Product Management Chapter 2

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Product Management Chapter 2

Product Design Strategies

Techniques for Product Design

Production Process Strategies

LESSON 1

PRODUCT MANAGERS NEED TO UNDERSTAND THE LIFECYCLE OF THEIR PRODUCT

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Product decision is to develop and implement a product strategy that meets the demands of the marketplace with a competitive advantage. The firm will select, define and design products.

The selection of new products should be based on Product-by Value analysis. This report lists in order of individual and total dollar/euro contribution. According to this report managers may take the following decisions:

- Increasing cash flow (improve the quality of the product to increase the price or reduce the cost)
- Increasing market penetration (improve the quality of the product to increase the price or reduce the cost)
- Discontinue products
- Discontinue further investments (R&D, Equipment) in existing products

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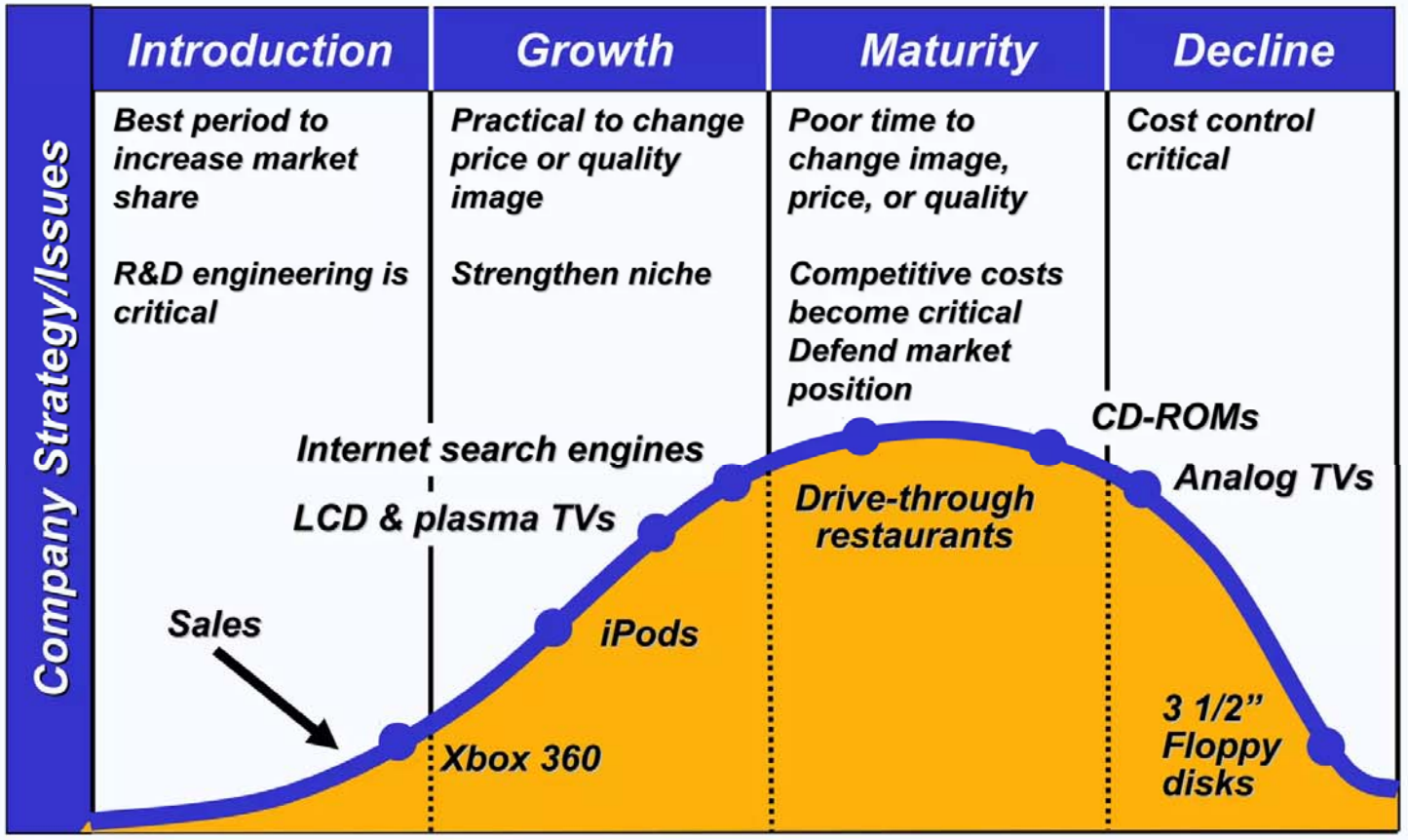
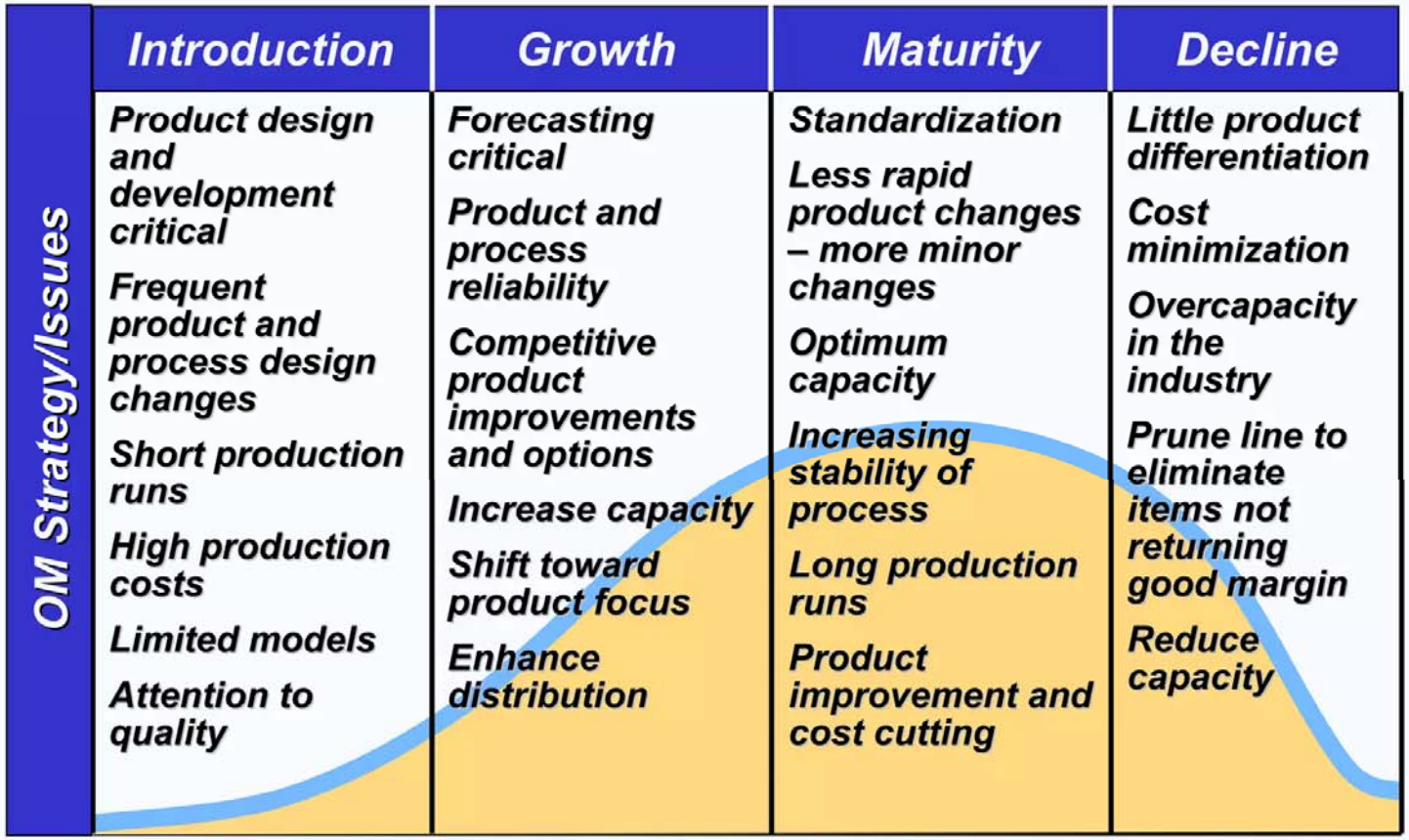
Product Life Cycle



