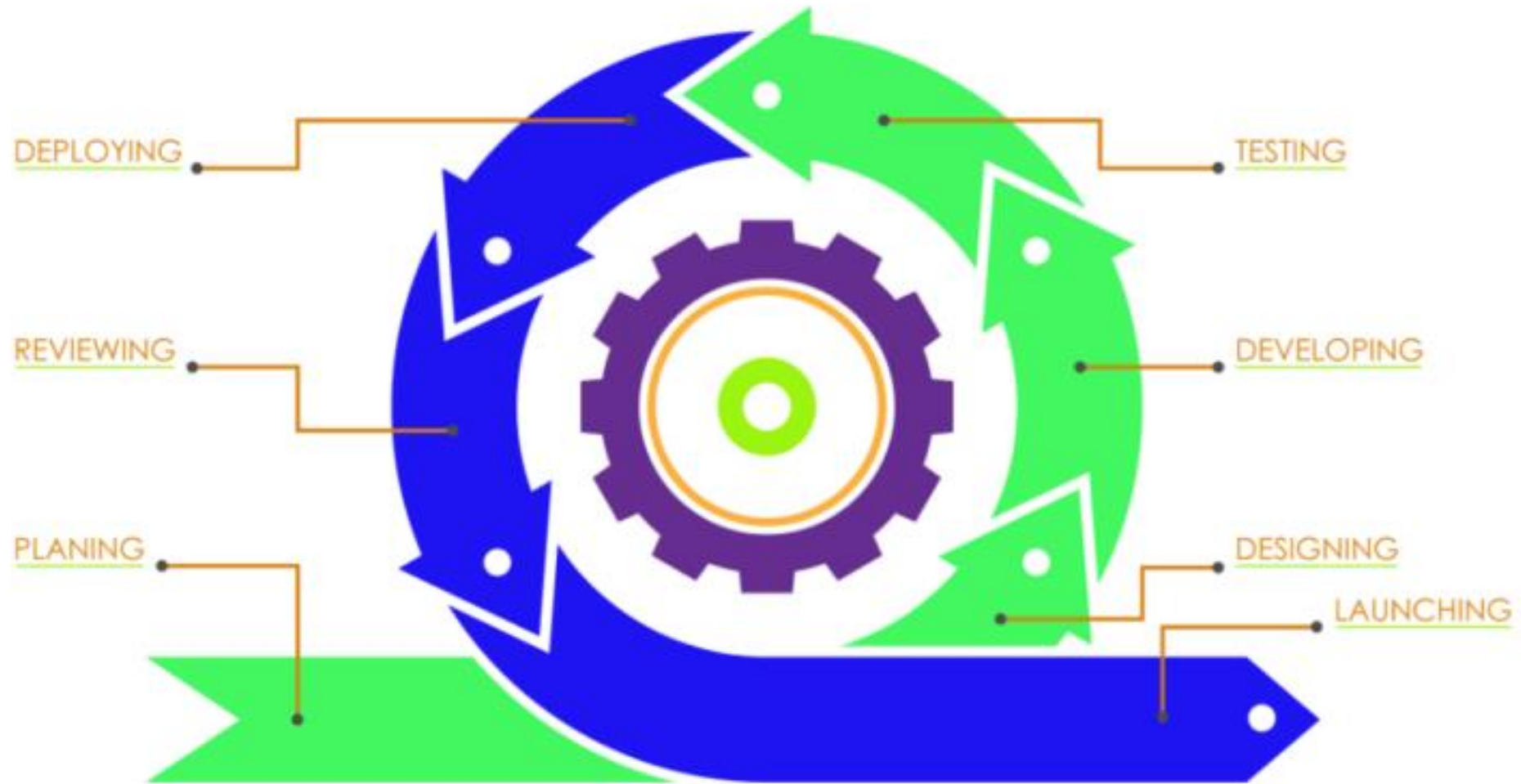
# ▶ Waterfall Product Development



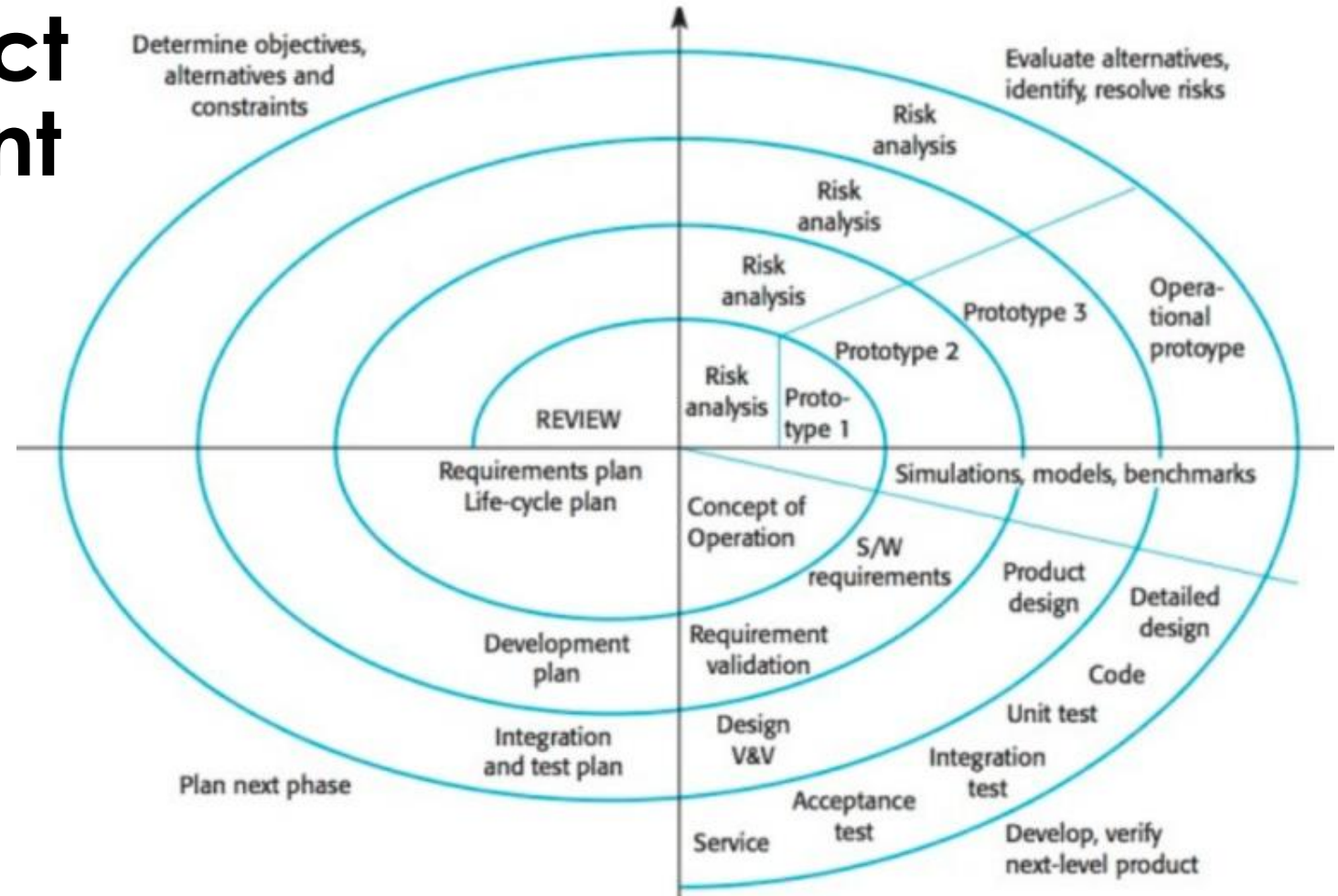
WATERFALL MODAL

[Software Testing Models - Qman](#)

# ▶ Agile Product Development



# Spiral Product Development



[Software Testing Models - Qman](#)

Spiral Model

▶ **Discussion and Break for 10 Minutes**



# What's in Toolkit on New Product Development and Inventions in the Public Domain (wipo.int)?

- 1) A set of fifteen. Each tool is an Excel spreadsheet.
- 2) A short video introducing each tool and explaining its importance for NPD
- 3) A Tool Description explaining why and how to use each tool with instructions on how to use the tool together with examples of how to find the data needed to complete the spreadsheet.
- 4) An example of a completed Excel spreadsheet based developing a biofuel mini-refinery.



