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PM: Product Management and Development

Week 5 – The Product Development Process; A/B and A/A Testing, MVP and Growth Hacking

Module Overview

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Module Overview

- How much time should be spent on new product development?
- Should all the steps in the process be followed?
- Understand the framework of opportunity cost and development risk
- Understand product market fit and product company fit
- Understand minimum viable product

Module Overview

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The New Product Development Process Revisited

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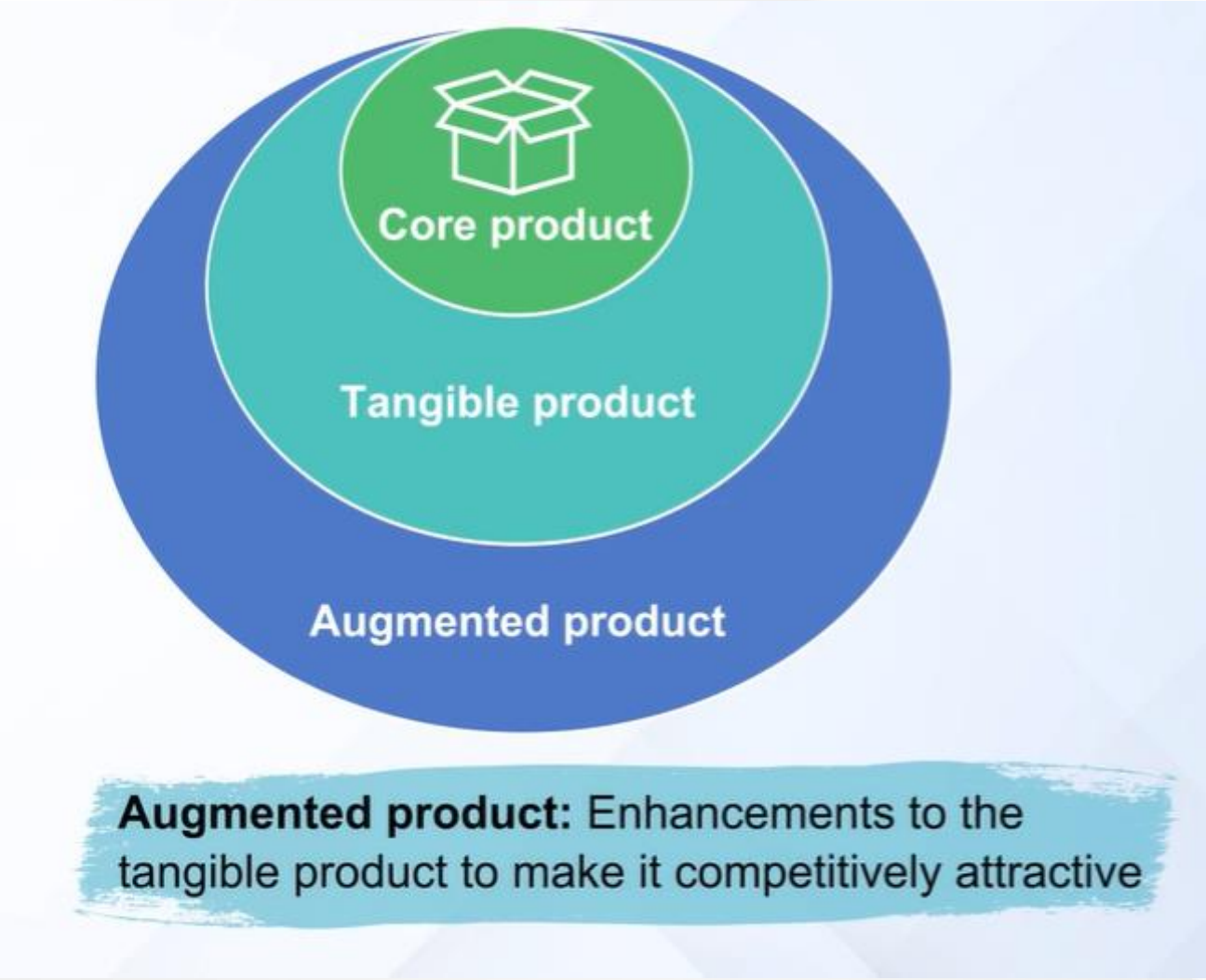
Three Levels of a Product or Solution

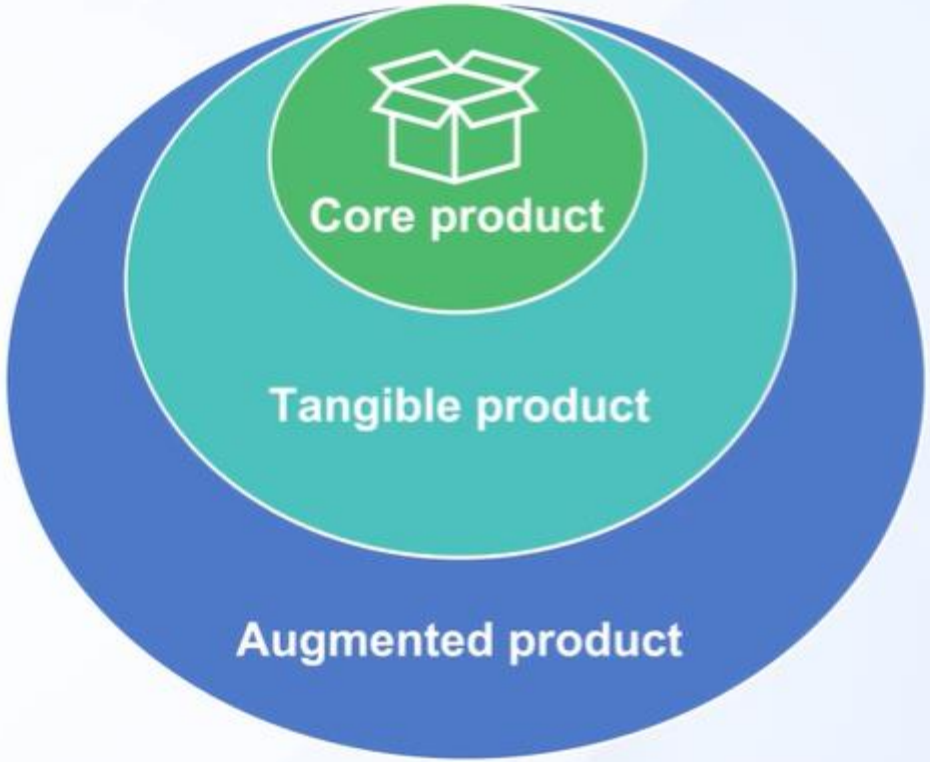
Three Levels of a Product or Solution

Tangible product: Transformation of core product into something customers can buy

Three Levels of a Product or Solution



Three Levels of a Product or Solution



Augmented product: Enhancements to the tangible product to make it competitively attractive

Three Levels of a Product or Solution : Example

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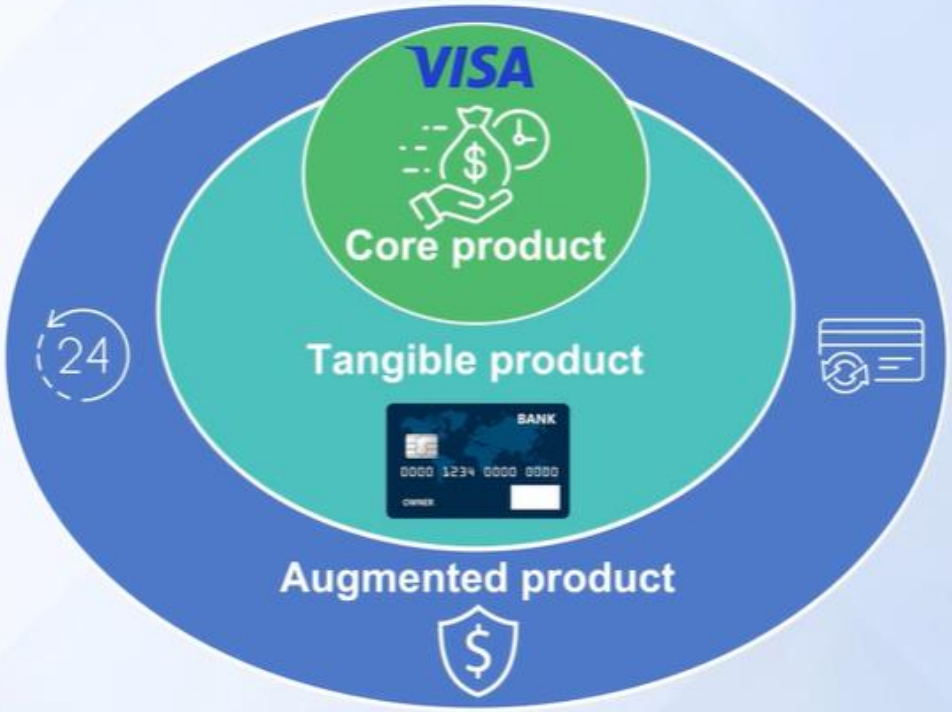
Three Levels of a Product or Solution: Example

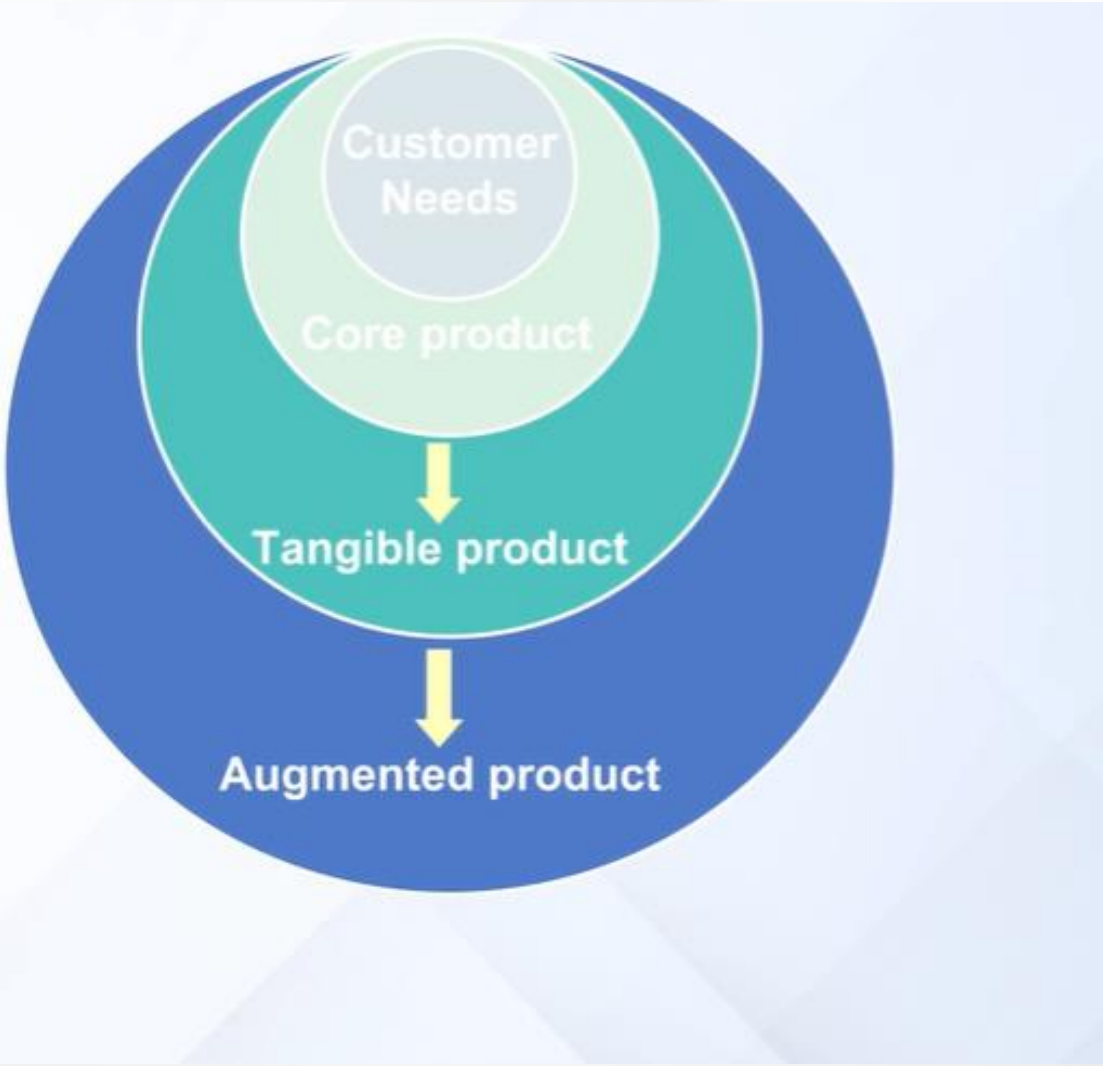
Three Levels of a Product or Solution: Example



Augmented product: 24 hour customer service, Theft protection and Loyalty points

Three Levels of a Product or Solution

Three Levels of a Product or Solution



New Product Variations

Commonly accepted categories for new products:

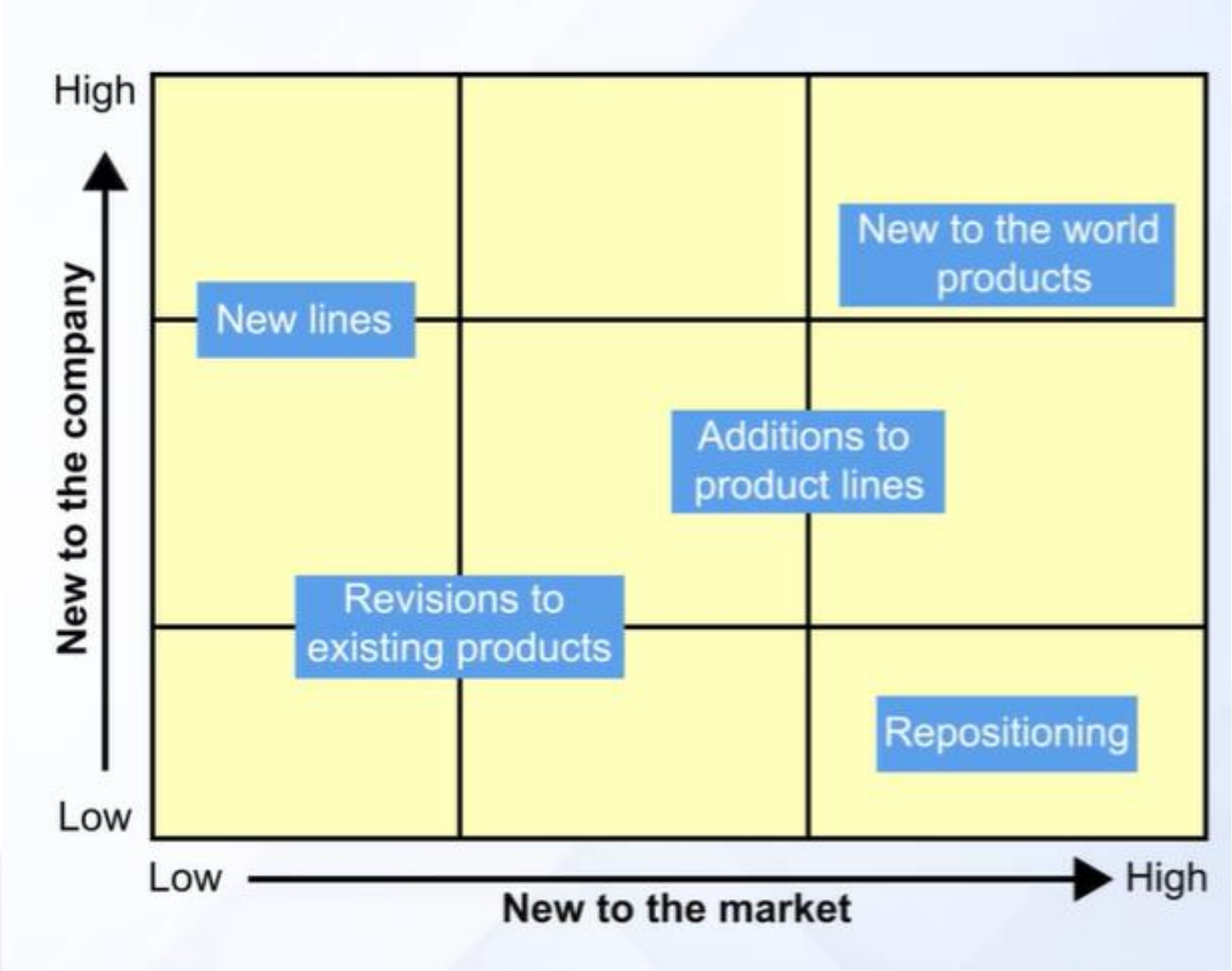
- **New-to-the-world products:** Inventions
- **New category entries:** AT&T's Universal Card
- **Additions to product lines:** Bud Light
- **Product improvements**
- **Repositioning** (retargeted for new use): Arm and Hammer

Non – New Product Variations

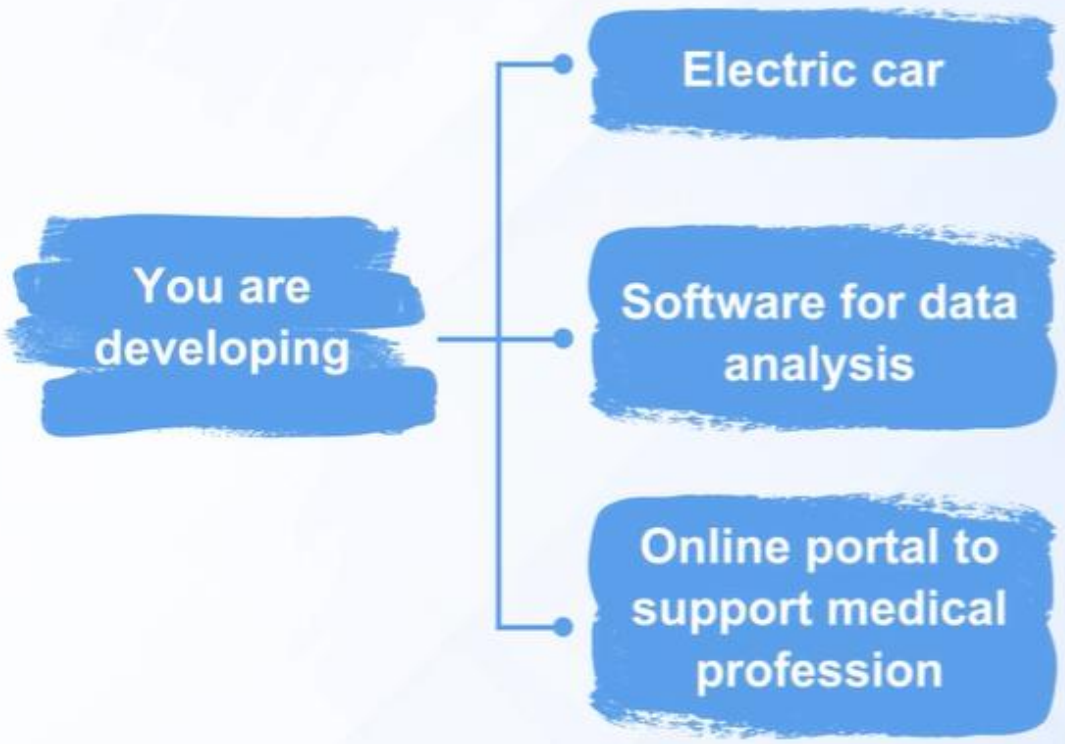
Variations not commonly accepted as new products:

- New to a country
- New channels of distribution
- Packaging improvements
- Different resource or method of manufacture