Product Life Cycle



LESSON 2

PRODUCT MANAGERS NEED TO UNDERSTAND IMPLICATIONS OF INTRODUCING AN INNOVATION INTO YOUR PRODUCT

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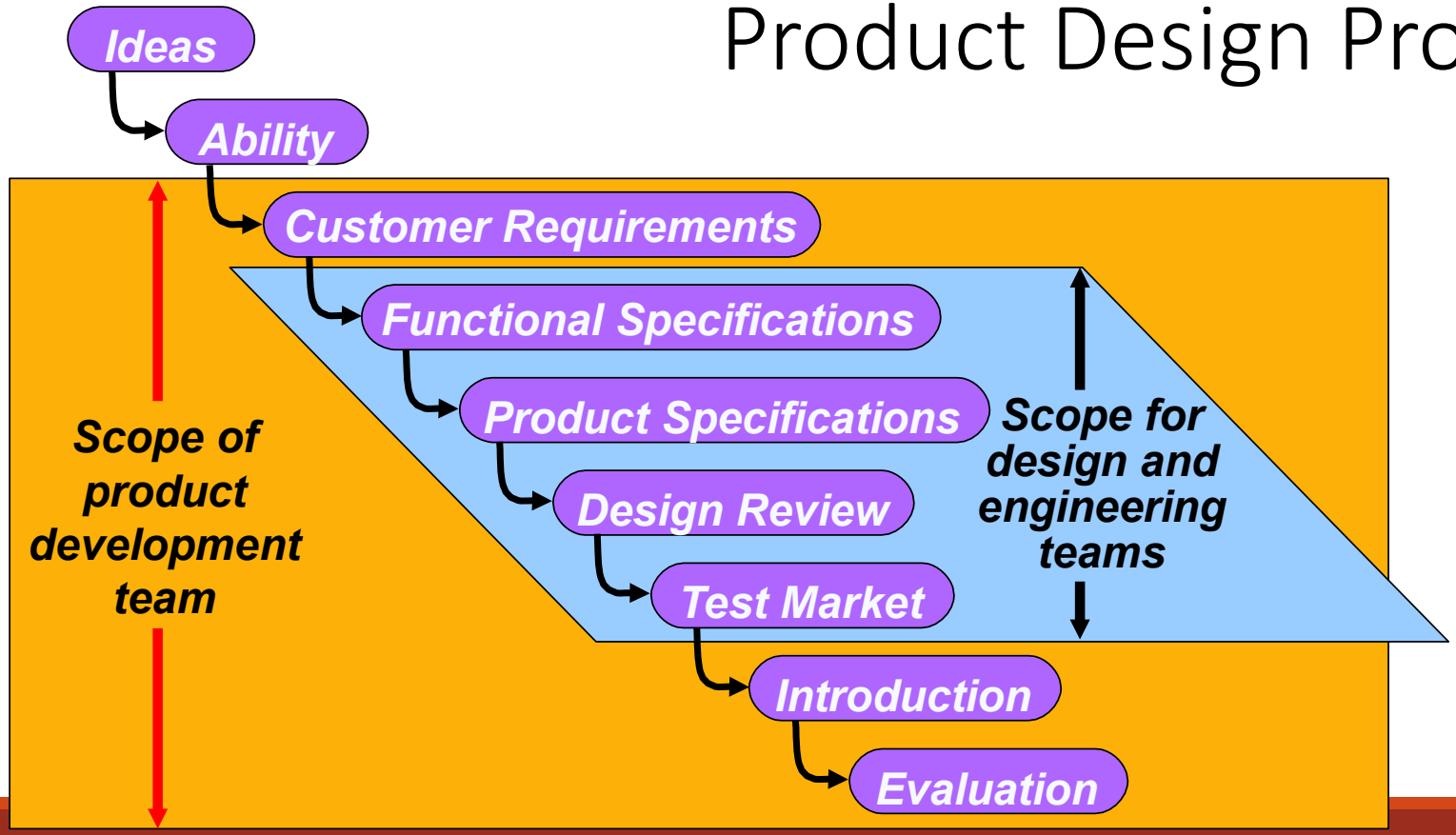
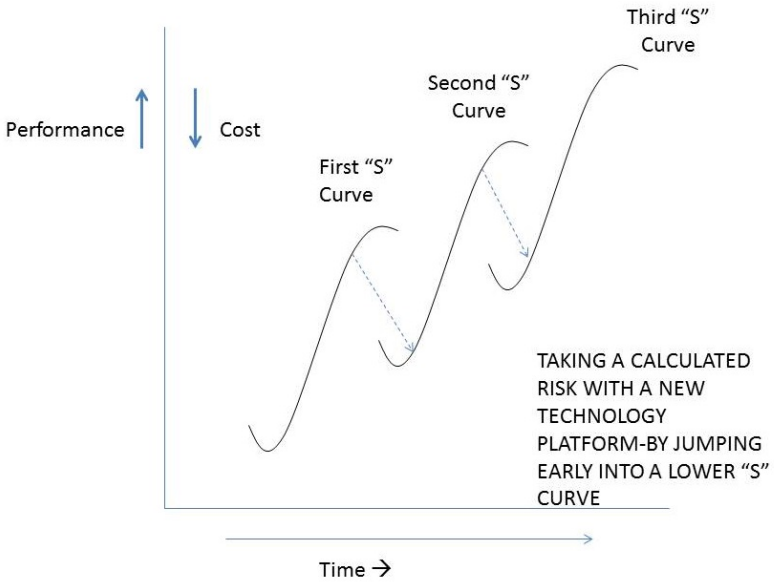
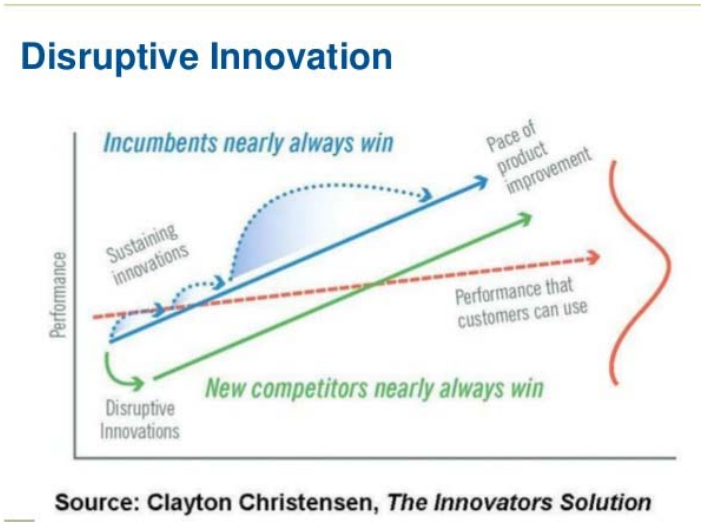
Product Design Process





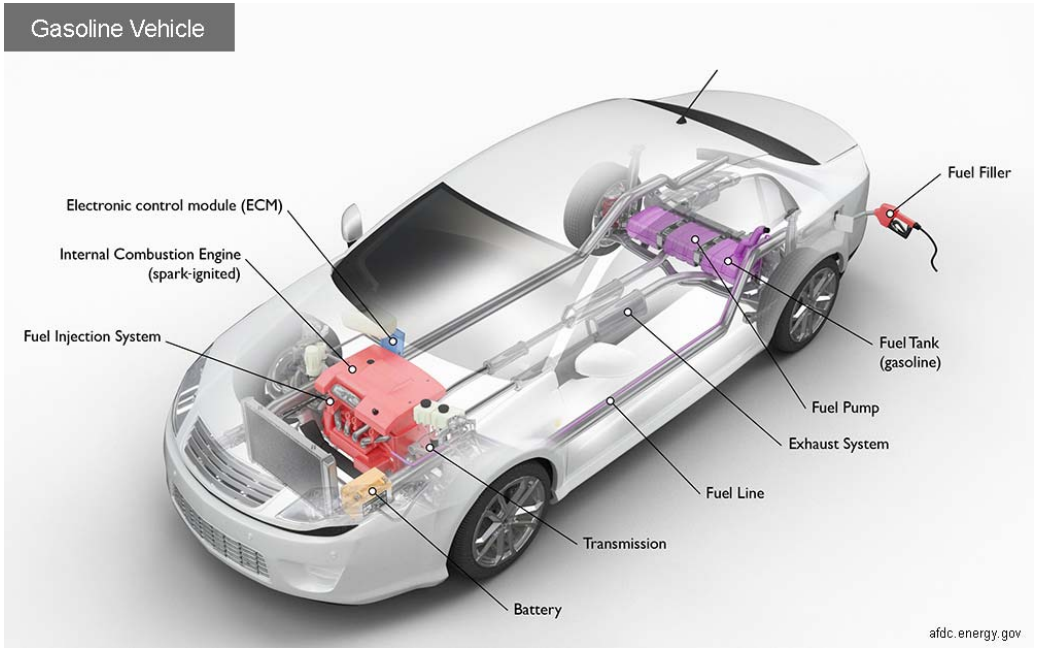


TECHNOLOGICAL PERSPECTIVE: Radical (Jump in Foster curve) vs Incremental Innovation (Staying in the Foster curve). Radical Innovation: Breakthrough in product functionalities, determined by an evolution of internal knowledge and competences, displacing existing technologies, markets and industries.. Radical innovation involves changes in the architecture of the product and changes in the main functionality. Incremental innovations represent small improvements in product functionalities, that support the life of the product.