# ► Overview on Tools



## Project Charter

The Project Charter for new product development defines the product or service that is going to be developed, the value that will be created, and establishes roles and outcomes for the project team. Learn how to use the Project Charter tool [PDF](#) [DOC](#) with an example of a completed tool [XLS](#).

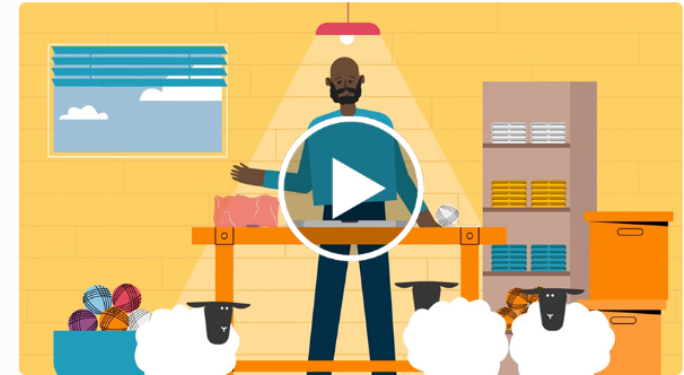
[Download the tool](#)



## Action Plan

The Action Plan for new product development (NPD) establishes the concrete tasks and milestones to be accomplished during each stage in the NPD process, and identifies the key resources needed for the project. Learn how to use the Action Plan tool [PDF](#) [DOC](#) with an example of a completed tool [XLS](#).

[Download the tool](#)



## Voice of the Customer

New Product Development focuses on creating products and services people need and use. The Voice of the Customer tool helps gather information from customers and end-users to ensure the final product or service will meet their needs. Learn how to use the Voice of the Customer tool [PDF](#) [DOC](#) with an example of a completed tool [XLS](#).

[Download the tool](#)

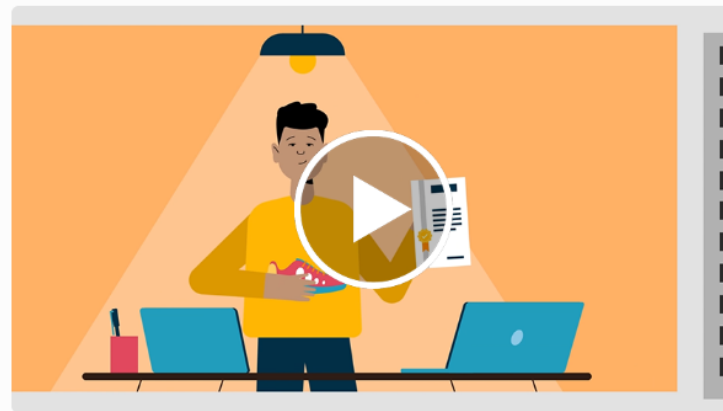
Idea and Screen



## Competitive Advantage

The Competitive Advantage tool helps gather information about competing goods to ensure that the final product or service will have a competitive advantage once it is in the market. Learn how to use the Competitive Advantage tool [PDF](#) [DOC](#) with an example of a completed tool [XLS](#) .

[Download the tool](#)



## Freedom to Operate

Freedom to Operate is the ability to proceed with a product or service without infringing on someone else's intellectual property. It is critical to ensure freedom to operate before launching a new product or service in the market. Learn how to use the Freedom to Operate tool [PDF](#) [DOC](#) with an example of a completed tool [XLS](#) .

[Download the tool](#)

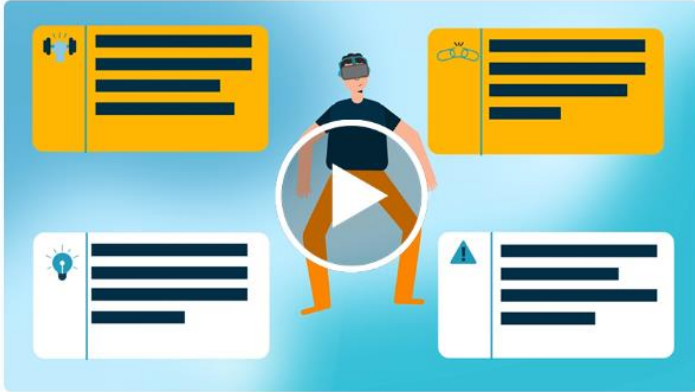


## Value Chain

The Value Chain establishes whether you have the capabilities and capacities needed to successfully develop, commercialize, and support the new product or service after its launch, and to create value. Learn how to use the Value Chain tool [PDF](#) [DOC](#) with an example of a completed tool [XLS](#) .