Types of New Products

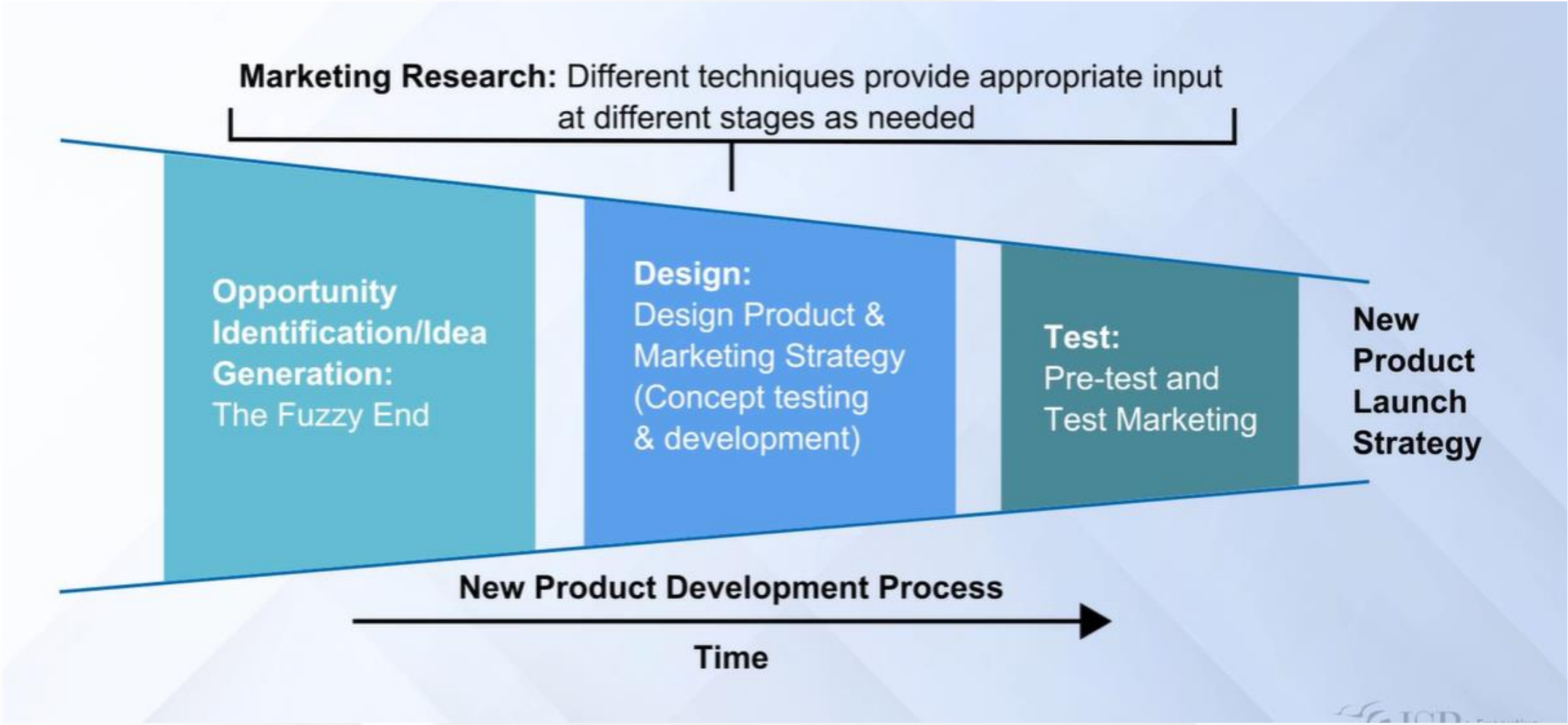


Exercise

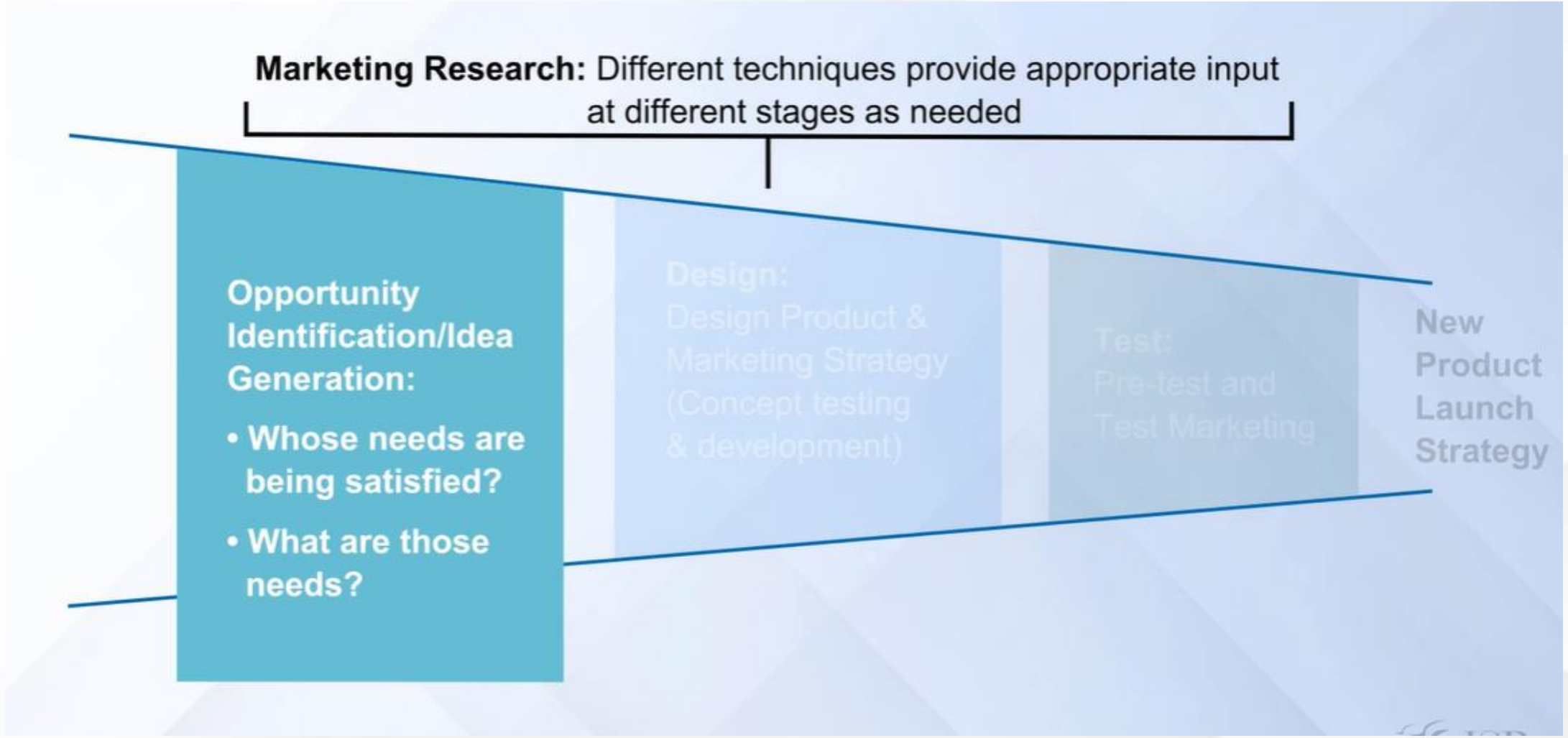


- Would the steps involved in the NPD process be same or different?
- How much time would you spend on the NPD process for each of these products?

New Product Development Process



New Product Development Process



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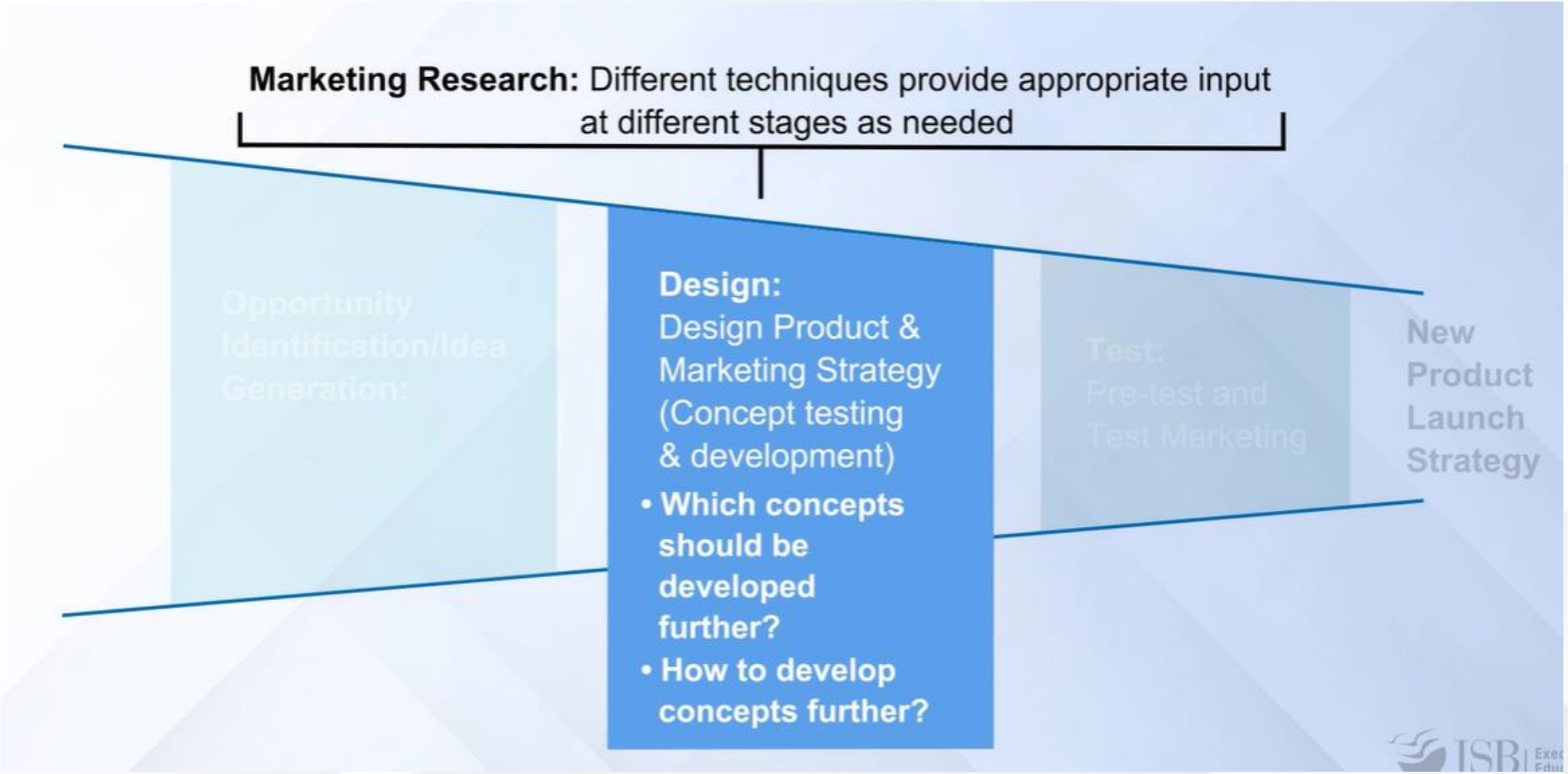
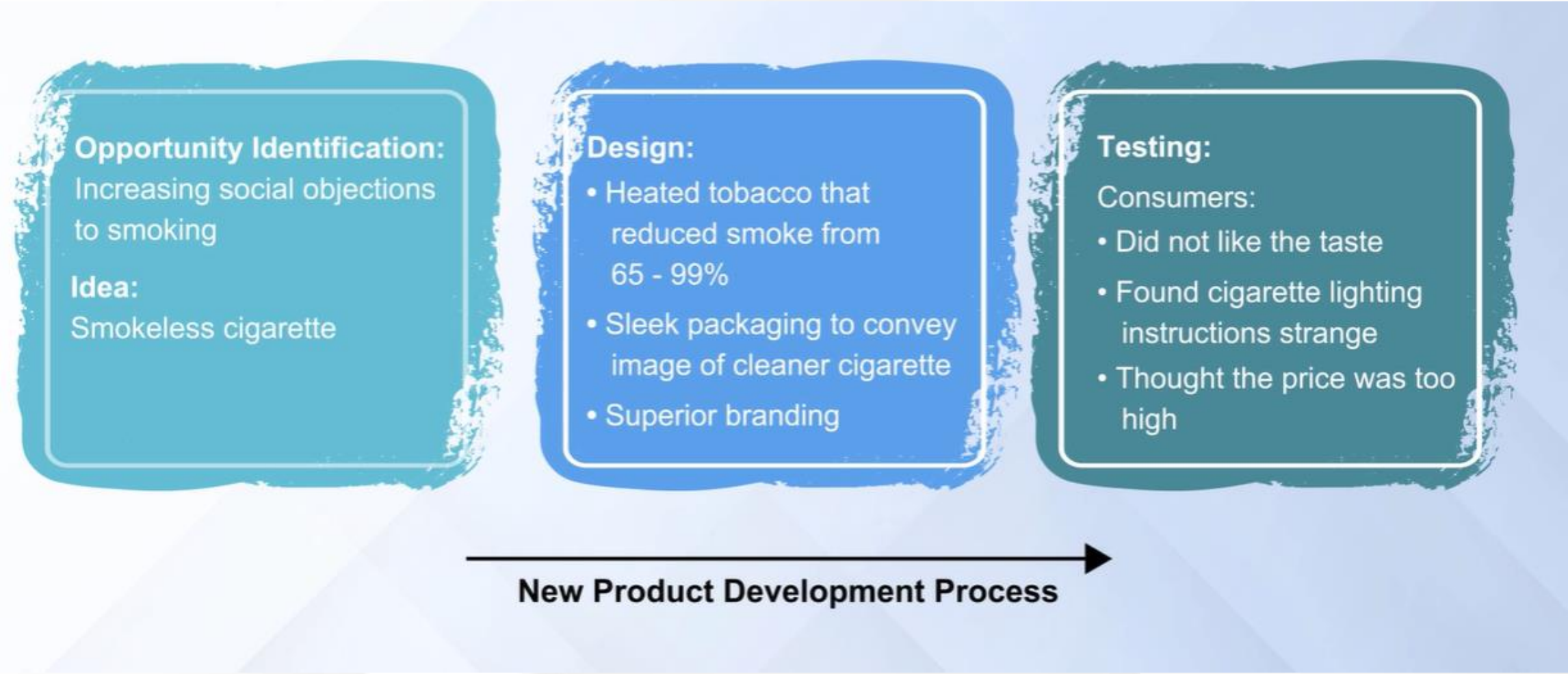
New Product Development Process



NPD Process: Example



Success and Failure of New Products

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Systematic Approach

Increases the probability of success of the new product

Success rate of firms with systematic approach is 73%

Product Development

Factors Corelated with New Product Success

Out of 4 research programs, the correlates of success are:	
Match to customer needs	3
High value to the customer	2
Innovation	2
Technical superiority	2
Screened on growth potential	3
Favorable competitive environment	1
Fit to internal company strengths	4
Communication among functions	2
Top management support	3
Enthusiastic champion	1
New product organization	2
Use new product process	3
Avoid unnecessary risk	2

Source: *Design and Marketing of New Products by Urban and Hauser*

Factors Corelated with New Product Success

Targeting decision at the opportunity identification stage helps in this.

Out of 4 research programs, the correlates of success are:	
Match to customer needs	3
High value to the customer	2
Innovation	2
Technical superiority	2
Screened on growth potential	3
Favorable competitive environment	1
Fit to internal company strengths	**4**
Communication among functions	2
Top management support	3
Enthusiastic champion	1
New product organization	2
Use new product process	3
Avoid unnecessary risk	2

Product Development Process: Factors

Factors directly addressed:

- Match to customer needs
- Screened on growth potential
- Fit to internal company strengths

Factor already present:

- Top management support

Context of New Product Development

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Context for New Product Development

Market research process must be tailored to context set by three factors:

Product's "reason why"

Context for New Product Development

Market research process must be tailored to context set by three factors:

Product's "reason why"

01

02

Market and company newness of the proposed product

Context for New Product Development

Market research process must be tailored to context set by three factors:

01 Product's "reason why"

02 Market and company newness of the proposed product

03 Opportunity cost and development risk associated with the product

Context and Market Research

Lead to different, optimal new product development processes

Vary the marketing research for developing new product

- Ask different set of questions
- Use different research methods

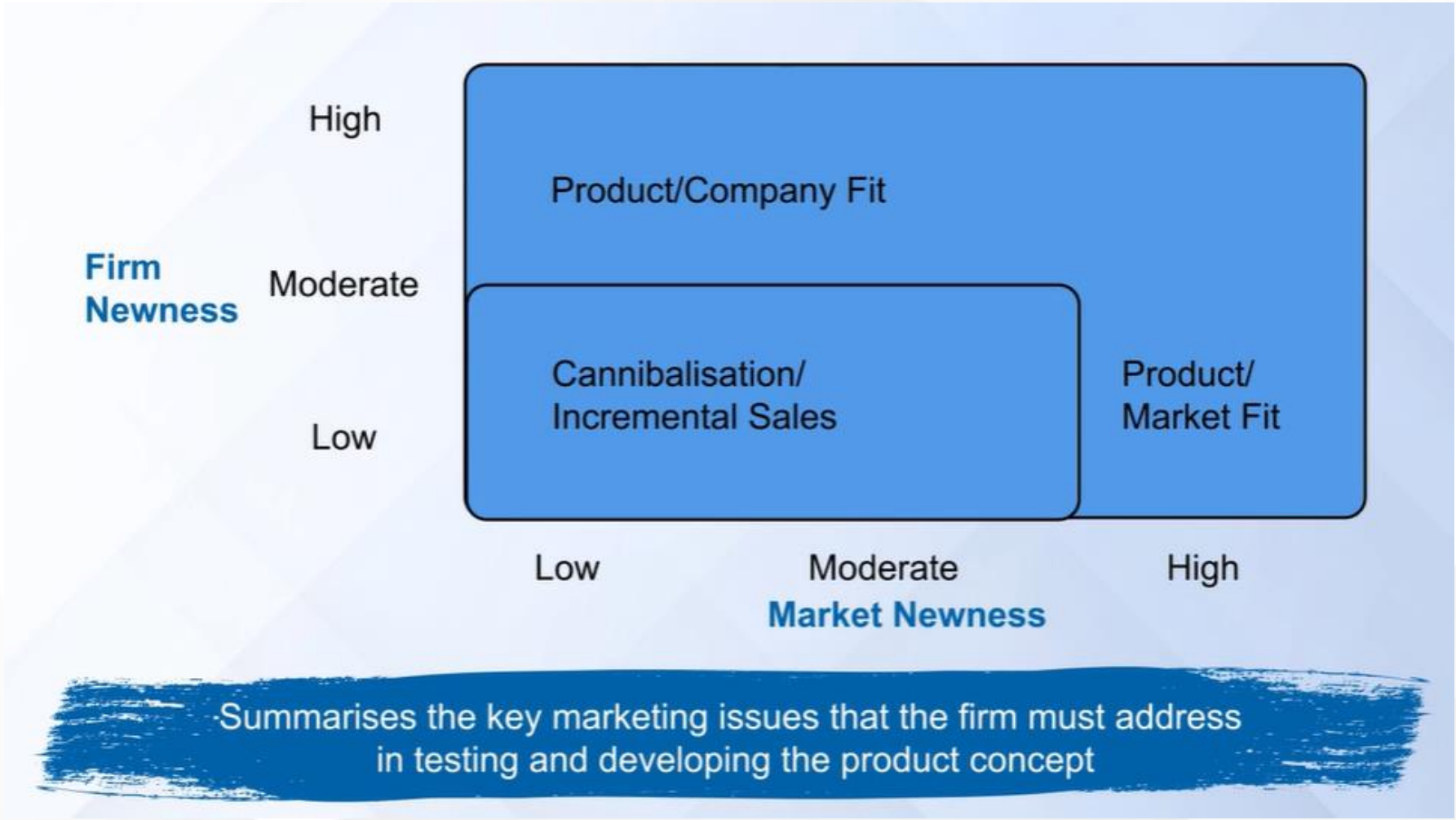
Factor 1: Reason for New Product

Use marketing research to check how well the concept is a success or failure

New Product Concept Testing

- Check how many new customers are attracted to the new product
- Ensure product pass the concept test before developed further

Factor 2: Firm and Market Newness



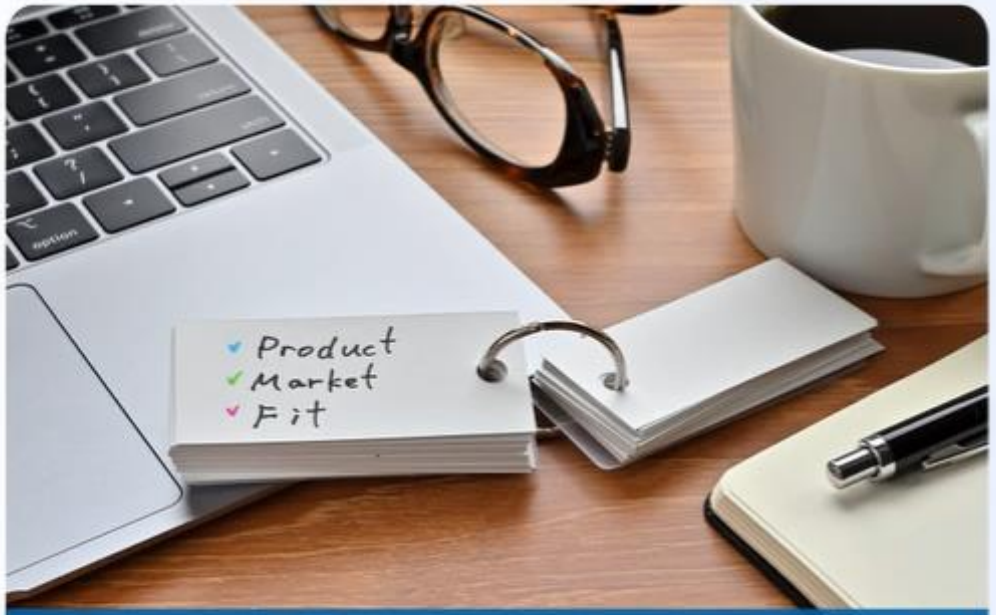
Firm Newness

How new is the new product for the firm?