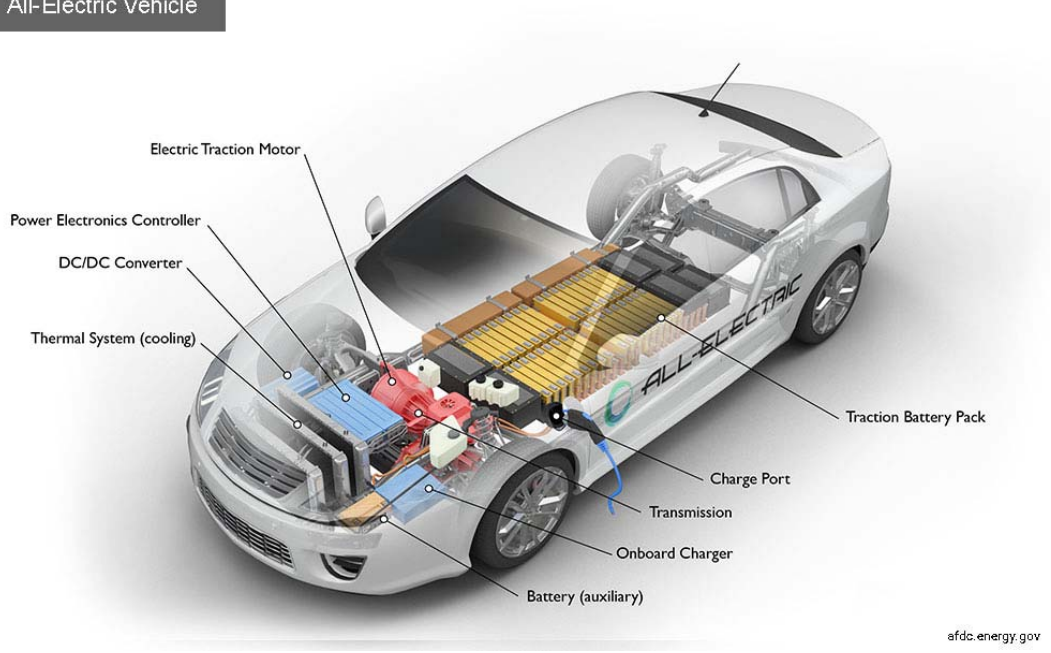
MARKET PERSPECTIVE: Low end disruptive innovation describes a process by which a product initially takes root in simple applications at the bottom of a market—typically by being less expensive and more accessible—and then relentlessly moves upmarket, eventually displacing established competitors. New-market disruption targets customers who have needs that were previously unserved by existing incumbents. A sustaining innovation does not create **new markets**, but develops existing ones with better value.

Radical Innovation

Gasoline Vehicle



All-Electric Vehicle



Incremental Innovation

Sustaining Innovation

iPhone 13

6.1" Super Retina XDR display
2532 x 1170 resolution
60Hz refresh rate
A15 Bionic chip
6-core CPU/4-core GPU
Dual 12MP camera system
Wide: ƒ/1.6 aperture
Cinematic mode: 1080p at 30 fps
-
12MP front ƒ/2.2 aperture
Emergency SOS
-
Bluetooth 5.0
3,227 mAh battery
Up to 19 hours video playback
128GB/256GB/512GB
Starting at $699

iPhone 14

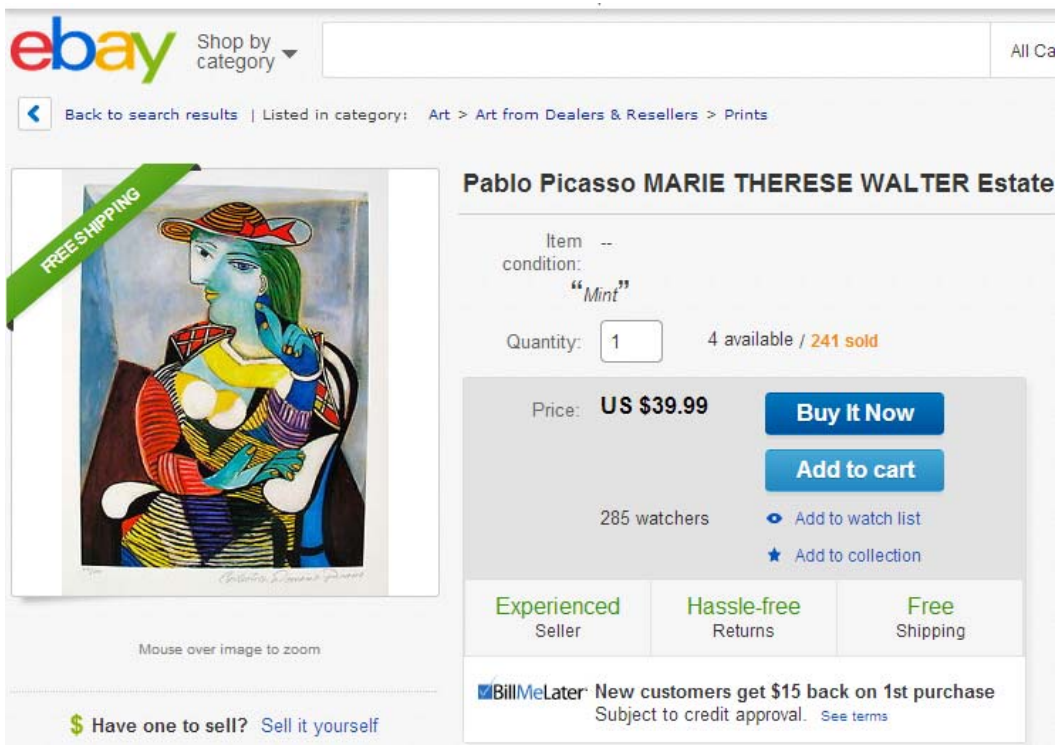
6.1" Super Retina XDR display
2532 x 1170 resolution
60Hz refresh rate
A15 Bionic chip
6-core CPU/5-core GPU
Dual 12MP camera system
Wide: ƒ/1.5 aperture
Cinematic mode: 4K up to 30 fps
Action mode
12MP front ƒ/1.9 aperture
Emergency SOS via satellite
Crash Detection
Bluetooth 5.3
3,279 mAh battery
Up to 20 hours video playback
128GB/256GB/512GB
Starting at $799