[Download the tool](#)

Screen



## SWOT Analysis

A strengths, weaknesses, opportunities and threats (SWOT) analysis helps develop strategies to mitigate risks, by using strengths to compensate for weaknesses and by leveraging opportunities to mitigate threats. Learn how to use the SWOT Analysis tool [PDF](#) [DOC](#) with an example of a completed tool [XLS](#) .

[Download the tool](#)



## Business Model Canvas

A Business Model Canvas gathers information to ensure there is a viable business opportunity and acts as a benchmark during the New Product Development process. Learn how to use the Business Model Canvas tool [PDF](#) [DOC](#) with an example of a completed tool [XLS](#) .

[Download the tool](#)

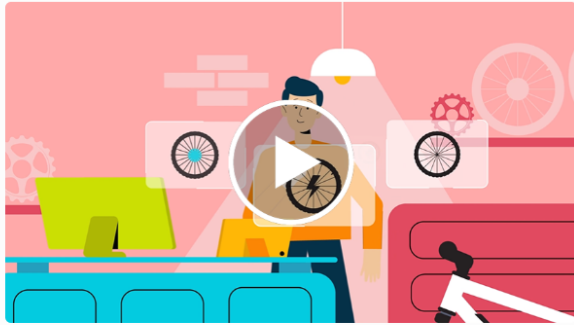


## Intellectual Property Audit

An Intellectual Property Audit helps identify intangible assets that can be protected as intellectual property to generate value. Learn how to use the Intellectual Property Audit tool [PDF](#) [DOC](#) with an example of a completed tool [XLS](#) .

[Download the tool](#)

Screen and Design



### Technology Forecasting

Technology Forecasting helps identify and evaluate the best possible parts for design and development to ensure a competitive advantage in the market. Learn how to use the Technology Forecasting tool [PDF](#) [DOC](#) with an example of a completed tool [XLS](#).

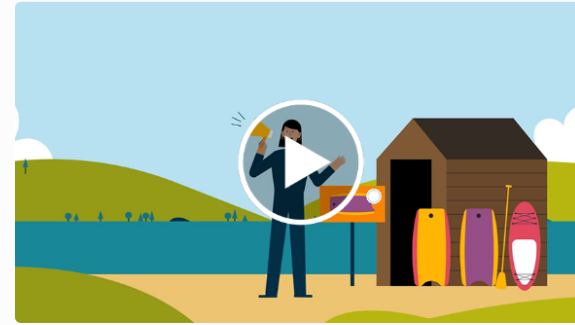
[Download the tool](#)



### Life Cycle Risk Reduction

The Life Cycle Risk Reduction tool analyzes the lifecycle of a product or service to identify potential risks that may occur during design and development, and helps develop risk mitigation strategies. Learn how to use the Life Cycle Risk Reduction tool [PDF](#) [DOC](#) with an example of a completed tool [XLS](#).

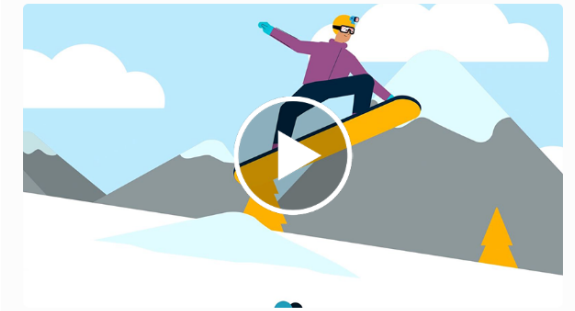
[Download the tool](#)



### Portfolio Construction

Portfolio Construction helps identify products or services that could be incorporated into the portfolio during design and development, in anticipation of future opportunities that may emerge in the market. Learn how to use the Portfolio Construction tool [PDF](#) [DOC](#) with an example of a completed tool [XLS](#).