Low firm newness: Firm **is familiar** with developing and marketing similar products

High firm newness: Firm **is not familiar** with developing and marketing similar products

Market Newness



How new is the new product to the market for which it is intended?

Are consumers in the market familiar with such products?

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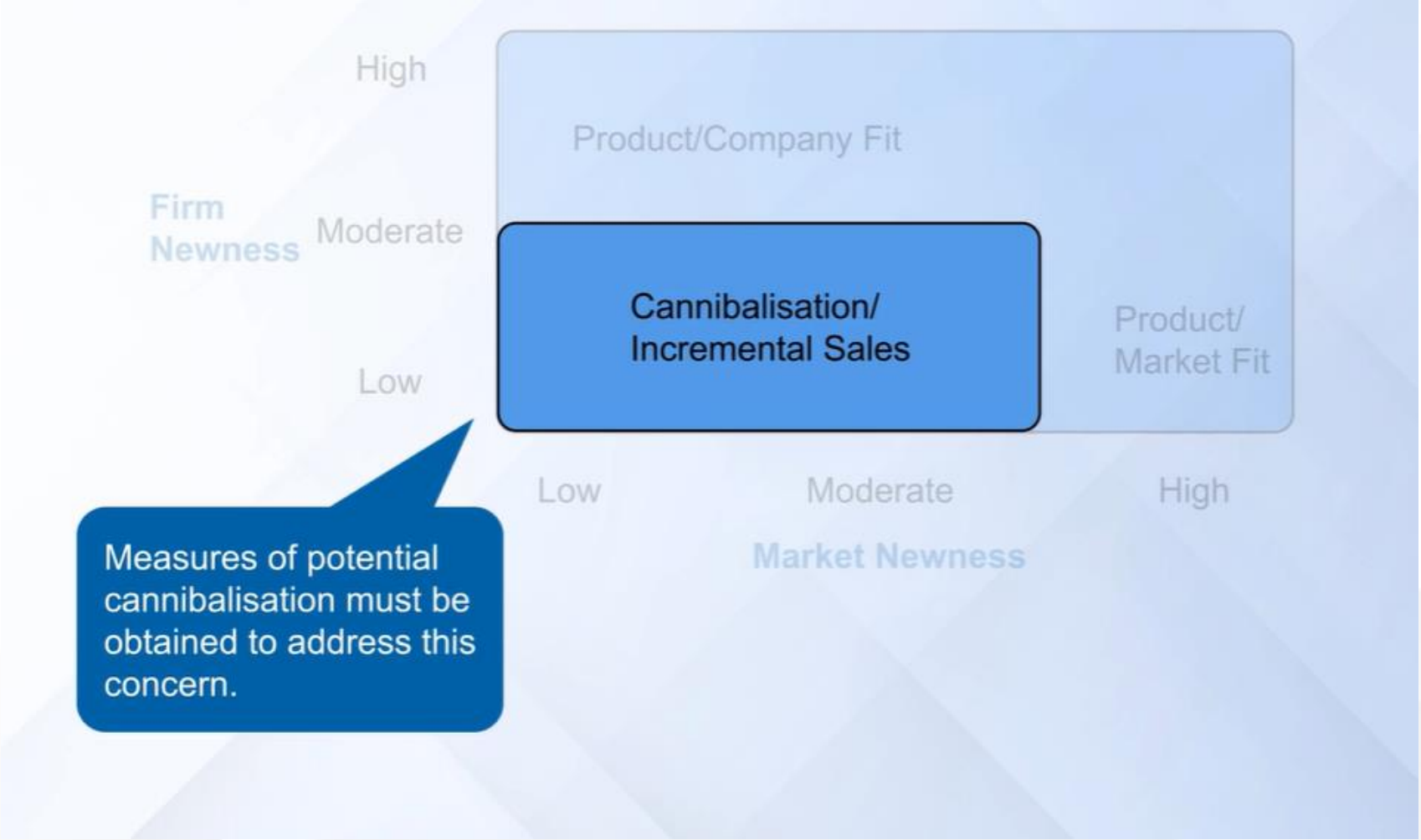
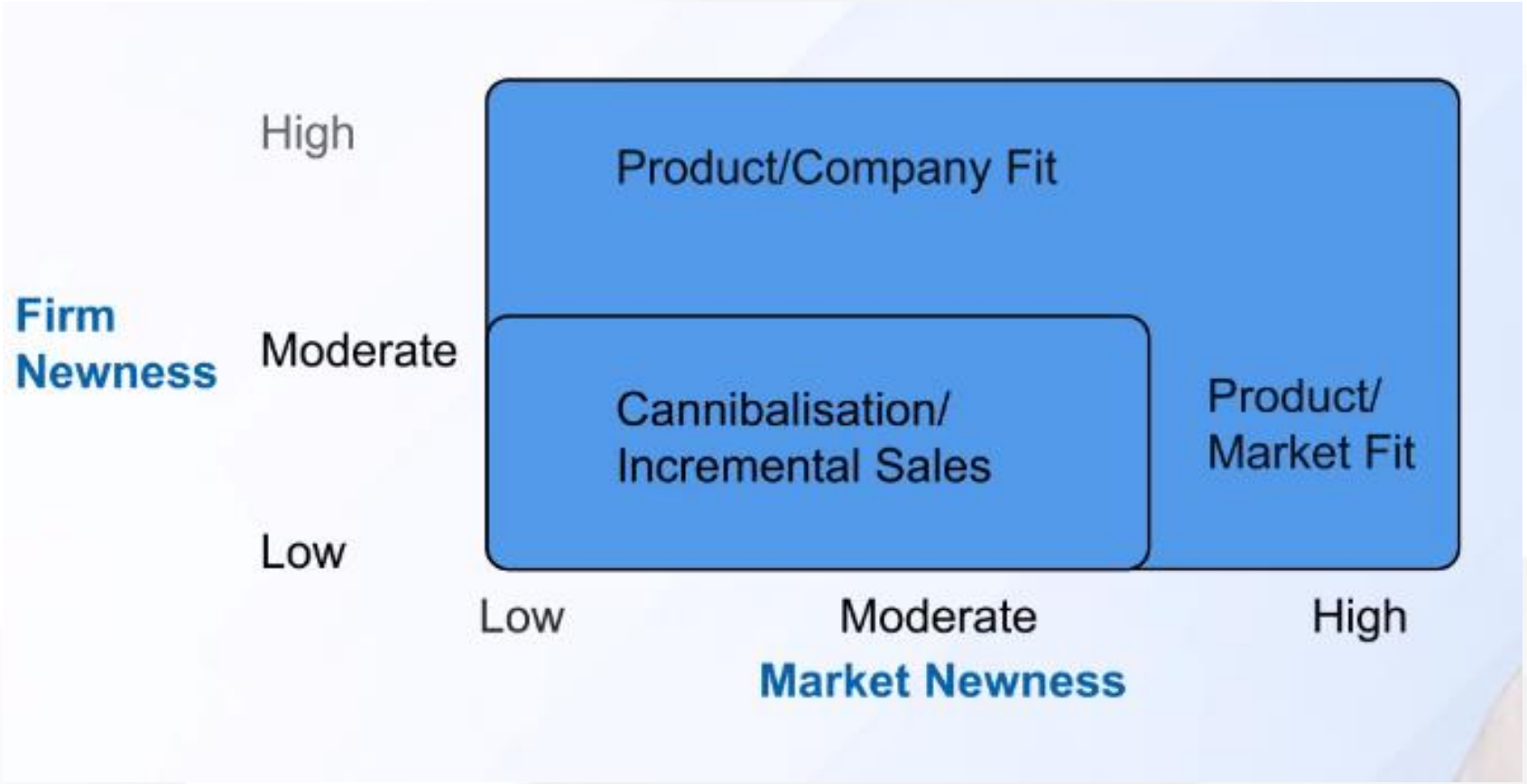
Cannibalisation and Incremental Sales Issue



Cannibalisation and Incremental Sales Issue

- What existing products the respondent is currently using ?
- How likely is the respondent going to switch to a new product if available at a reasonable price?

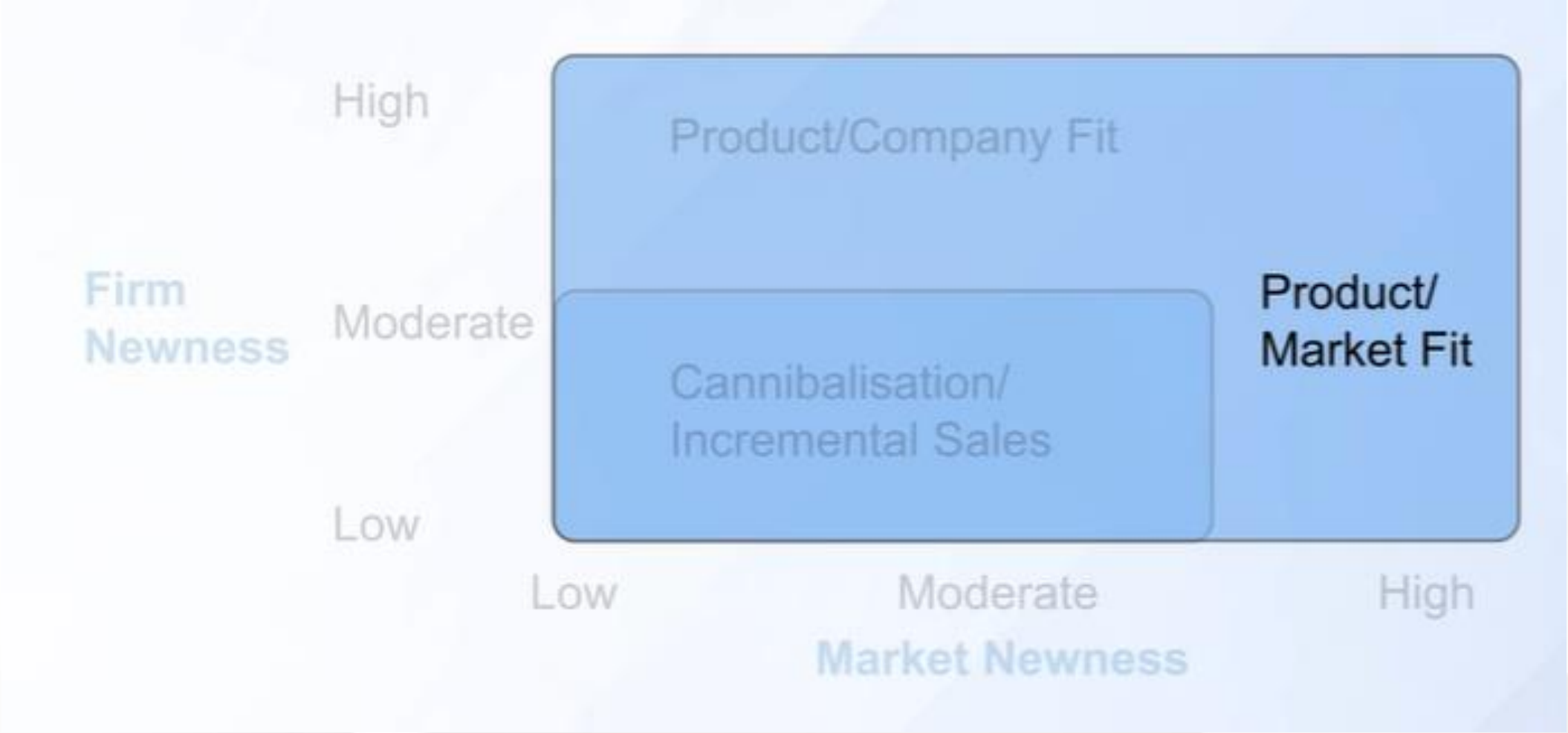
Product/Company Fit Issue



Product/Company Fit Issue

- How well suited are its marketing assets?
- Will R&D and manufacturing capabilities help the new product?
- What impact will the new product have on its other products?
- Would the new product cannibalise its existing products or complement them?
- Should the company diversify into new areas and thus reduce business risk?
- Would it enhance the reputation of the company?

Product/Market Fit Issue



Product/Market Fit Issue

- Does the product satisfy the consumer need well?
- What would be the market size at different prices?
- How much money would be required to build the market?
- How much money would be required to maintain the market?

Opportunity Cost and Development Risk

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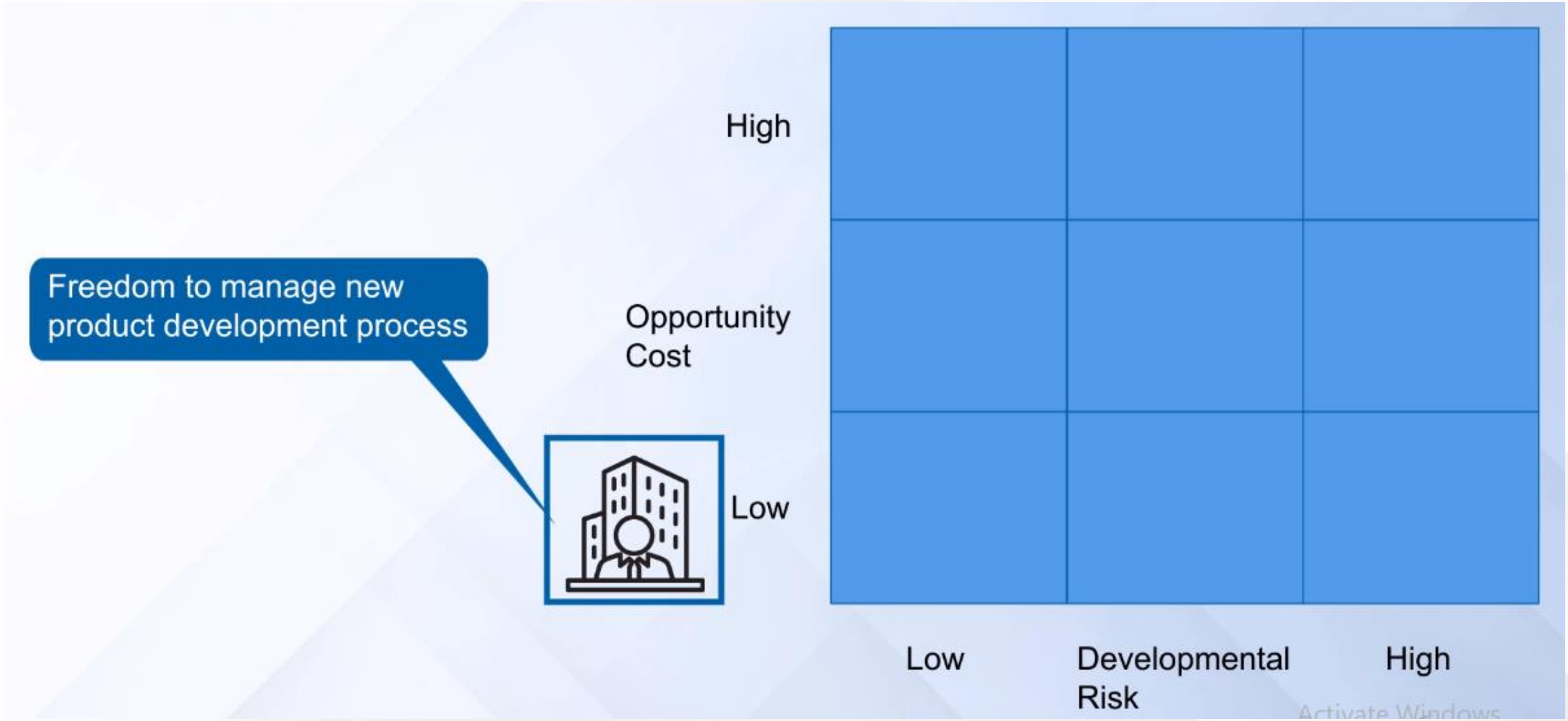
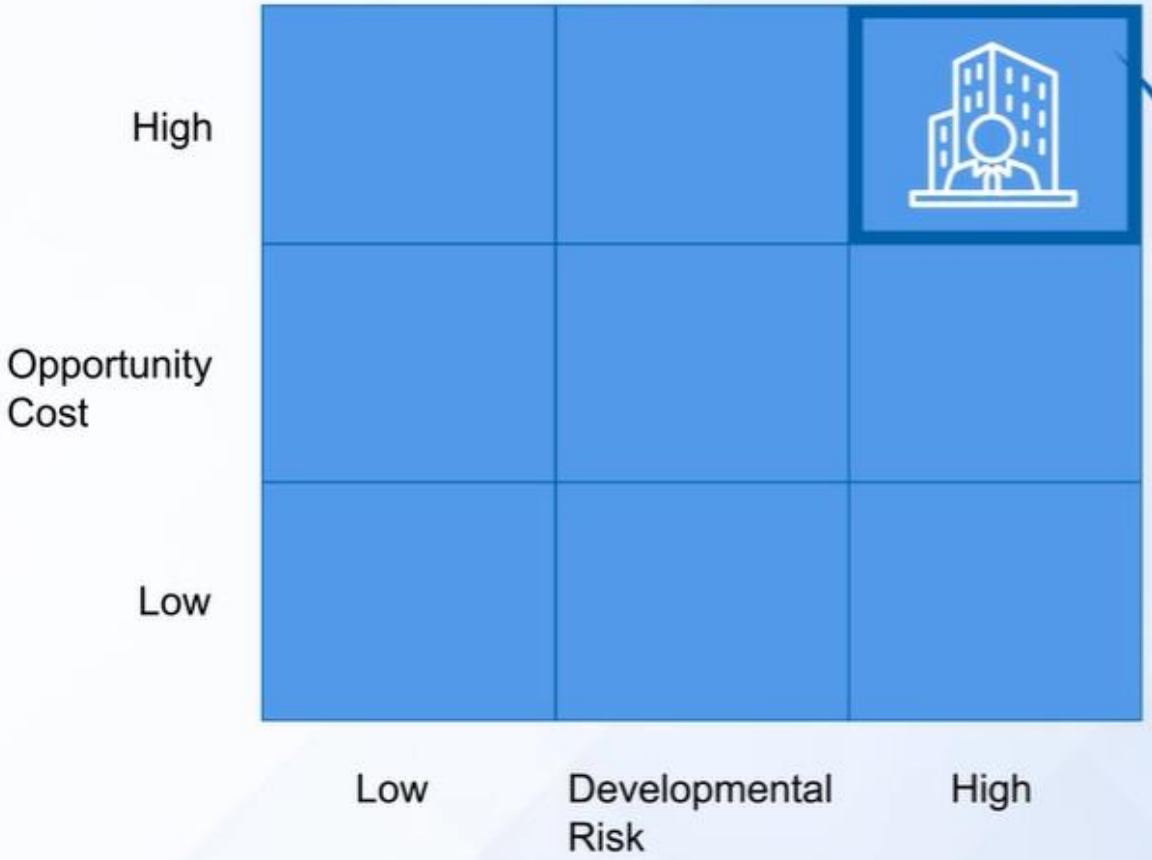
Opportunity Cost vs Development Risk

Risk Map



Risk Map

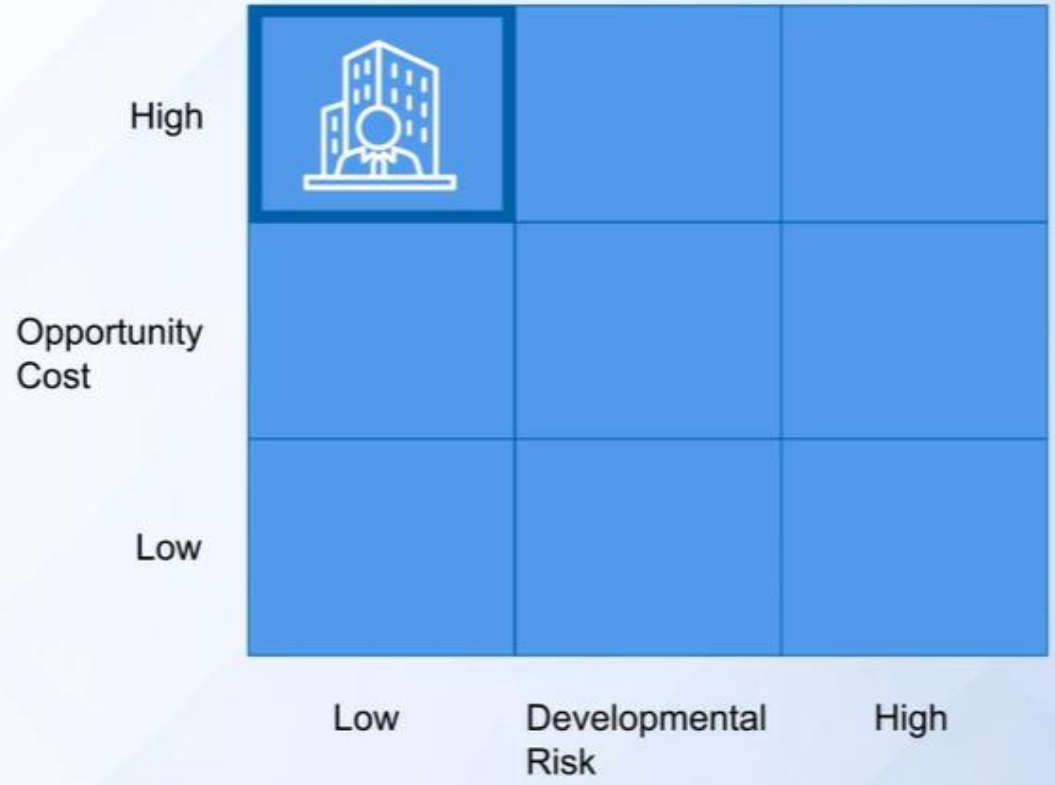


More pressure and reduced pace of product development process

- Challenging position for the company
- Companies with limited resources and capabilities can re-consider new product opportunities.