@theapplehub

Apple

Low end disruptive innovation

New Market disruptive innovation



LESSON 3

PRODUCT MANAGERS NEED TO LEARN TO DEFINE DESIGN PRIORITIES WHEN LAUNCHING A NEW PRODUCT OR MODIFYING AN EXISTING ONE

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Techniques to identify product design priorities:

- **Reverse Engineering**
- **Design Thinking**
- **Quality Function Deployment**
- **Value Engineering**

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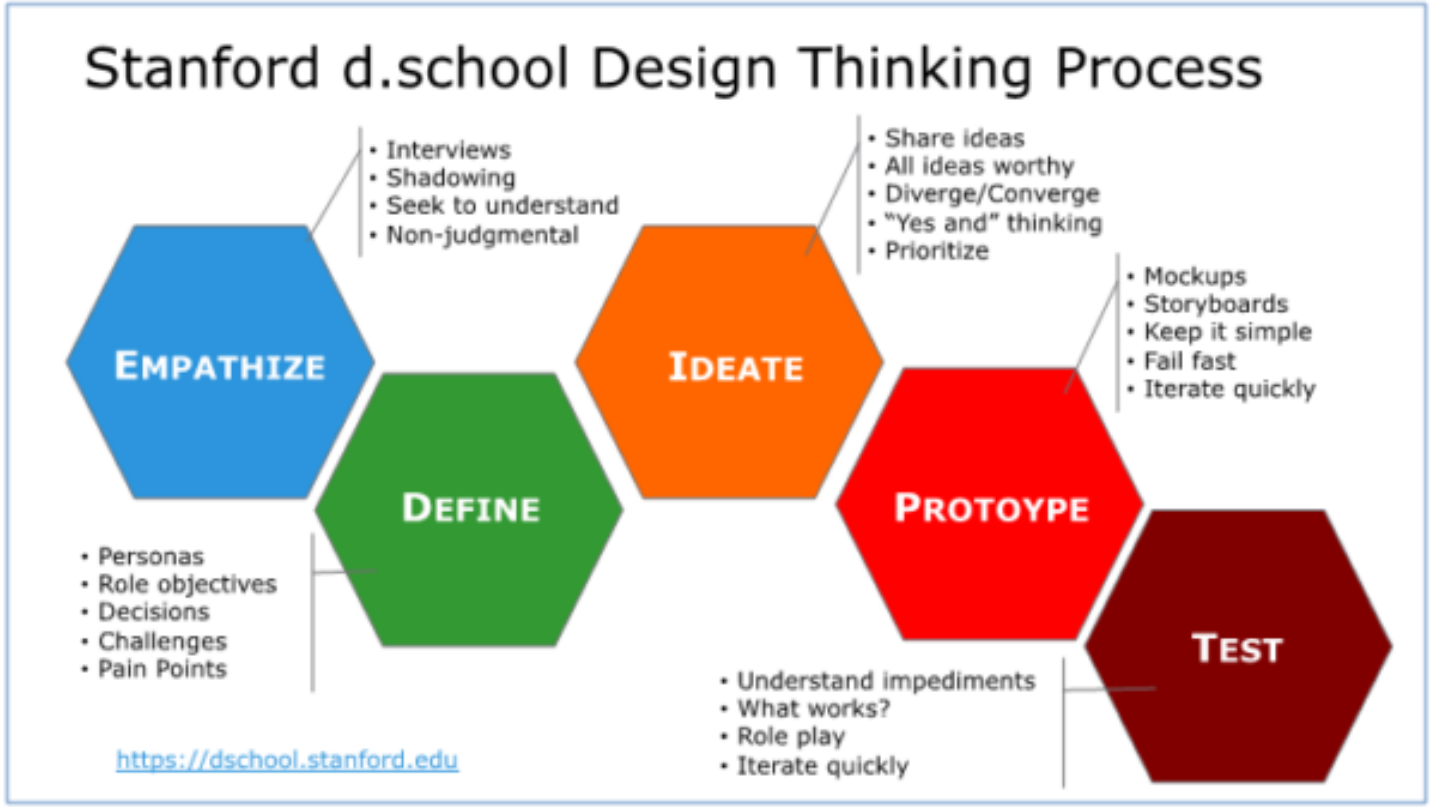
Design Thinking:

Design thinking is a process for creative problem solving. *Design thinking* has a human-centered core. It encourages organizations to focus on the people they're creating for, which leads to better products, services, and internal processes.



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Design Thinking:

1. *The main goal of this technique is to reduce firms 'own subjectivity bias in product design.*
2. *The main result is a better understanding of customer needs and pains. The prototype in Design Thinking is used to test potential functionality required by the customer, while the actual solution might be quite different from the prototype in the Design Thinking methodology. Firms focus on*
3. *It combines cognitive divergence stages (Empathize, Ideation, Testing) with cognitive convergence stages (Desk Research, Define, Prototype).*
4. *It requires multidisciplinary teams to reduce subjectivity bias.*
5. *It is an iterative process. Once a first sprint is finished with product testing, the firm should start over again from Desk Research. In case, there is no enough time or budget, iterations can be limited to Ideation, Prototyping and Testing stages.*
6. *It is based on flat hierarchies (no bosses, but team coordinators), to promote creativity and free speech.*
7. *It is based on visual thinking to promote more creative and focused discussions.*

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Reverse Engineering is a systematic methodology for analyzing the design of an existing device or system, either as an approach to study the design or as a prerequisite for re-design.