[Download the tool](#)



### TRIZ

TRIZ, or the "Theory of Inventive Problem Solving", helps analyze design specifications and optimize or solve possible design contradictions in order to maximize value for customers and end-users. Learn how to use the TRIZ tool [PDF](#) [DOC](#) with an example of a completed tool [XLS](#).

[Download the tool](#)





## Gate Progress Review

Gate Progress Review helps ensure that risks are being addressed and that the project is on track at each key stage in the New Product Development process. Learn how to use the Gate Progress Review tool [PDF](#) [DOC](#) with an example of a completed tool [XLS](#) .

[Download the tool](#)



## Net Present Value

The Net Present Value tool helps calculate whether a product or service that is being developed is likely to meet its financial objectives, by estimating the value of cash flows in and out of the project over time. Learn how to use the Net Present Value tool [PDF](#) [DOC](#) with an example of a completed tool [XLS](#) .

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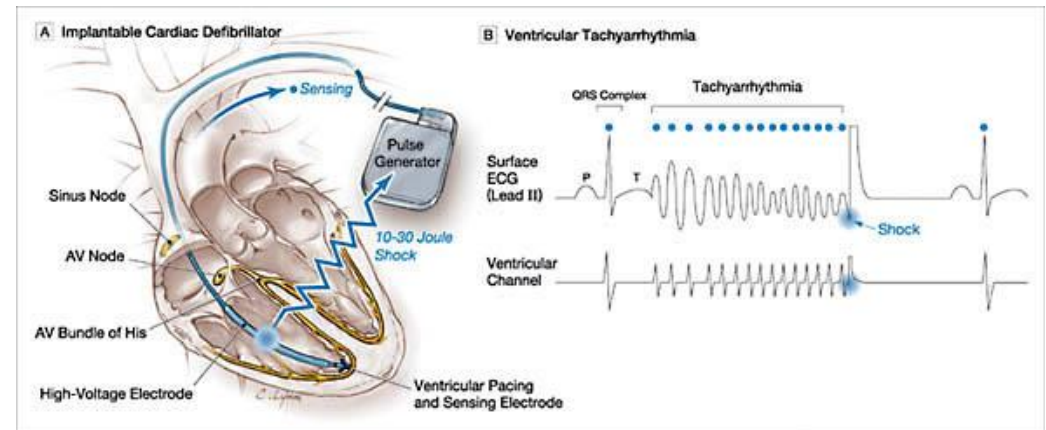
All Gates

# ► Current State of the Art in UAV Delivery





# ▶ UAV for Delivery with Articulating Arm





## ▶ **Subsystems**

### → Cable

- > Zipline plus power and sensors
- > Sleeve
- > Articulator

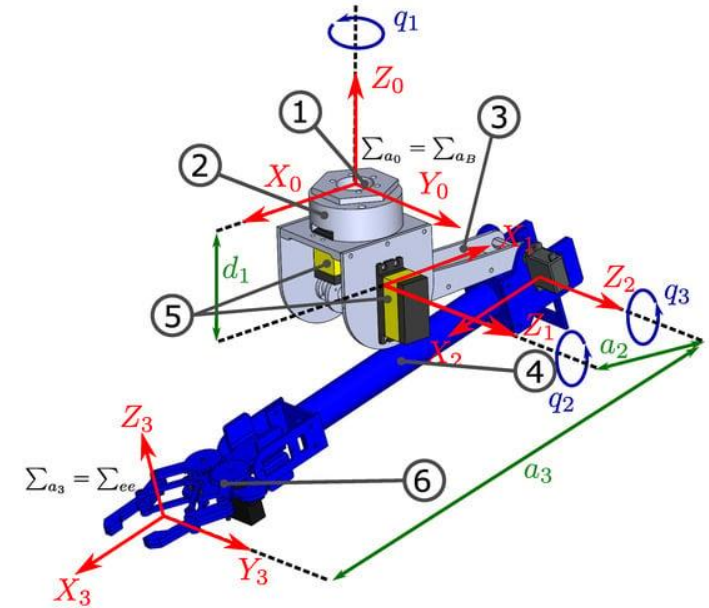
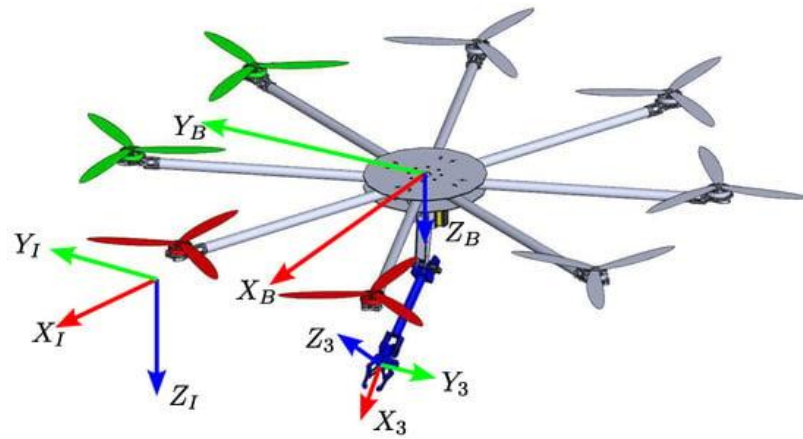
### → Control System