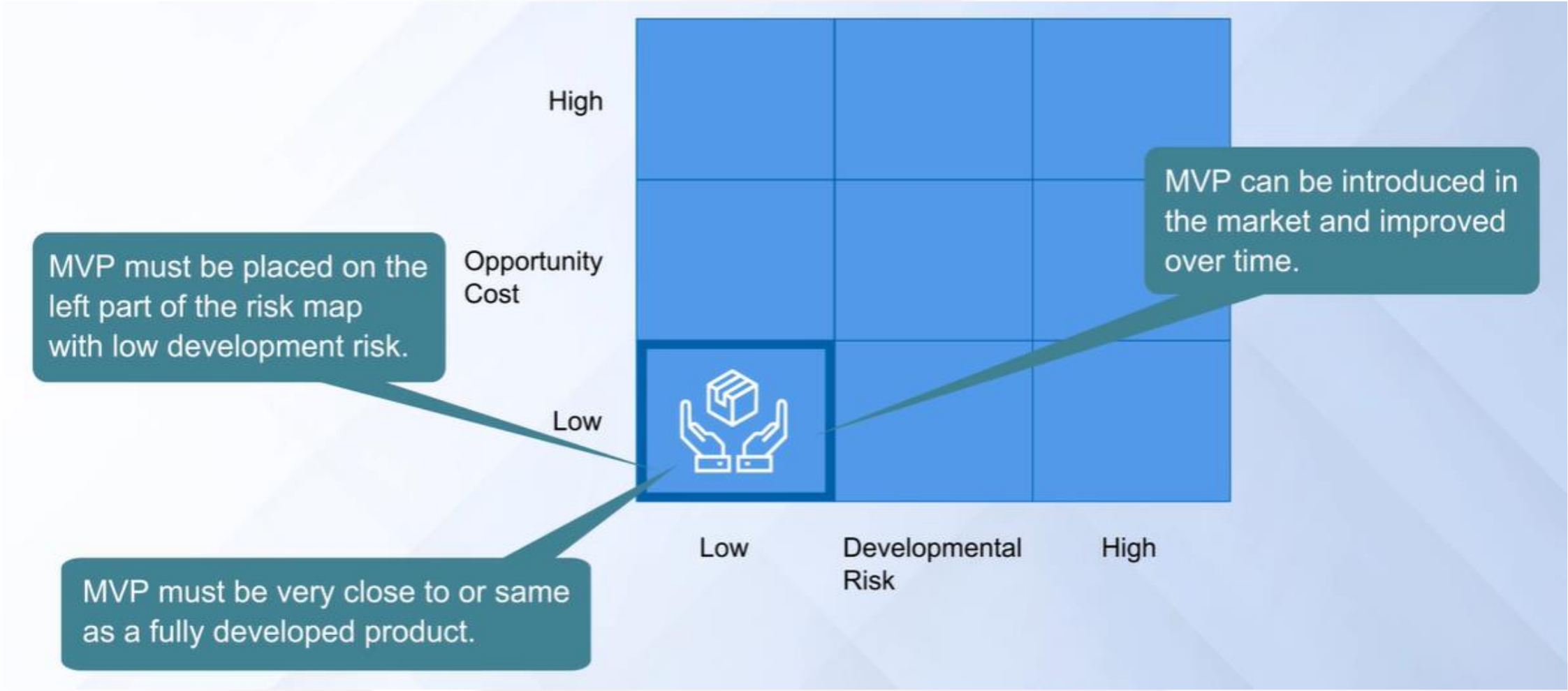
Risk Map

Risk Map



Company enters the market quickly with a good product and improve it over time.

Minimum Viable Product (MVP): Conditions for Success



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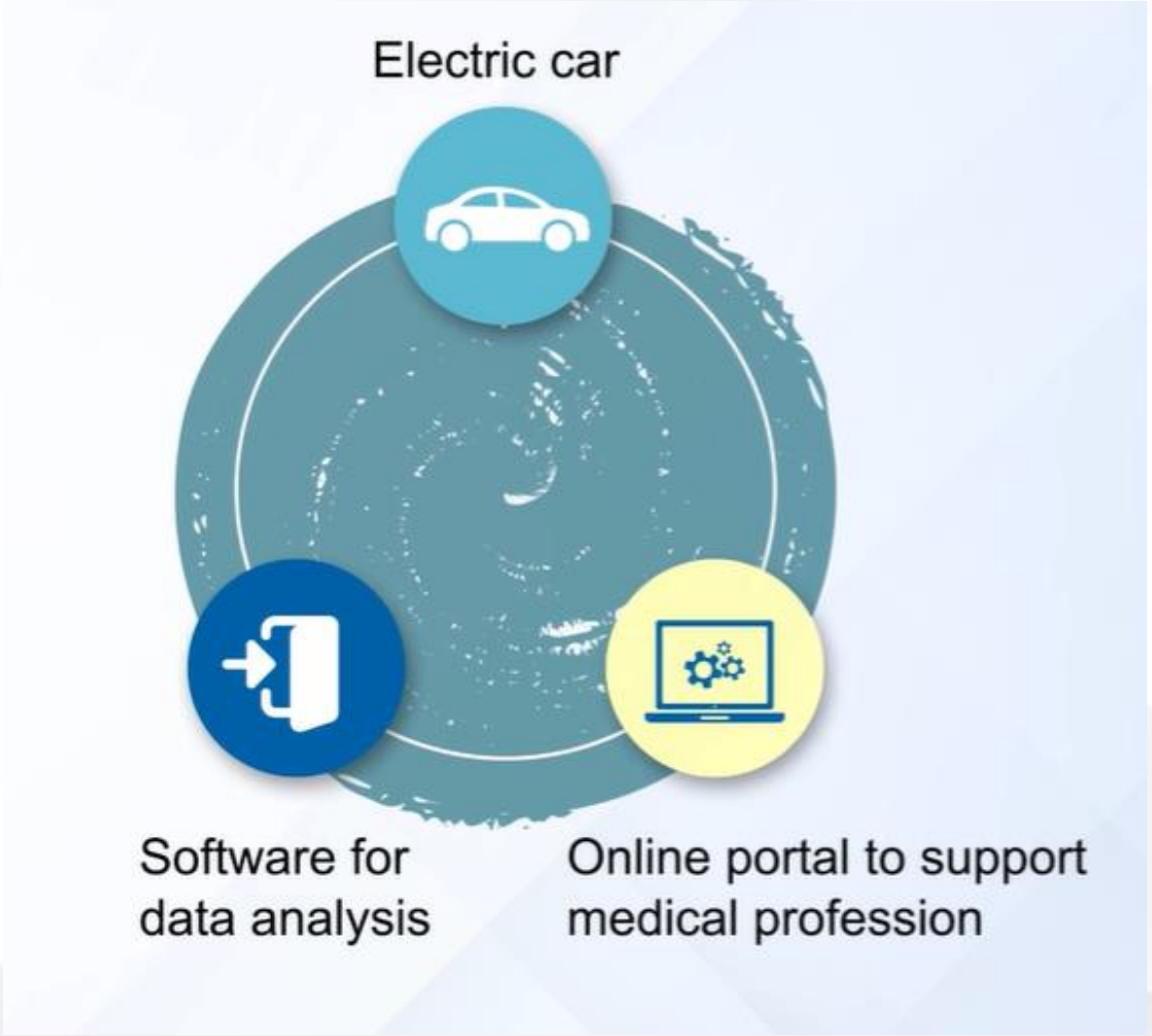
NPD Process Exercise: Product Development Projects



NPD Process Exercise: Electric Car

Opportunity cost

- Low to medium
- Many models in the market and growing category

Development risk

- Very high
- Risks related to car failure
- High competition in the market

NPD Process Exercise: Software

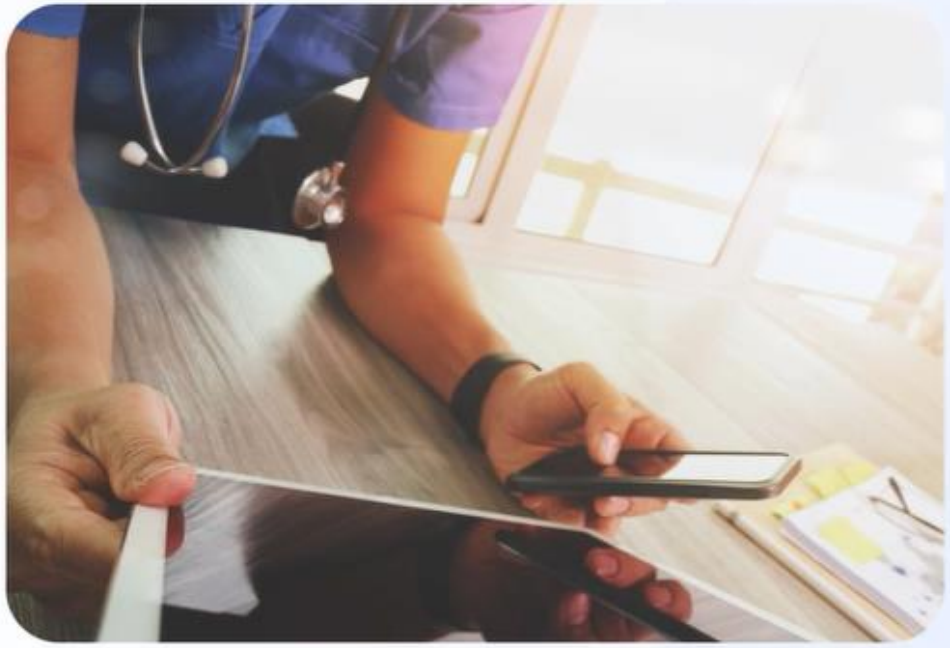
Opportunity cost

- Low to medium
- Depends on factors such as the functions offered

Development risk

- Low
- Software can be launched with a few key functions
- Core data analysis information is commonly available
- Need not be a complete product offering before launch

NPD Process Exercise: Online Portal for Medical Profession



Development risk

- Low
- Company can easily correct mistakes in case of issues

Opportunity cost

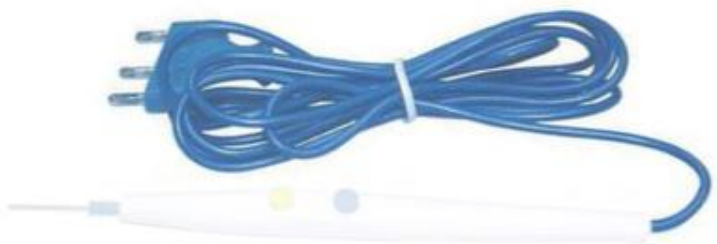
- Very high
- Success of the product is critically dependent upon network effects

Company can select some key functions to launch an MVP or use an open source option to start the process quickly.

Suture – Uses

Suture is a specialised needle attached with a specialised string to tie layers of tissues together.

Monopolar Pencil



- Requires the patient to lie down on a metal plate
- Includes passage of electric current through the patient's body
- Stops bleeding in tissues with the help of current instead of sutures

Monopolar Pencils vs Powerstar Bipolar Scissors

Monopolar Pencil

- Current passing through the patient's body could impact other implants
- Causes skin burns at the site of the metal plate

VS

Bipolar Scissors

- Consists of a scissor connecting wires to a power generator
- Causes no harm to the body as only the tissue required to be cut and coagulated experiences the current

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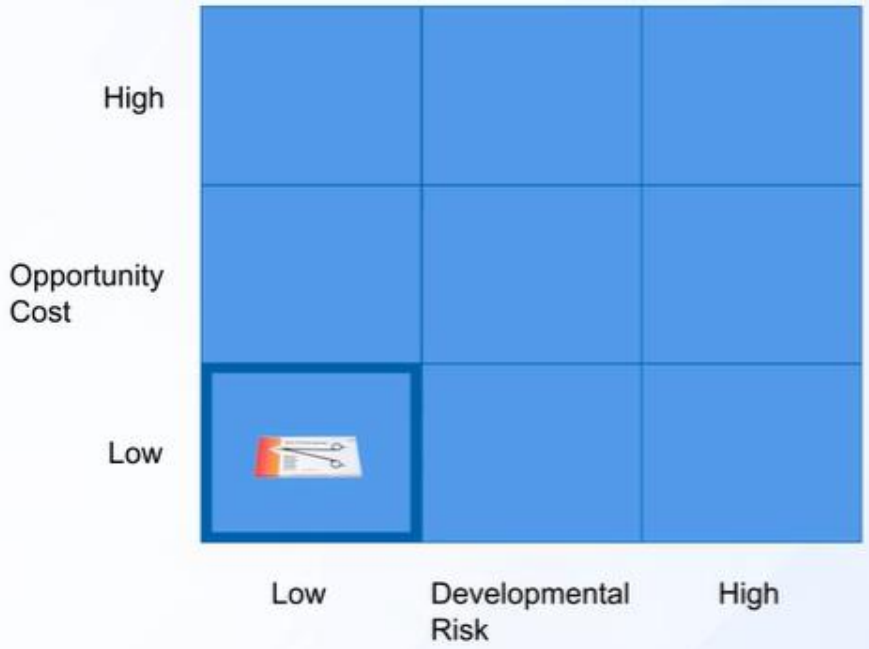
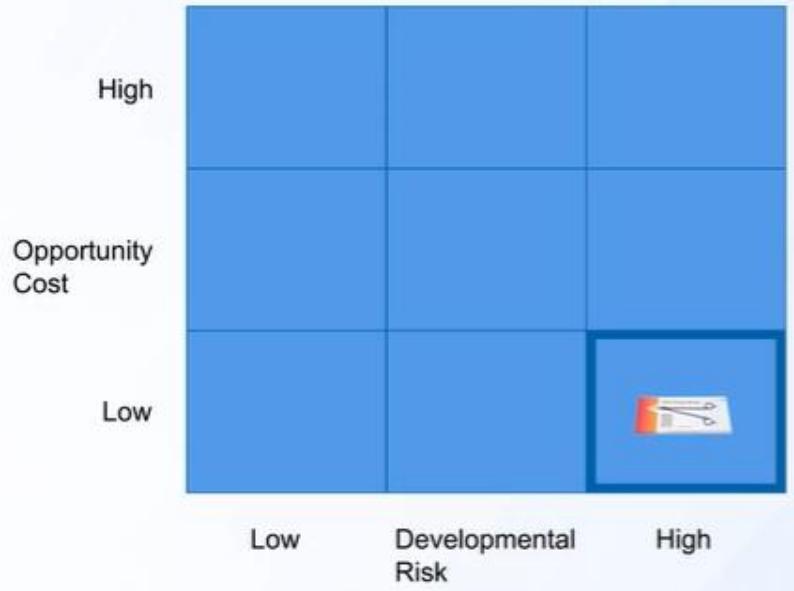
PowerStar – Opportunity Cost



Low opportunity cost

- Product is protected by patents
- Less fear of some other company taking away the window of opportunity

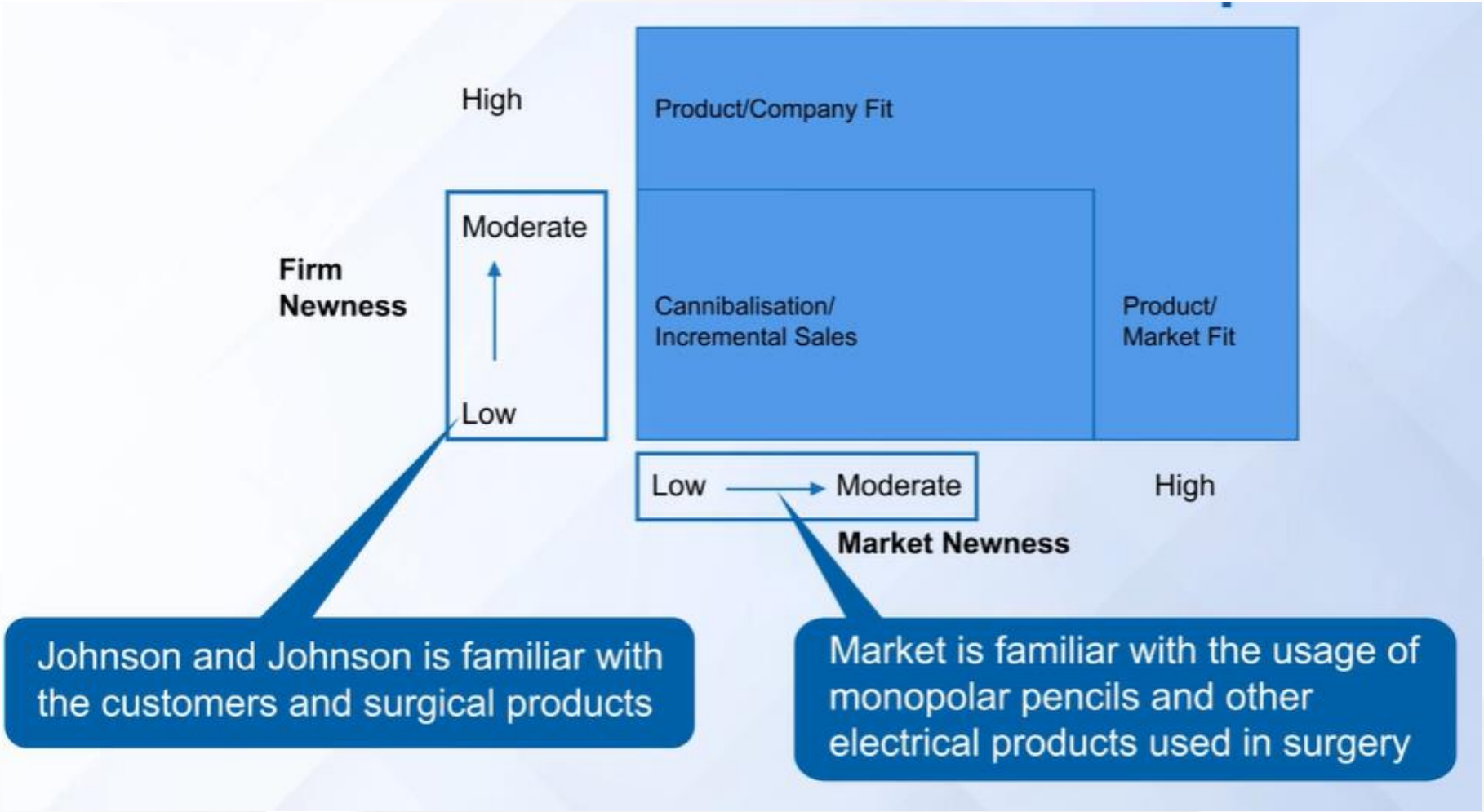
PowerStar – Opportunity Cost



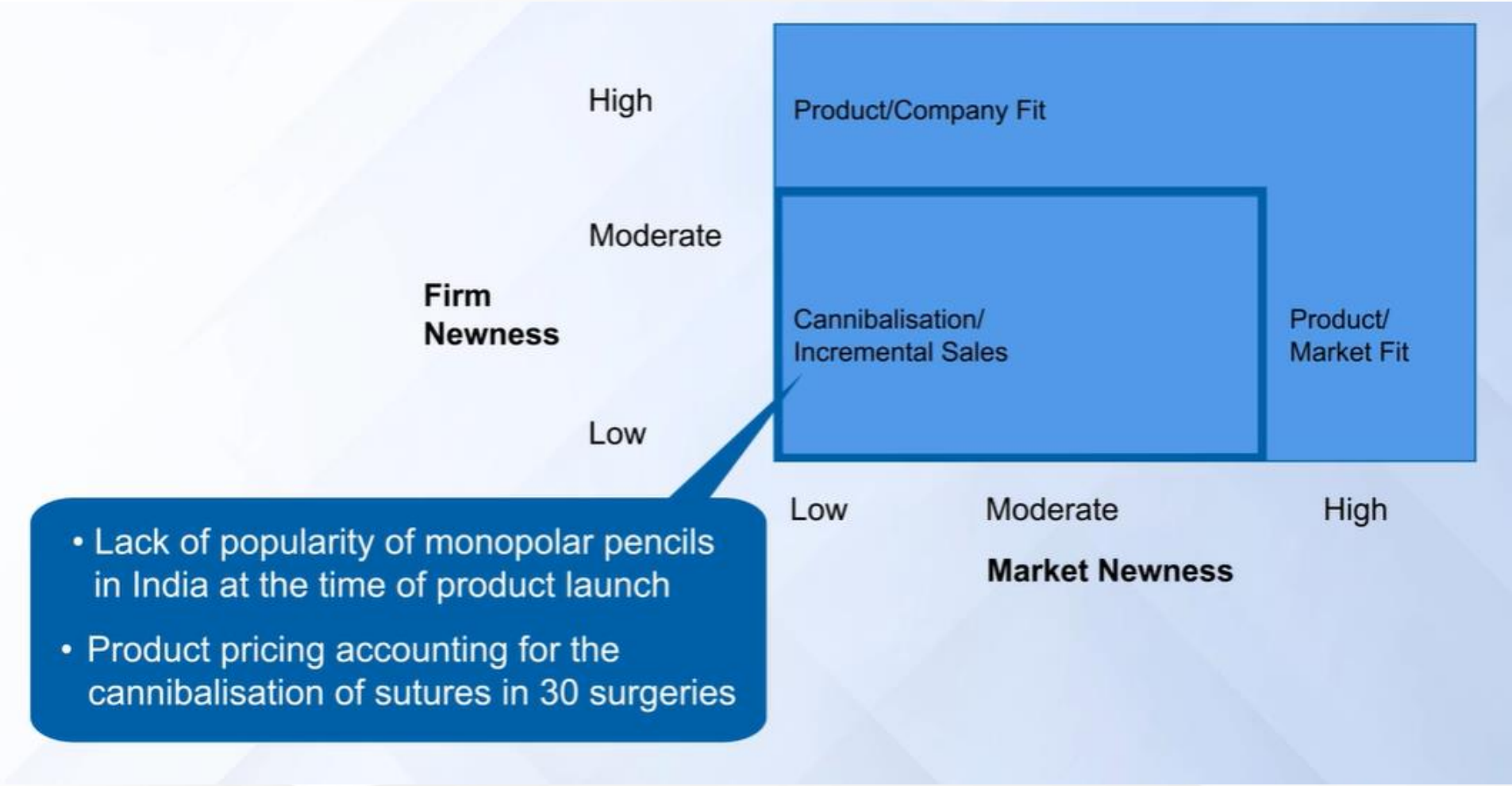
High development risk

- If something goes wrong during surgery, the patient may die, and company's brand name may suffer
- Long and thorough product development process is adopted