Reverse Engineering develops a systematic approach to thinking about the engineering design of devices and systems and creates a mental data bank of mechanical design solutions.

Reverse Engineering has Four steps:

- System-Wide Analysis: Customer requirements (Typically obtained from Design Thinking Processes)
- Subsystem Dissection Analysis: Functional specifications and physical/maths principles.
- Individual Component Analysis: Functional specifications and physical/maths principles as wells as material selection and manufacturing process (Firm will build a Bill of Materials).
- Suggest alternative designs, systems, components, materials.

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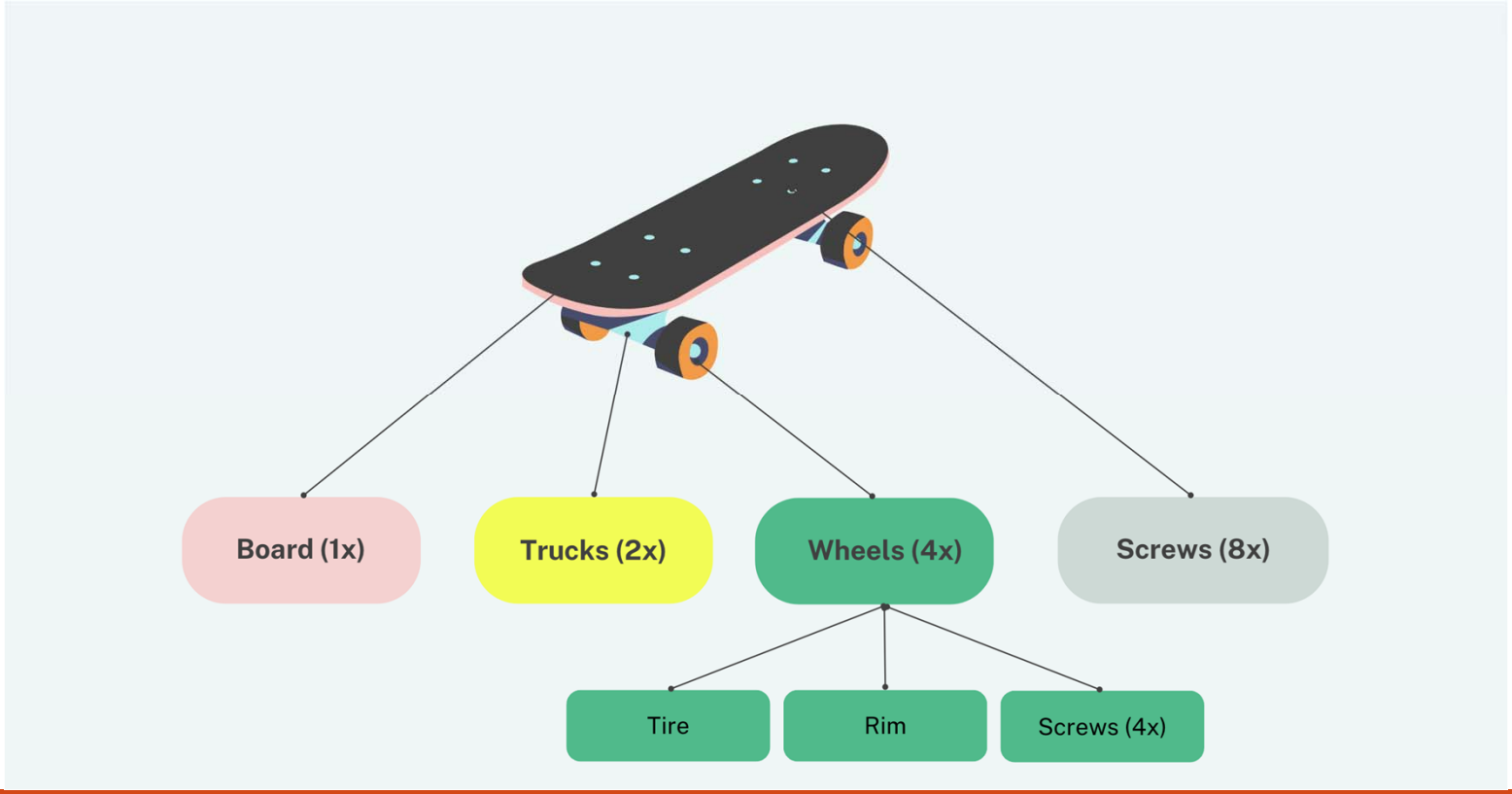
BILL OF MATERIALS WOULD BE ONE OUTCOME OF REVERSE ENGINEERING



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Qualify Function Deployment is a process and set of tools used to effectively transform customer requirements into detailed engineering specifications and plans to produce the products that fulfill those requirements. The steps are:

1. ***Identify customer wants (Design Thinking)***
2. ***Identify how the good/service will satisfy customer wants (describe Product Components obtained through Reverse Engineering)***
3. ***Relate customer wants to product hows***
4. ***Identify relationships between the firm's hows***
5. ***Develop importance ratings***
6. ***Evaluate competing products***
7. ***Compare performance to desirable technical attributes***