- > Image processing
- > Cable positioning

### → Interface

- > Joystick with buttons
- > Display

# Revising the Concept In Design After Screening





## TRIZ inventive principles

|    |   | Useful | Not useful |
|----|---|--------|------------|
| 1  | Segmentation: divide into parts, easy to disassemble, increase degree of segmentation |        |            |
| 2  | Taking out: extraction, separation, removal, segregation                              |        |            |
| 3  | Local quality: uniform to non-uniform, fulfill different and useful functions         |        |            |
| 4  | Asymmetry: change symmetrical to asymmetrical, increase asymmetry                     |        |            |
| 5  | Merging: bring together, align, parallel  |        |            |
| 6  | Universality: multifunction   |        |            |
| 7  | Nested doll: place one inside the other or pass through                               |        |            |
| 8  | Anti-weight: compensate for the weight of an object                                   |        |            |
| 9  | Preliminary anti-action: buffer, pre-stress, mask before exposure                     |        |            |
| 10 | Preliminary action: pre-arrange, pre-processing                                       |        |            |
| 11 | Cushion in advance: prepare for emergencies beforehand                                |        |            |
| 12 | Equipotentiality: eliminate the need to move something                                |        |            |





## ▶ Closing Thoughts

- It is fun to have fun, but you have to know how.

*The Cat in the Hat, Dr. Seuss*

- Nothing happens without a sale.

*David Speser*

- A well-defined imagination is the source of great deeds.

*Chinese Fortune Cookie*

- If opportunity doesn't knock, build a door.

*Milton Berle*



## **▶ Knowing NPD is Useful for Bidding RIF Innovation-Related R&D Calls**

- Enables developing a better work plan
- Helps with defining impacts



# ▶ RIF Innovation Voucher

- Provides financial support for enhancement of the innovation capacity of existing companies
- New call planned for 2024
- Watch for Call for specifics
- PDMA certified New Product Development Professionals are a good resource for NPD support



## Europe

**Central Europe (Poland, Czech Republic, Slovakia, Latvia, Lithuania and Estonia)**

Alina Kubiak, President

[a.kubiak@pdma-ce.org](mailto:a.kubiak@pdma-ce.org)

**DACH (Germany, Austria, and Switzerland)**

[dach@pdma.org](mailto:dach@pdma.org)

**Netherlands**

Egbert-Jan van Dijck, President

[penningmeester@pdma.nl](mailto:penningmeester@pdma.nl)

# ▶ The RIF NPD Certification Course



- Last year's course highly rated by participants
- To be held later this year
- Gives you an opportunity to work on your own NPD while learning
- Free
- Introductory Session open to all
- Full 7-week course limited 25 people on a first come, first served basis
- Up to 3 Courses to be held

[NPDP Certification Requirements –  
Product Development and Management Association  
\(pdma.org\)](http://pdma.org)

# ▶ Thank you!

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