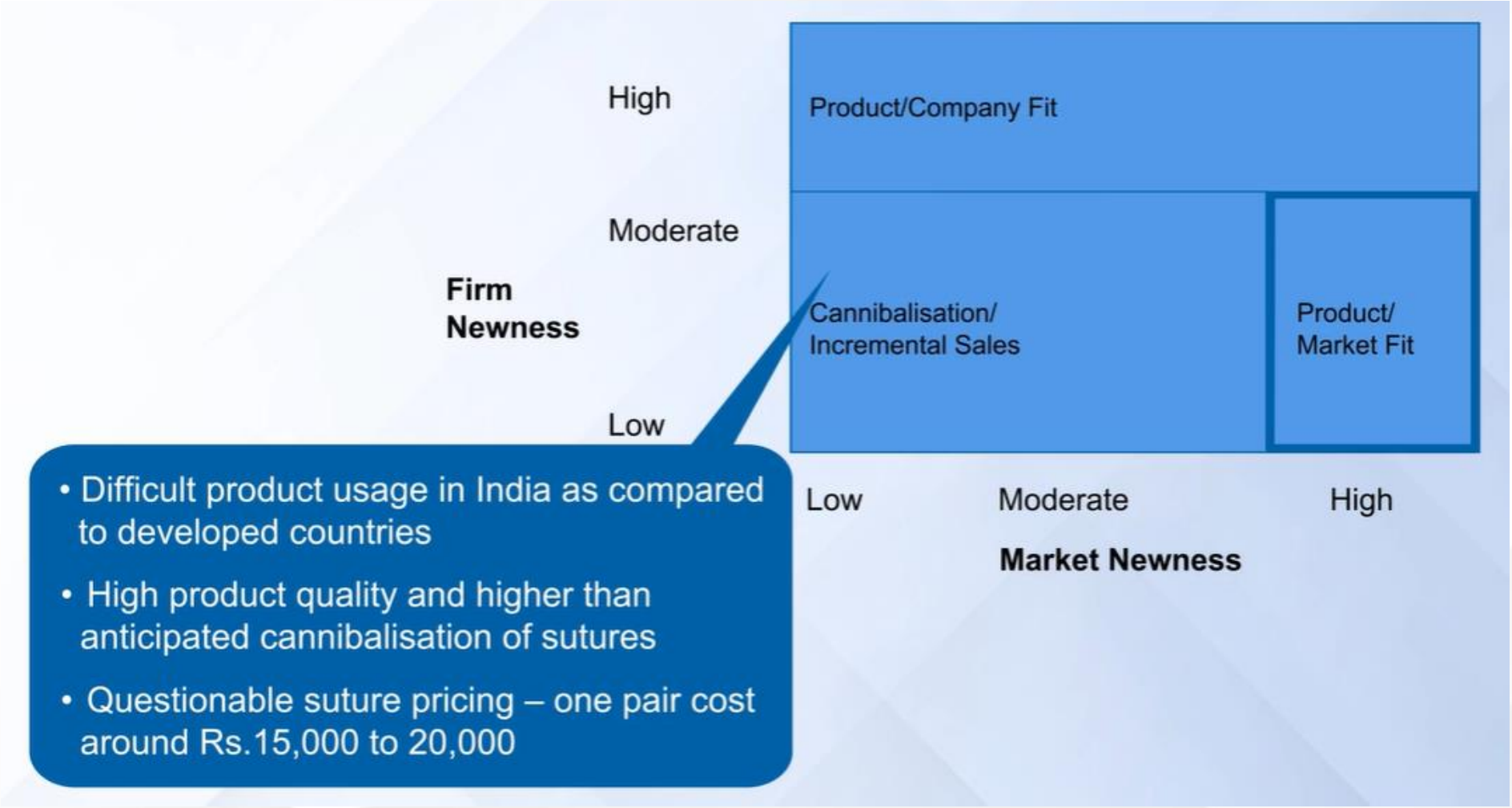
PowerStar – Position in the Newness Map



Product Cannibalisation Issue



Product Market Fit Issues



- Difficult product usage in India as compared to developed countries
- High product quality and higher than anticipated cannibalisation of sutures
- Questionable suture pricing – one pair cost around Rs.15,000 to 20,000

Increasing The Price of Bipolar Scissors

Online Experimentation

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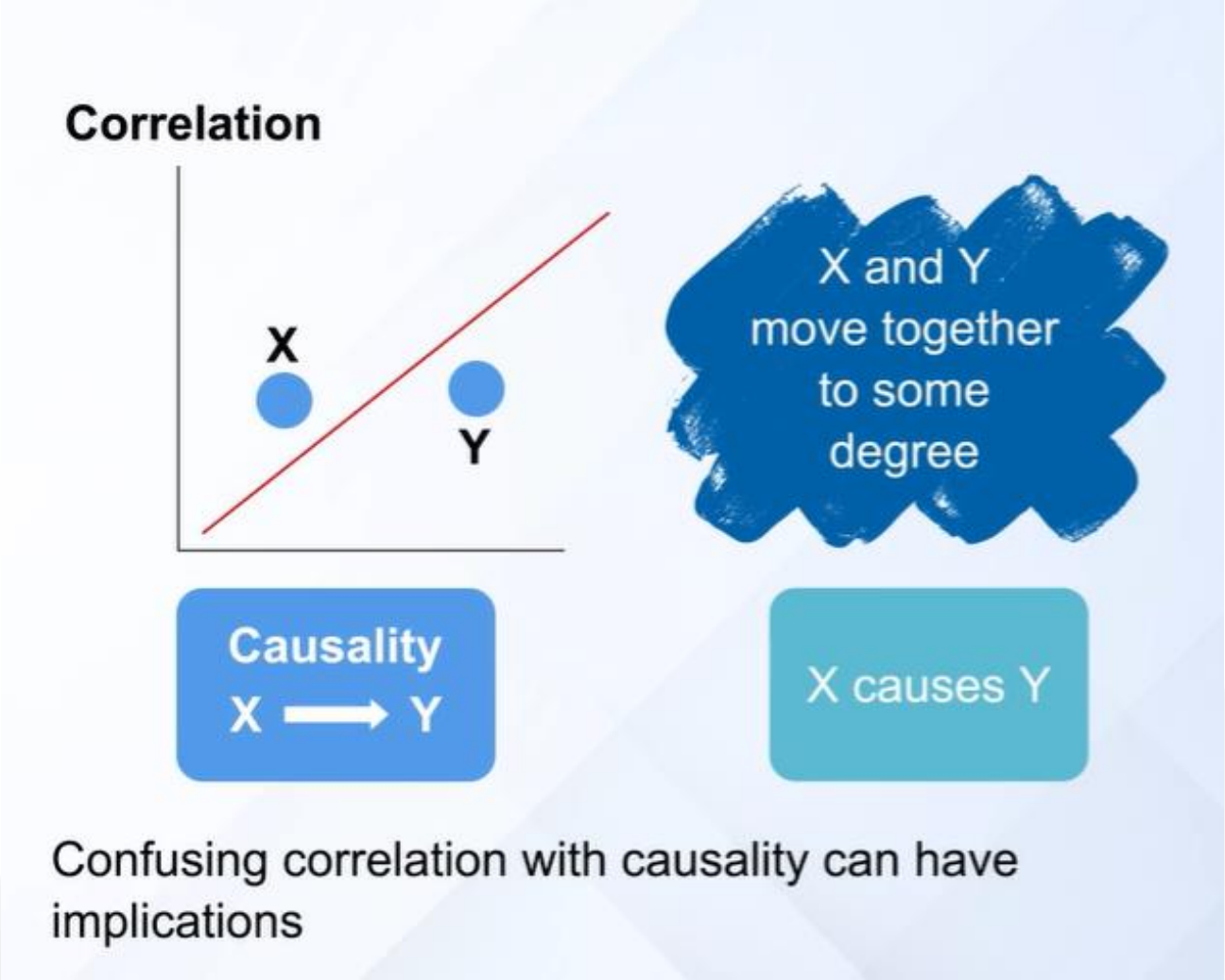
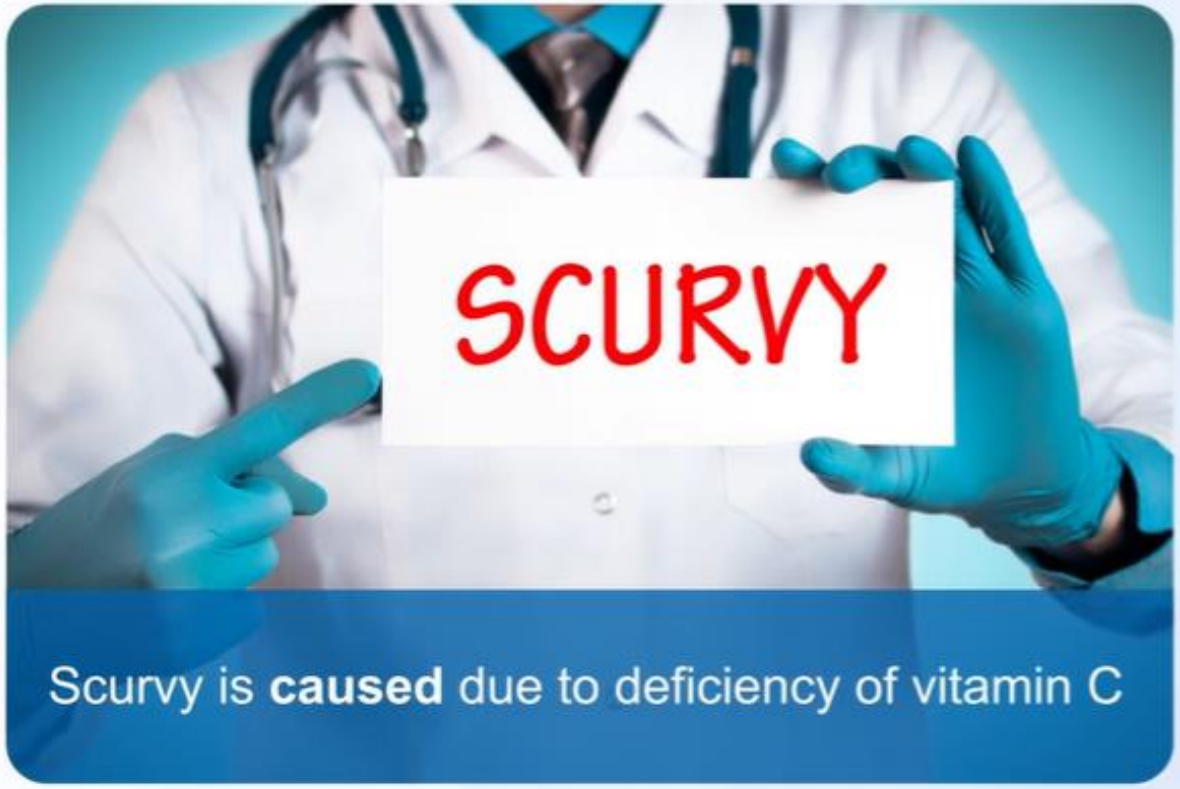
Corelation and Causality

X (Presumed cause)	Y (Presumed effect)
Educational level	Future income
Advertising	Sales

Corelation and Causality



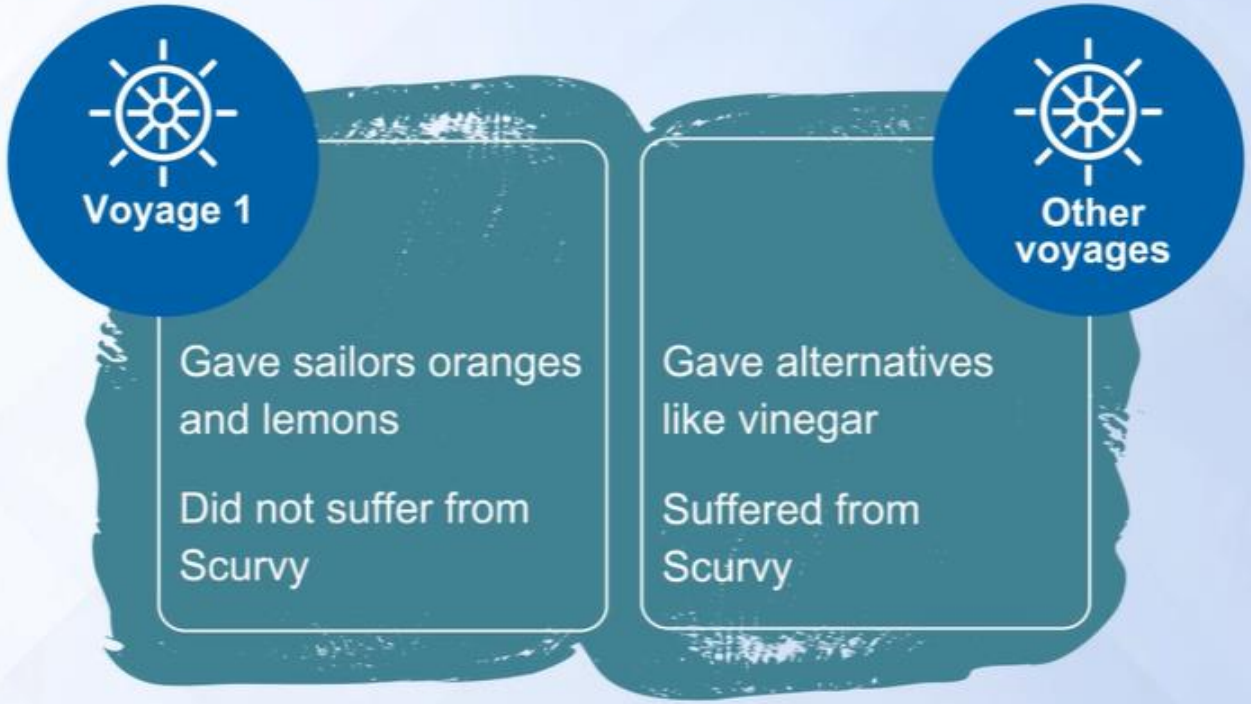
Corelation and Causality – An Example



https://hbr.org/2017/09/the-surprising-power-of-online-experiments

Experiment by Dr. James Lind

Problem: 2 million sailors died due to scurvy from 1500 to 1800



Result: Citrus fruits can prevent scurvy, but reason for the same was not known

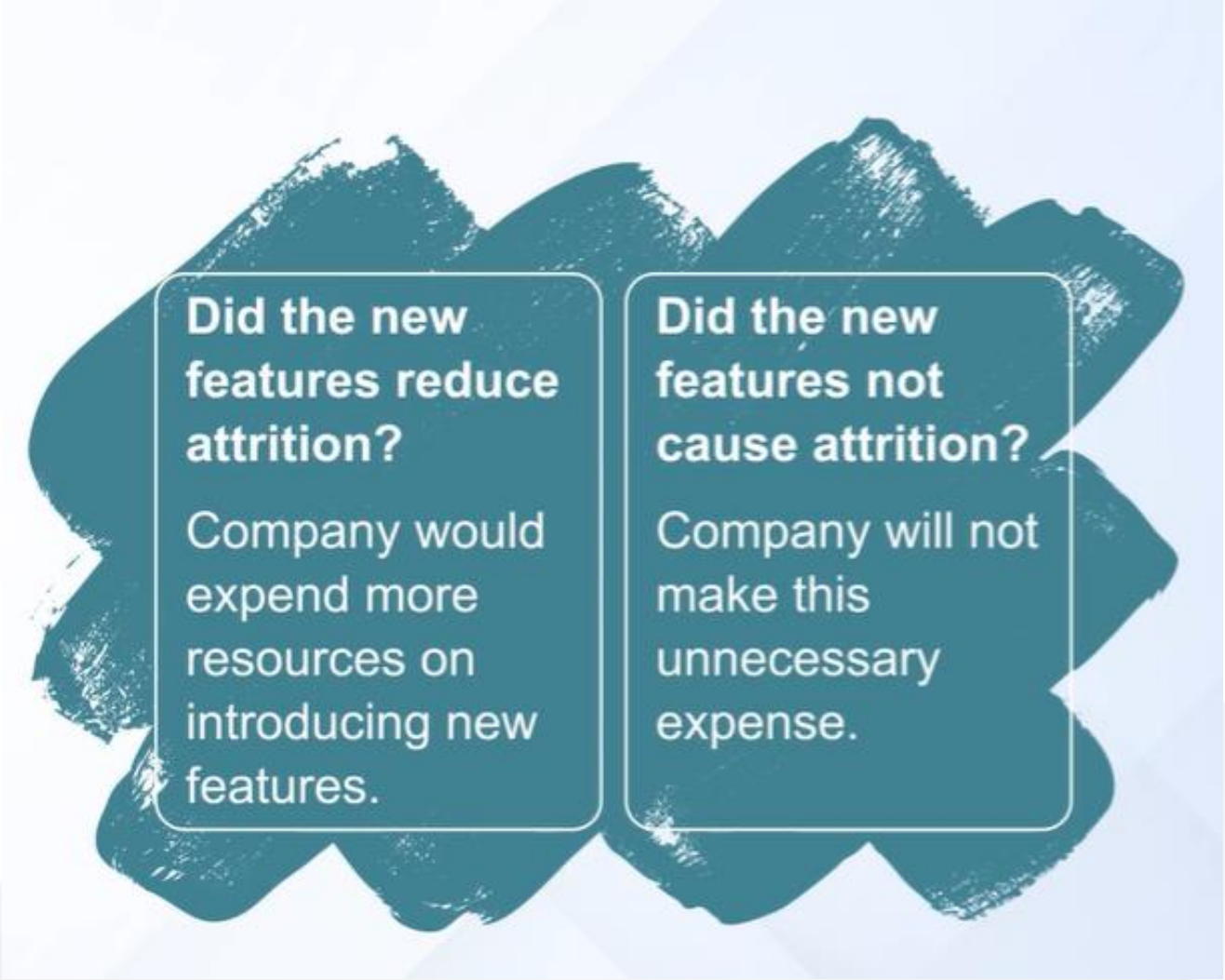
Importance of Causality

Study: Two observational studies of two advanced features of MS Office

Conclusion: New features reduced attrition

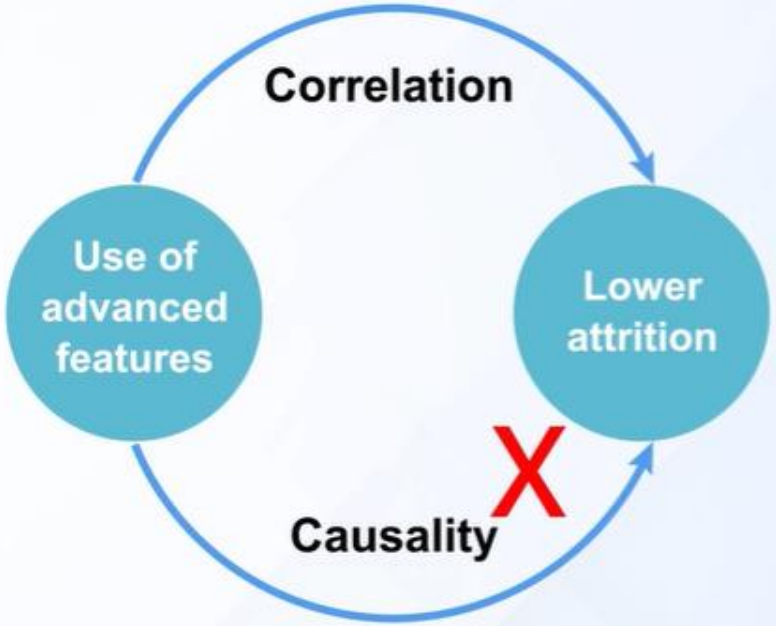
https://hbr.org/2017/09/the-surprising-power-of-online-experiments

Effect of Attrition



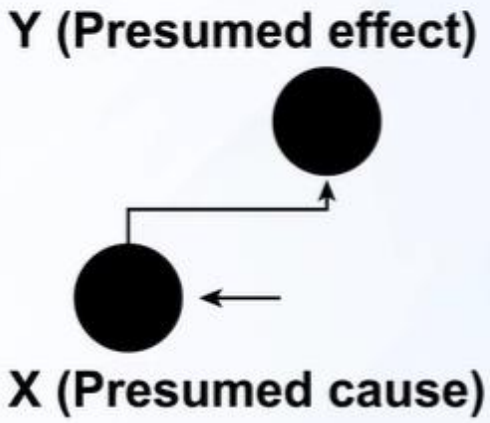
Understanding Causality

Heavy users of MS Office used advanced features more and have lower attrition.