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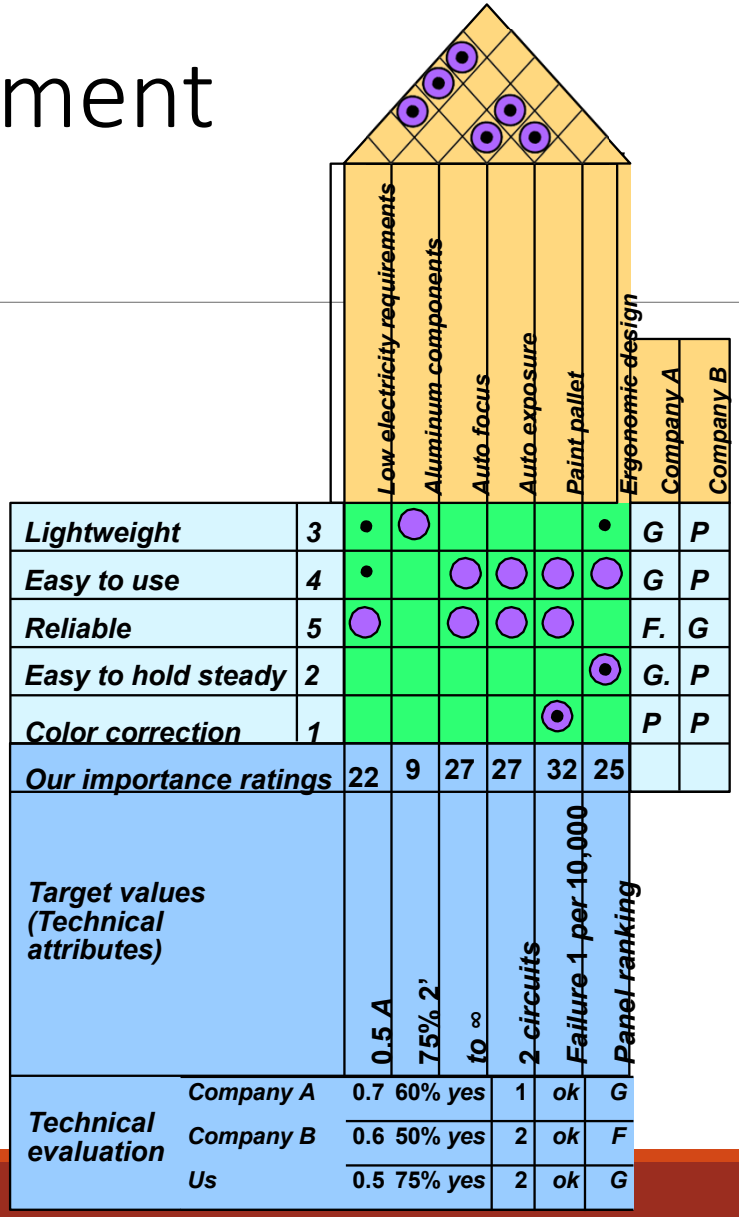
Example of QFD



		Low electricity requirements	Aluminum components	Auto focus	Auto exposure	Paint pallet	Ergonomic design	Company A	Company B
Lightweight	3	•	○				•	G	P
Easy to use	4	•		○	○	○	○	G	P
Reliable	5	○		○	○	○		F.	G
Easy to hold steady	2						◎	G.	P
Color correction	1					◎		P	P
Our importance ratings		22	9	27	27	32	25		
Target values (Technical attributes)		0.5 A	75% 2'	to ∞	2 circuits	Failure 1 per 10,000	Panel ranking		
Technical evaluation	Company A	0.7	60%	yes	1	ok	G		
	Company B	0.6	50%	yes	2	ok	F		
	Us	0.5	75%	yes	2	ok	G		

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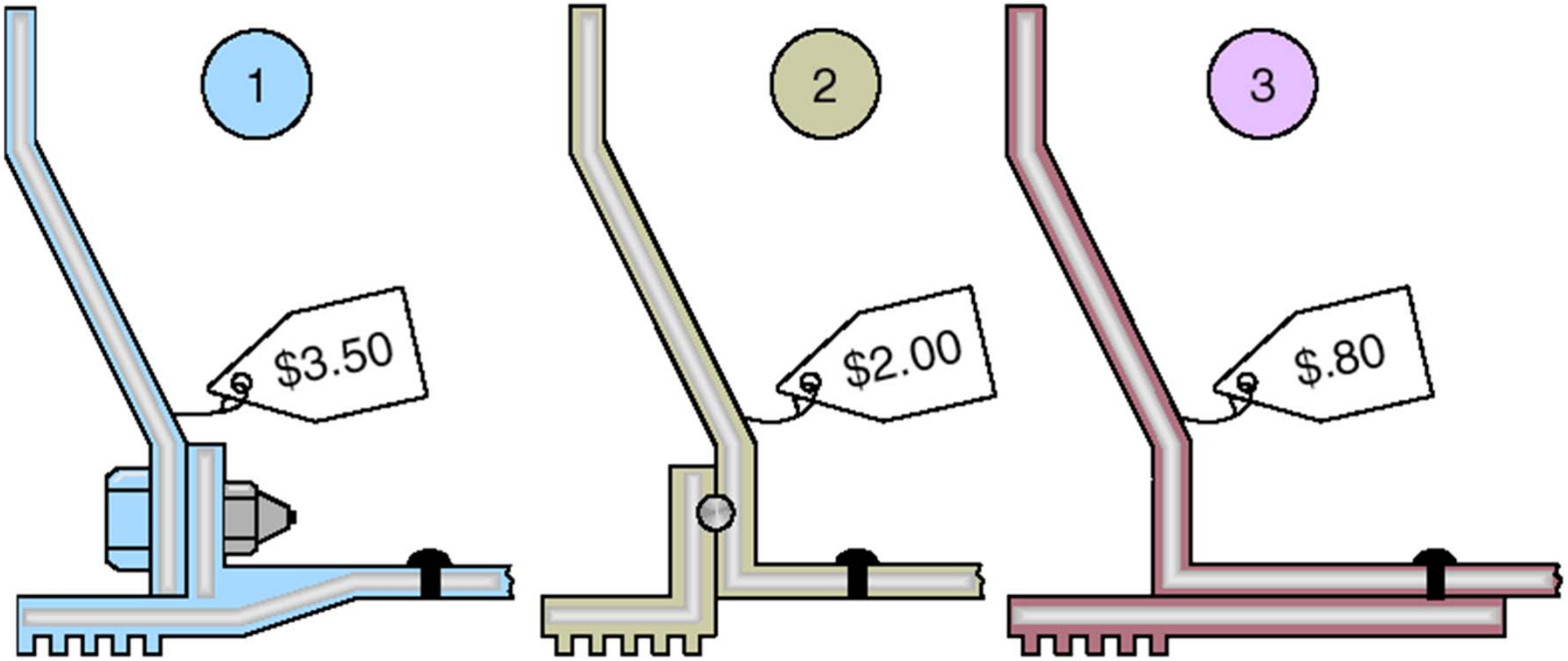