Understanding causality helps in understanding growth

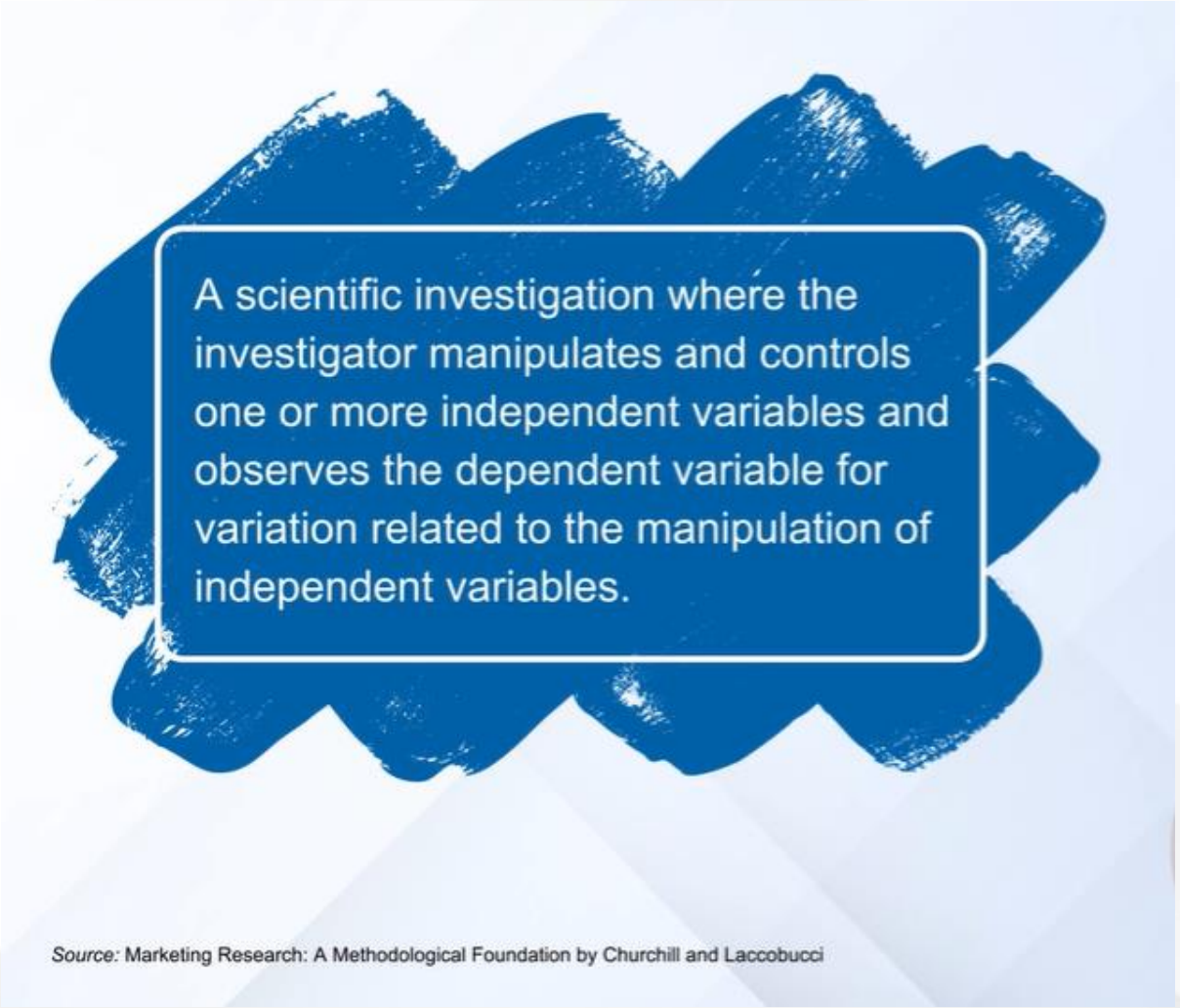
Experiments and causality



Conditions to be satisfied:

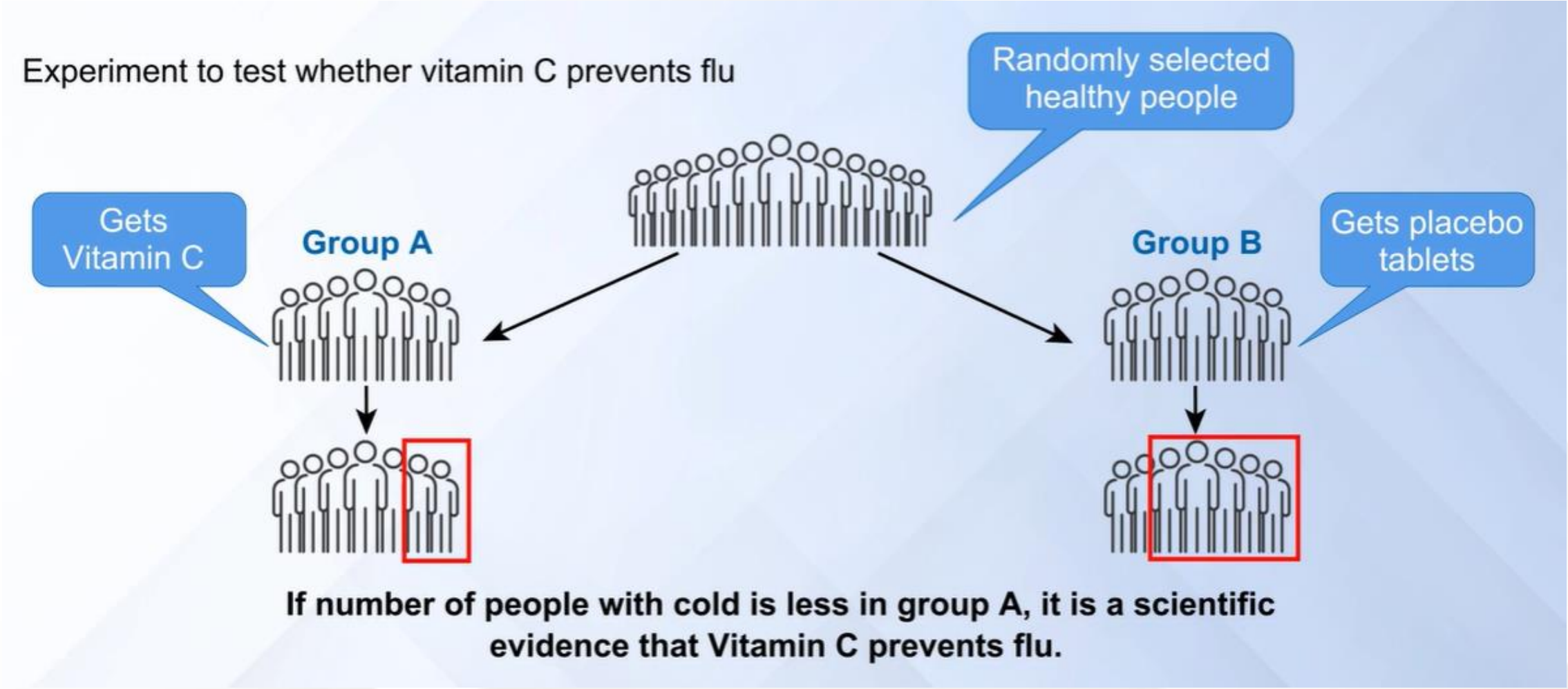
- Correlation
- Time sequence
- Alternative explanations

Experiments



Types of Experiments

Example of a Classic Scientific Experiment



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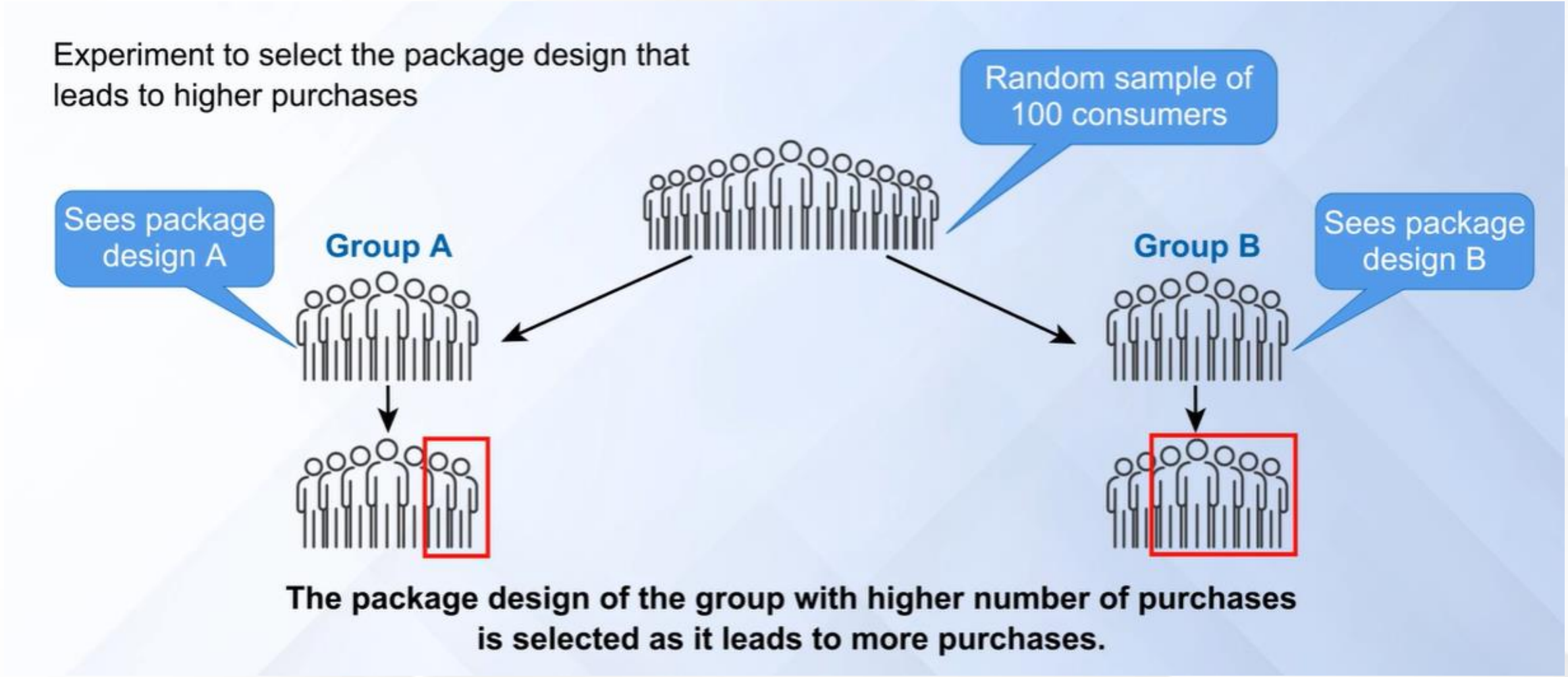
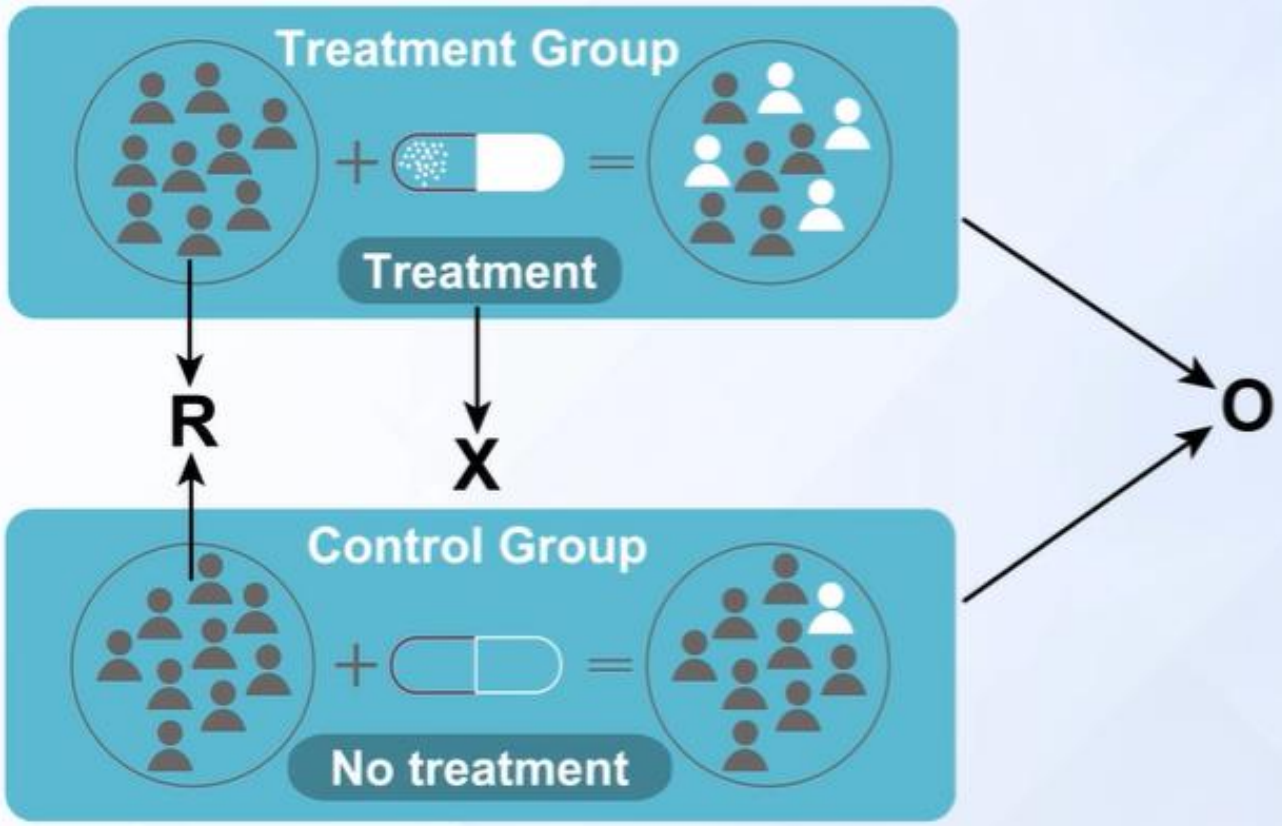
Example of a Market Research Experiment



Important Terms in Experimental Design

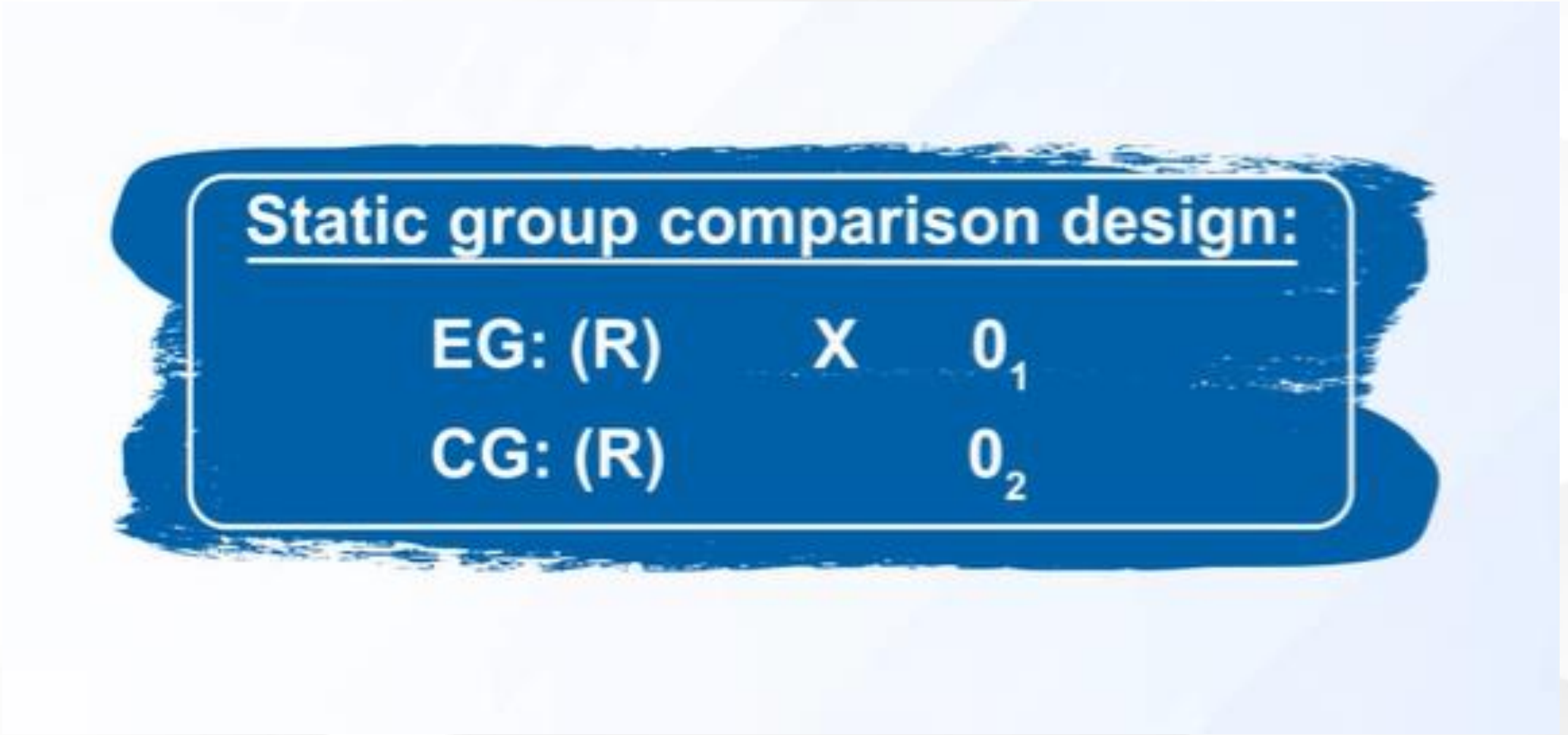


R: Random assignments t=-o treatment/control groups

X: treatment

O: Observation taken from experiment unit

Experimental Designs: The Static Group Comparison Design



Experimental Designs: The Static Group Comparison Design

EG: Experimental group

CG: Control group

X: Treatment/intervention

O_1/O_2: Observations taken on the experimental units in each group

The Static Group Comparison Design: Example

Measure the impact of 5% increase in sales commission on the salespersons' performance.

- **EG** – Group that gets 5% extra commission
- **CG** – Group that does not get extra commission
- **X** – 5% increase in commission
- **O1/O2** – Overall sales of each group at the end of the study

Before-After-With Control Group Design

Before-after-with control group design:

EG:	(R)	O_1	X	O_2
CG:	(R)	O_3		O_4

Pre-measures

In some cases, the dependent variable is measured before the treatment to establish the equivalence of the experimental and control groups

Before-After-With Control Group Design

Before-after-with control group design:

EG:	(R)	O_1	X	O_2
CG:	(R)	O_3		O_4
		Pre-measures		Post-measures

In some cases, the dependent variable is measured before the treatment to establish the equivalence of the experimental and control groups

Variation of Before-After-With Control Group Design

Test multiple treatments

X1 – 5% increase in sales commission

X2 – 10% increase in sales commission

EG1: (R)	**X1**	**O1**
EG2: (R)	**X2**	**O2**
CG: (R)		**O3**

More test conditions → Larger sample size → More complex experiment management

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Quasi –Experimental Designs

Experimental Validity in Causal Research

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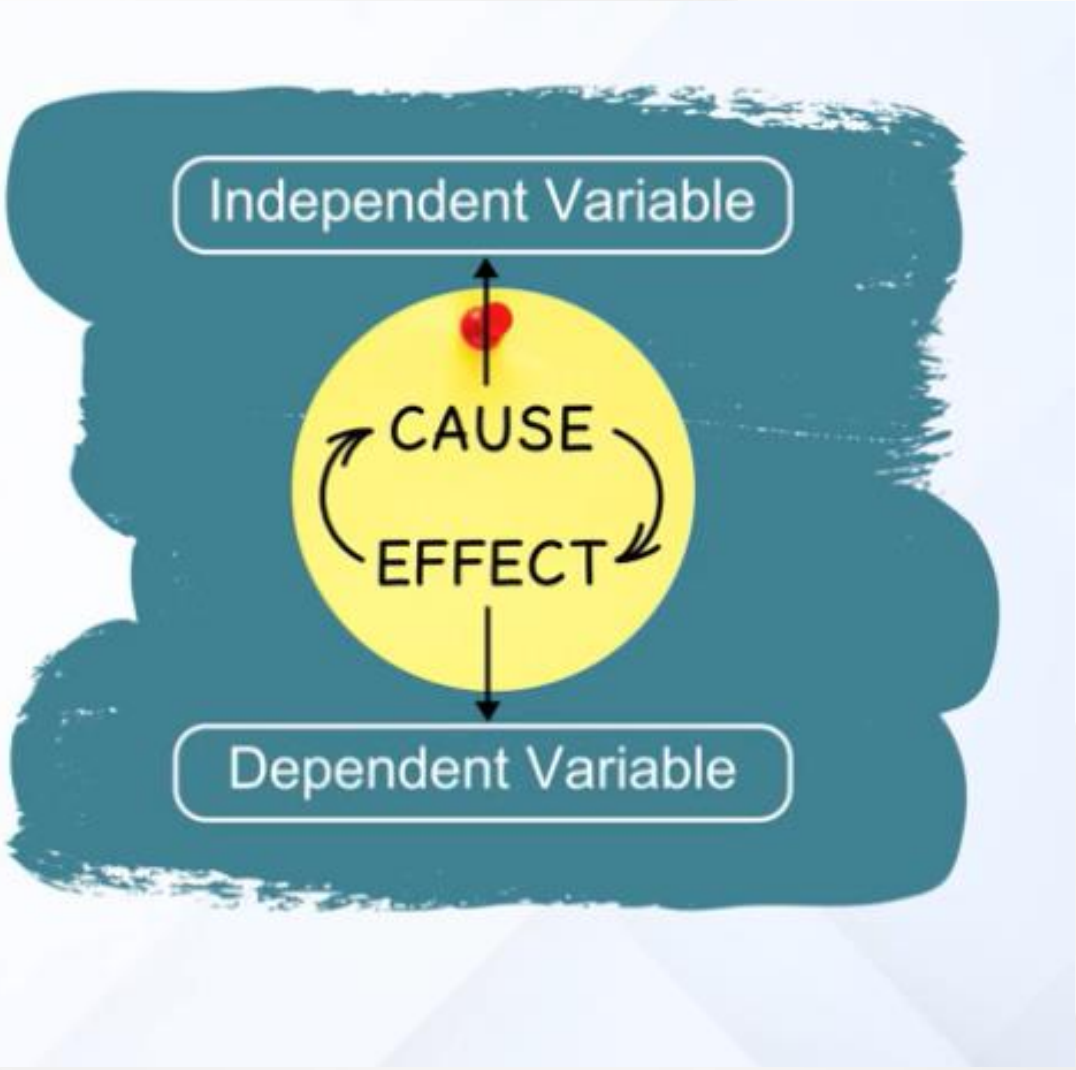
Internal Validity



Internal Validity

High internal validity allows the researcher to rule out alternative explanations.

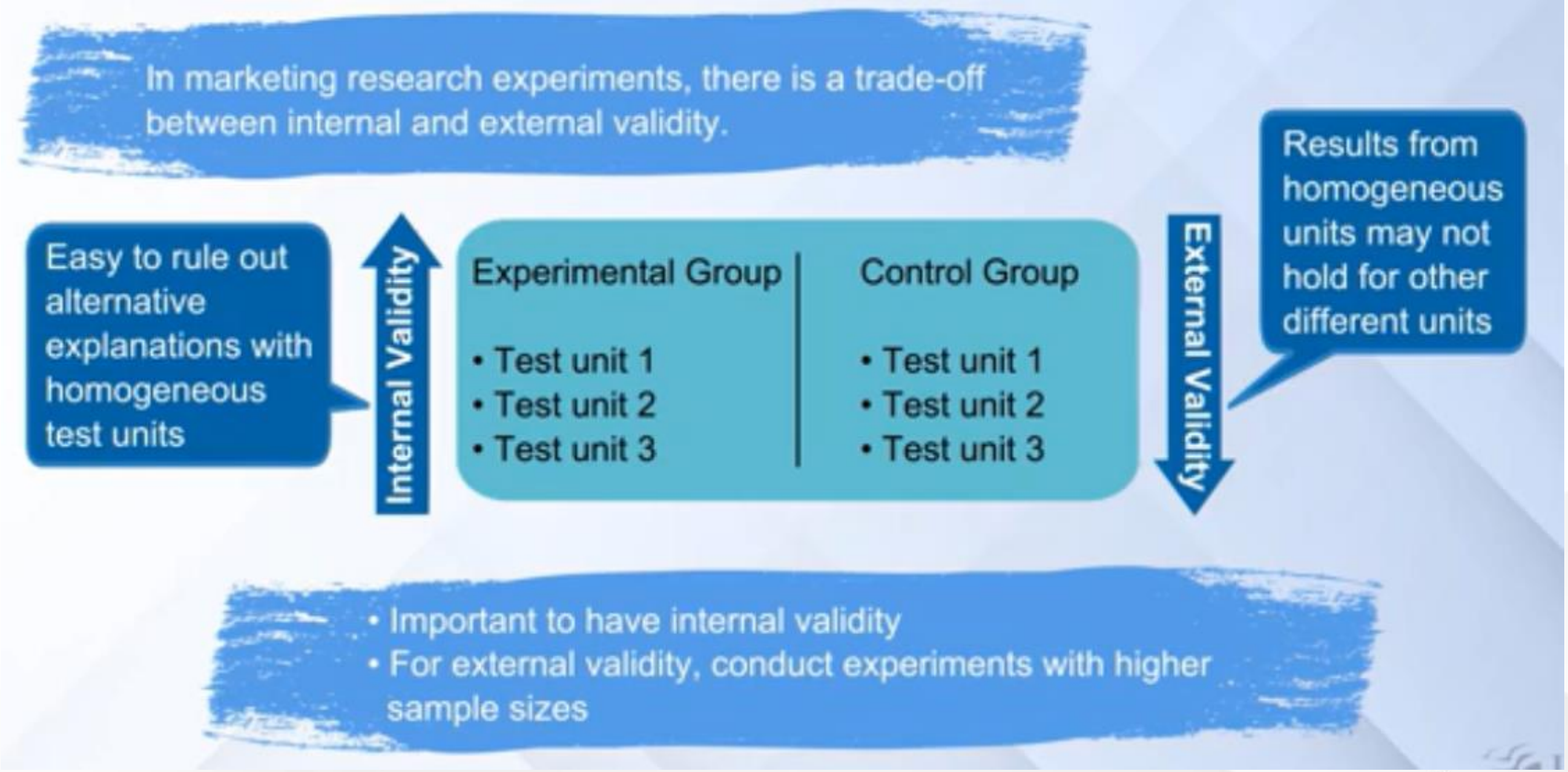
Internal Validity

Matched samples are used in case random assignment is not possible

Matching is done on multiple observed variables

External Validity

Internal Vs External Validity



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Threats to Internal Validity: History

- External event that happens between pre and post measures
- Affects the value of the criterion or response or dependent variable

History: Example

Measure the impact of 5% increase in sales commission on the salespersons' performance.

Increase in commission for rival company salespersons = 20%

- **EG** – Group that gets 5% extra commission
- **CG** – Group that does not get extra commission
- **X** – 5% increase in commission
- **O1/O2** – Overall sales of each group at the end of the study

Impacts the sales of the salespersons

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Threats to Internal Validity: Maturation

Maturation :Example

Measure the impact of 5% increase in sales commission on the salespersons' performance.

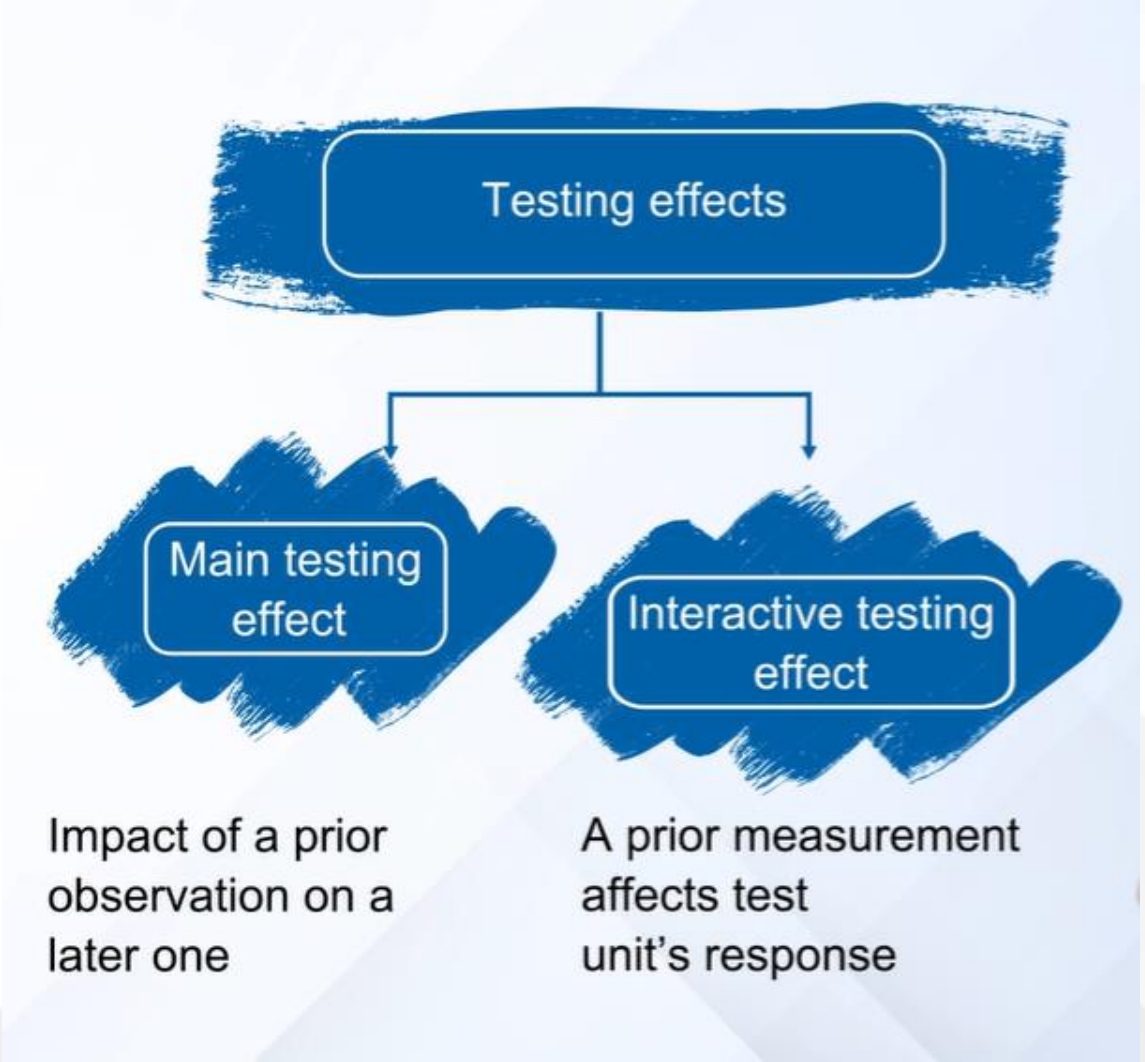
Long duration of experiment may lead to little or no intervention

- **EG** – Group that gets 5% extra commission
- **CG** – Group that does not get extra commission
- **X** – 5% increase in commission
- **O1/O2** – Overall sales of each group at the end of the study

Threats to Internal Validity : Testing

The process of experimentation itself affects the observed response.

Threats to Internal Validity : Testing



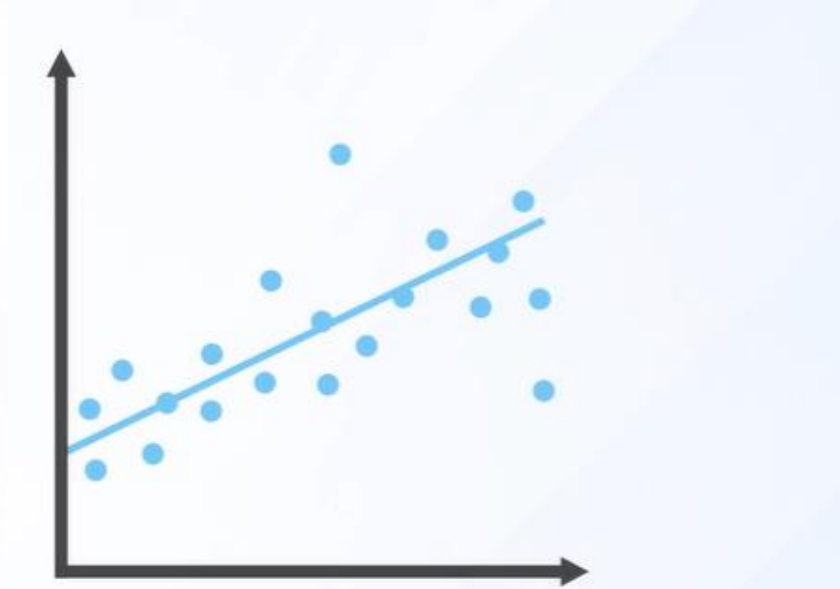
Threats to Internal Validity : Instrument Variation

All changes in the measuring device

Company may have to adjust to this factor before it impacts the treatment

Threats to Internal Validity : Selection Bias

Threats to Internal Validity : Statistical Regression



- Tendency of extreme cases to move towards central position
- Individuals are grouped according to scores and their performances regresses towards the mean

Statistical Regression : Example

Measure the impact of 5% increase in sales commission on the salespersons' performance.

Only high performing salespersons are given extra commission

- **EG** – Group that gets 5% extra commission
- **CG** – Group that does not get extra commission
- **X** – 5% increase in commission
- **O1/O2** – Overall sales of each group at the end of the study

Regression of high performing salespersons towards mean gives wrong estimation

Threats to Internal Validity : Experimental Mortality

- Test units are lost during an experiment
- Non-equivalence between control and experimental group

Experimental Mortality : Example

Measure the impact of 5% increase in sales commission on the salespersons' performance.

Salespersons leaving company contaminates the experiment

- **EG** – Group that gets 5% extra commission
- **CG** – Group that does not get extra commission
- **X** – 5% increase in commission
- **O1/O2** – Overall sales of each group at the end of the study

Growth Hacking

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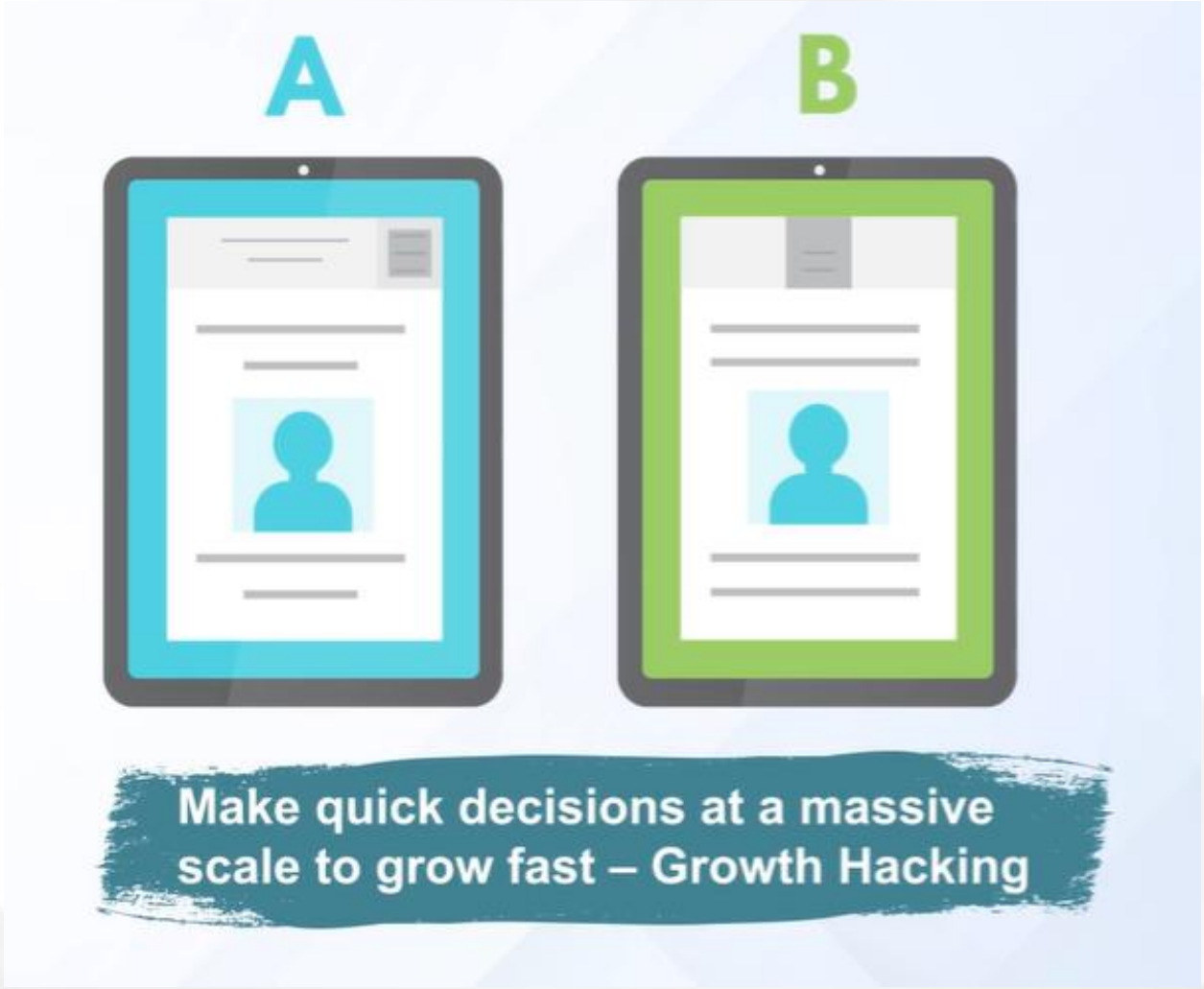
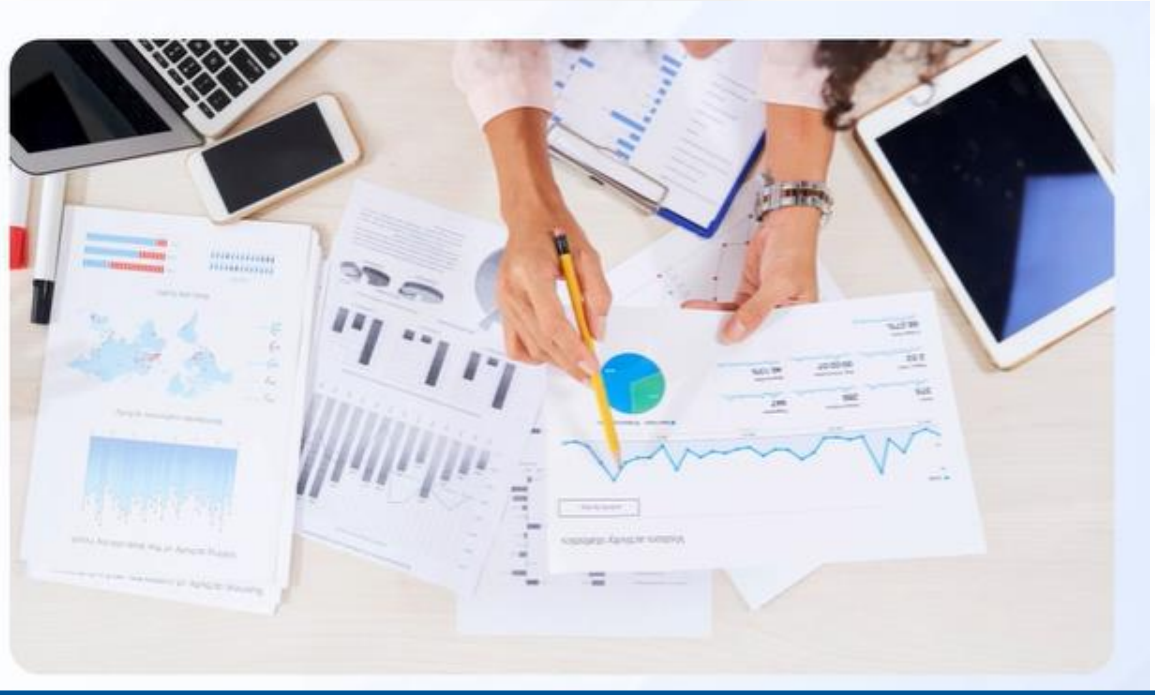
New Product Testing for Fast Food Company

Companies experiment directly in the marketplace to grow fast when the development risk is not high.

Online Experimentation



Growth Hacking



- Transforms decision making into a scientific evidence driven process
- Availability of big data does not reduce the importance of understanding causality

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Controlled Online Experiments

Online Experimentation

- Engage millions of consumers
- Harvest useful results to be implemented quickly
- Requires specialized knowledge and skills

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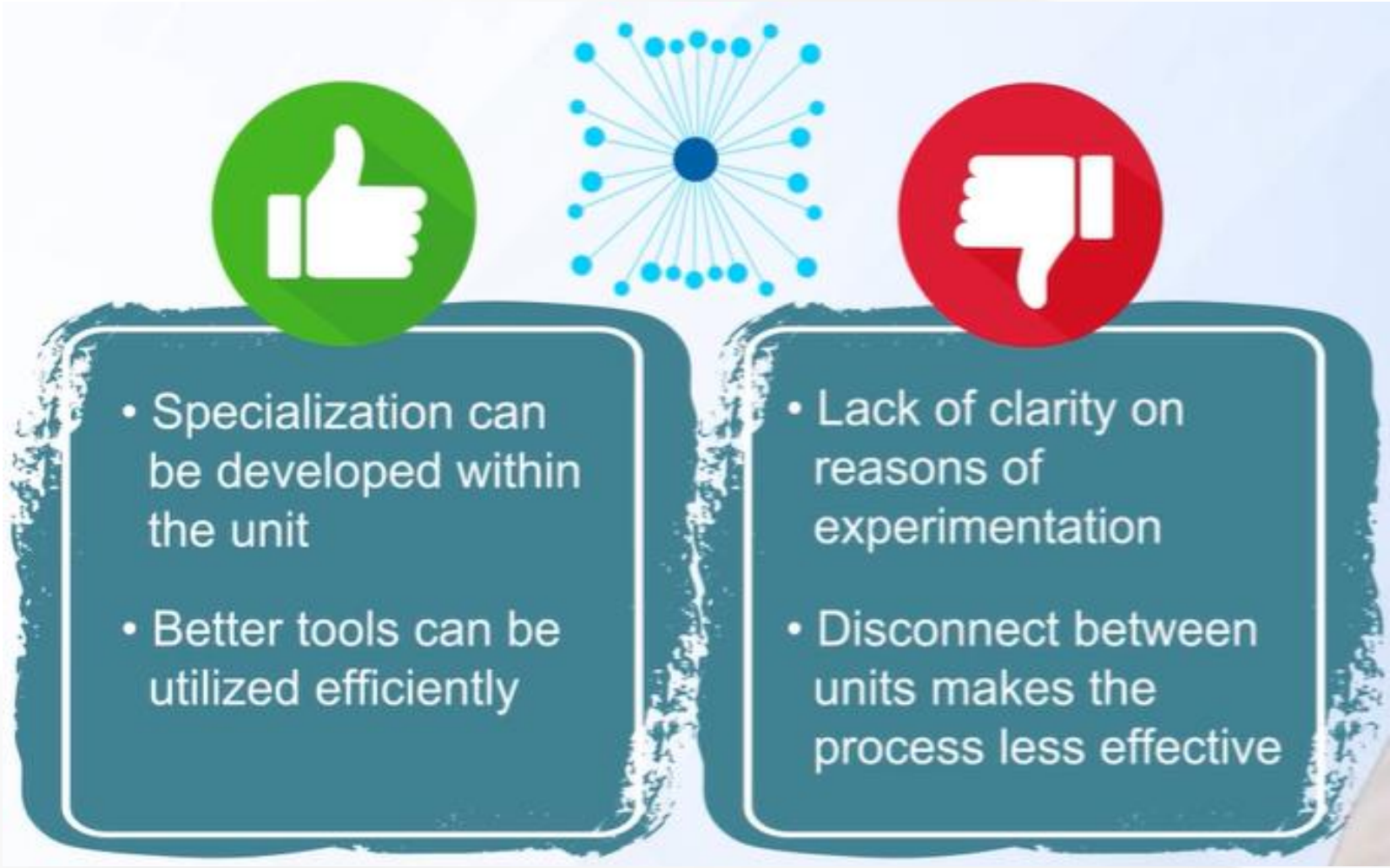
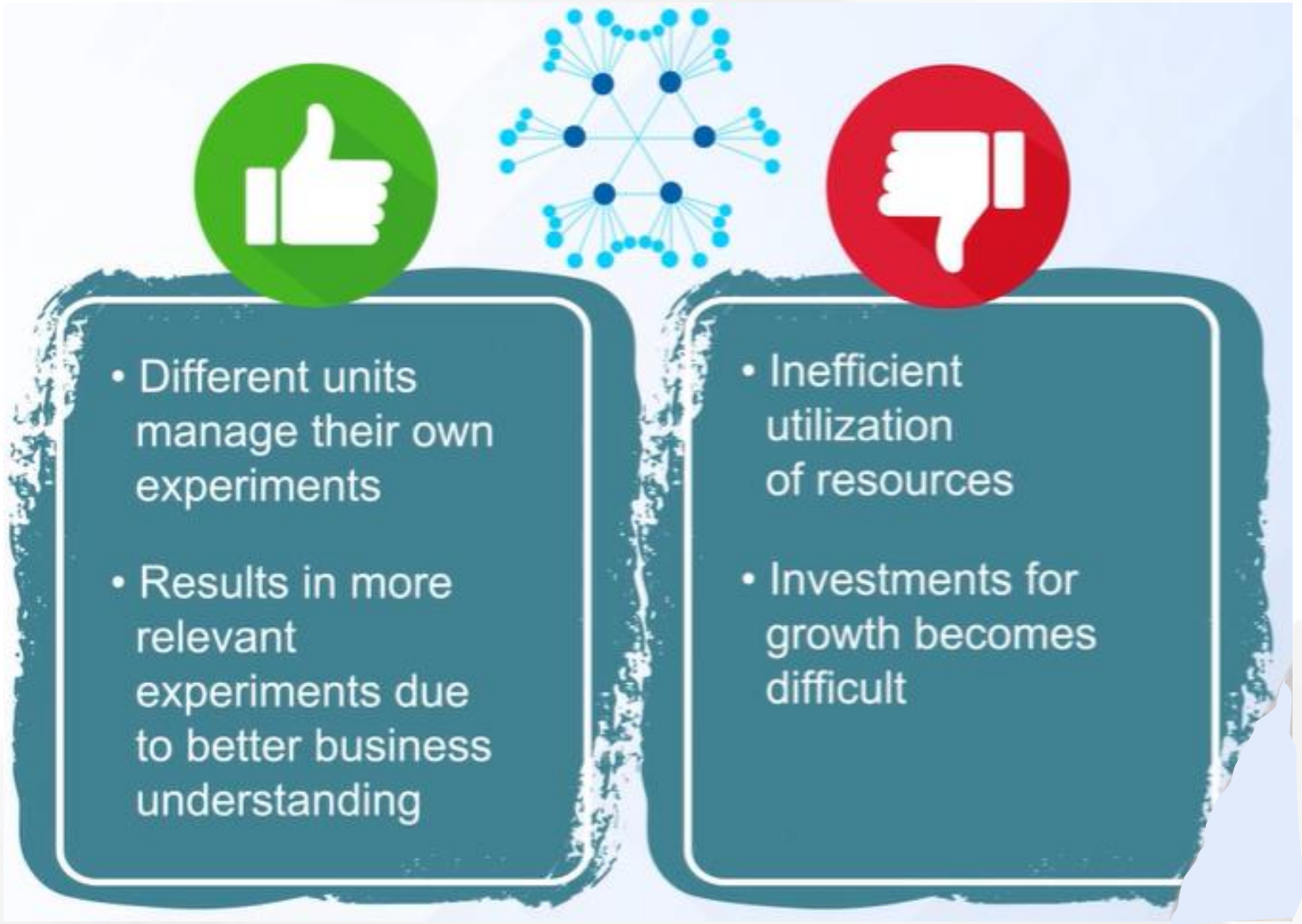
Centralised Experimentation

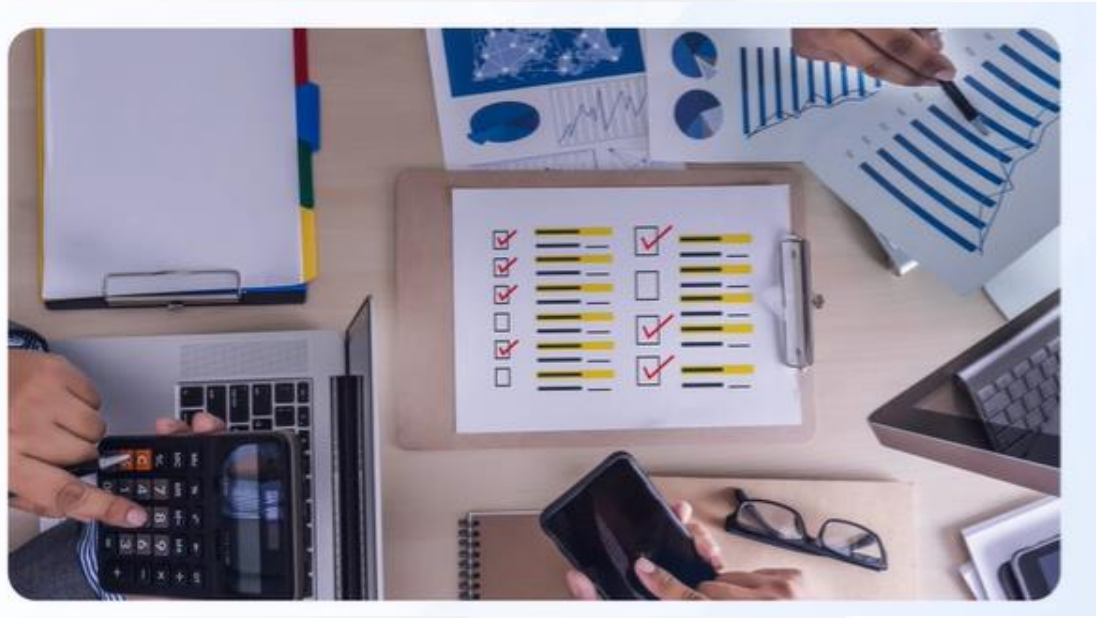


Decentralised Experimentation



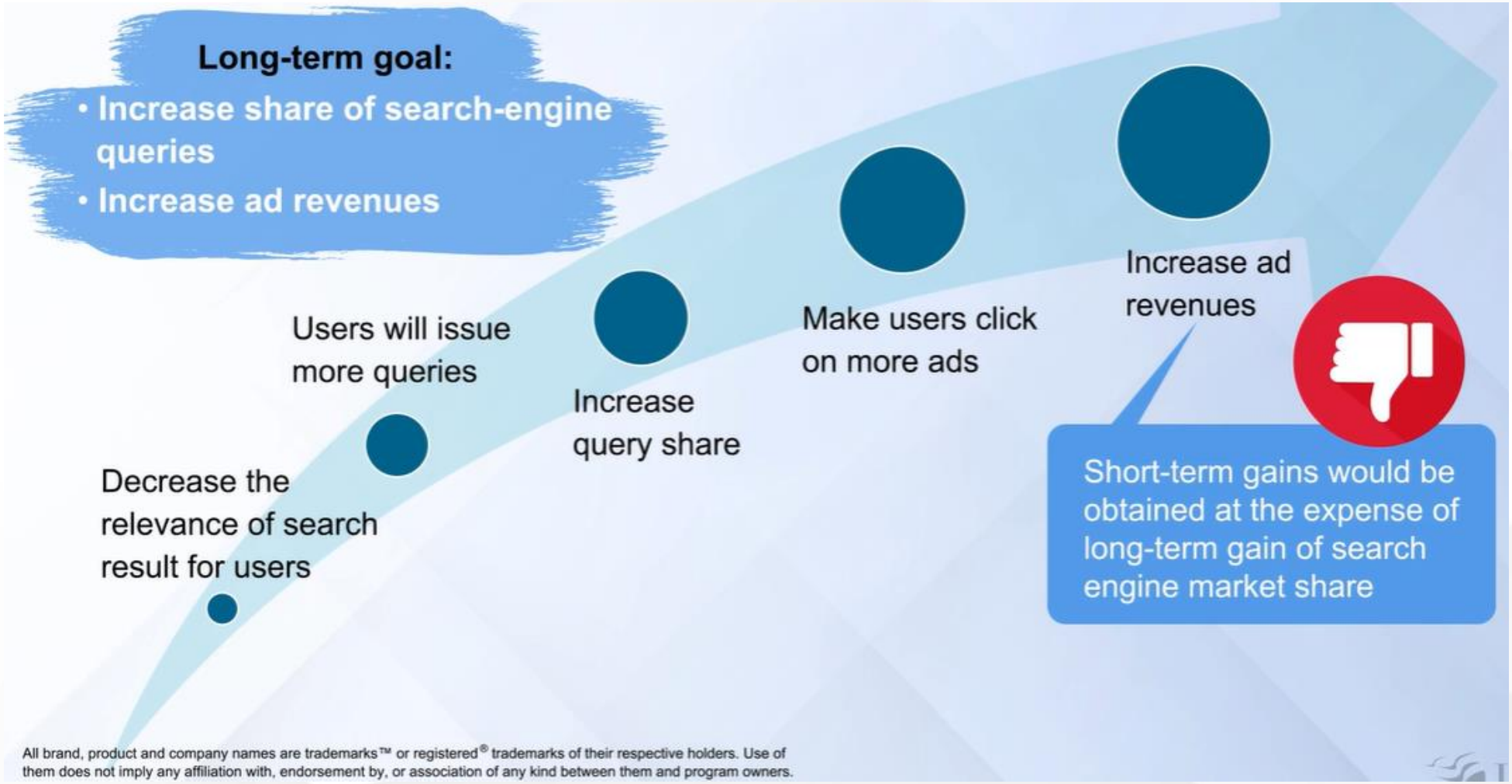
Hybrid Model

Overall Evaluation Criteria (OEC)



- Measures for the success of the entire process
- Decided through internal discussions by senior management
- Break down the OEC and track success insights

Example of Overall Evaluation Criteria: Bing



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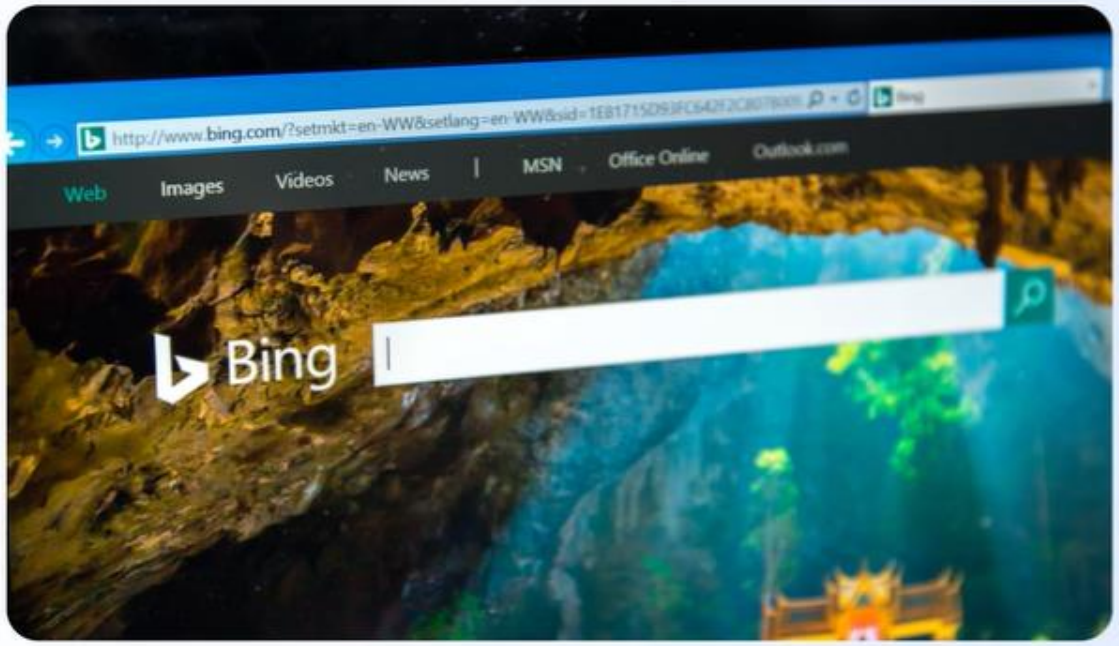
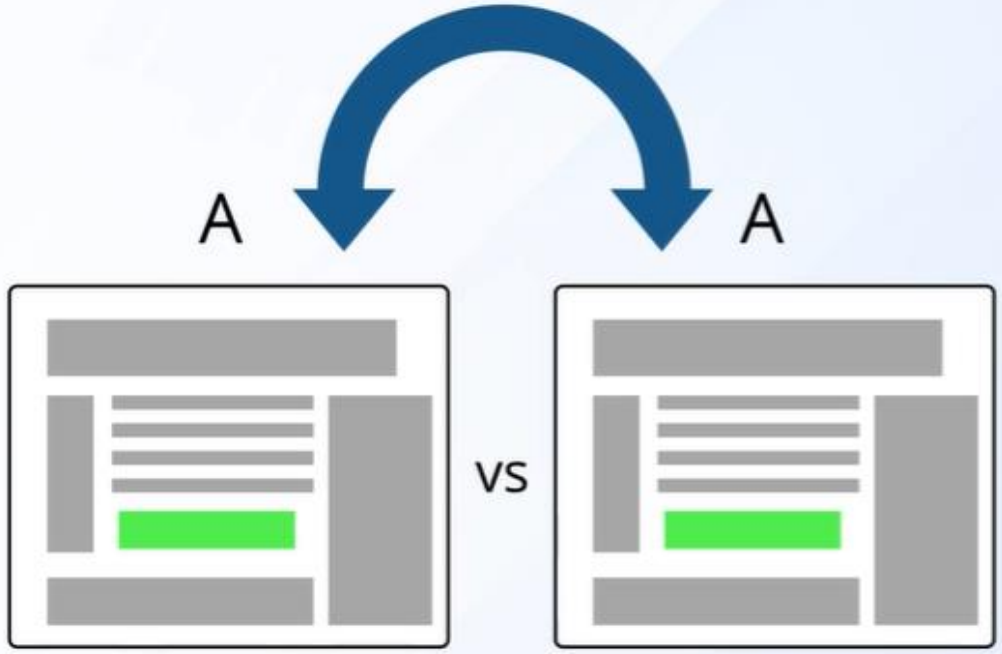
Example of Overall Evaluation Criteria: Bing



- Minimise the number of user queries for each task/session
- Maximise the number of tasks/sessions that users conducted

A/A Testing



- Done before implementing new A/B testing
- Check the accuracy of A/B tests
- Point out issues before A/B tests

A/A testing should show no significant difference in conversions between control and test groups

Data Quality

- How was data obtained?
- Are there any outliers in the data?
- Are multiple consumers segments grouped into one group?

Summary

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Key Learnings

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