VALUE ENGINEERING: Reducing the number of components and materials required to produce a product

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Advantages of Value Engineering

1. ***Reduced complexity of products***
2. ***Additional standardization of products***
3. ***Improved functional aspects of product***
4. ***Improved job design and job safety***
5. ***Improved maintainability (serviceability) of the product***
6. ***Robust design***

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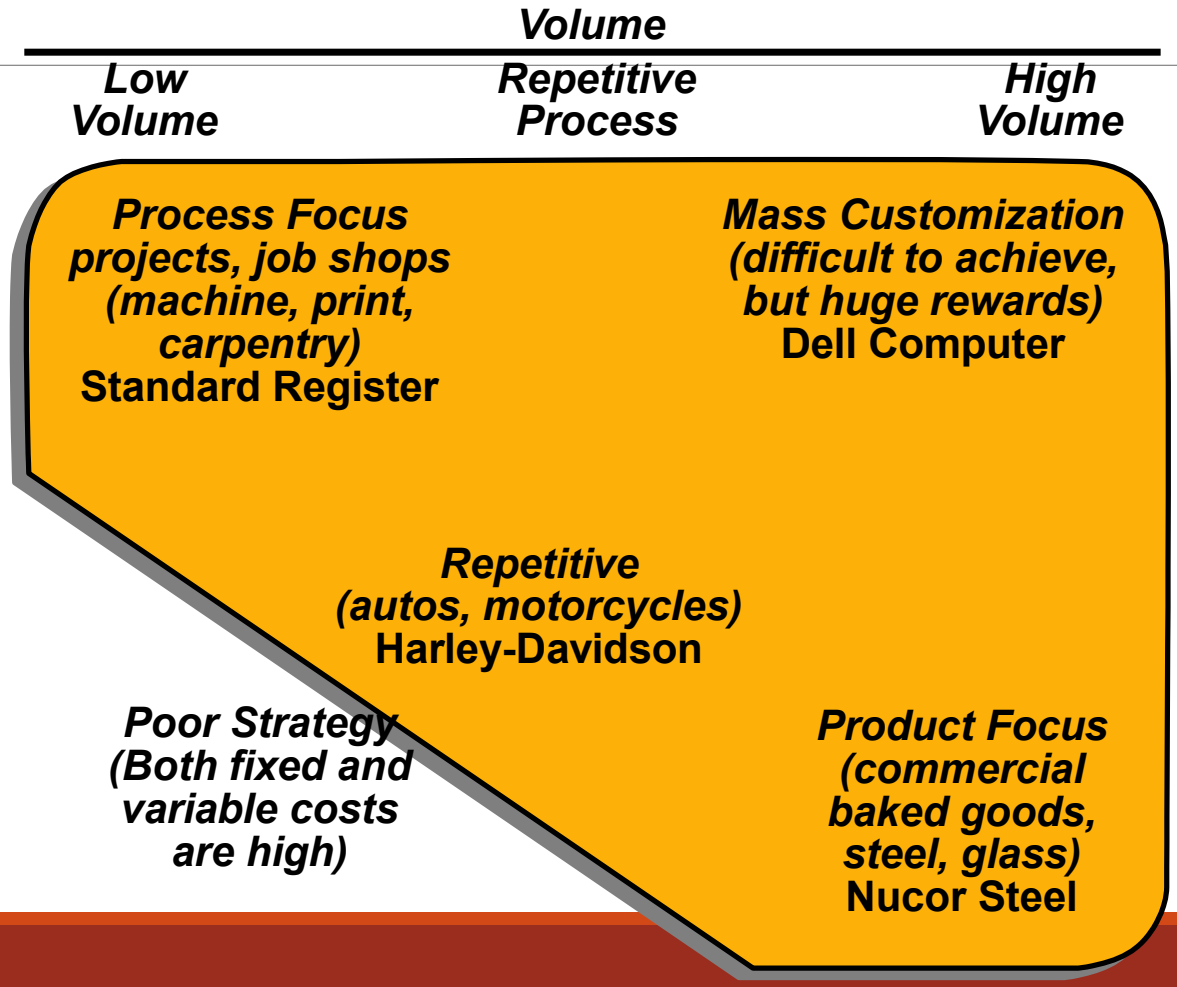
LESSON 4

PRODUCT MANAGERS NEED TO UNDERSTAND THE IMPLICATIONS OF HOW THEIR PRODUCT IS BEING MANUFACTURED

PRODUCT-PROCESS MATRIX



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Goals of Process Design:

How to produce a product or provide a service that

Meets or exceeds customer requirements

Meets cost and managerial goals

Has long term effects on

Efficiency and production flexibility

Costs and quality

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Two basic strategies

Process focus

Product focus

Within these basic strategies there are many ways they may be implemented

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Process Focus (Low volume, high variety)	Repetitive Focus (Modular)	Product Focus (High-volume, low-variety)	Mass Customization (High-volume, high-variety)
Small quantity, large variety of products	Long runs, standardized product made from modules	Large quantity, small variety of products	Large quantity, large variety of products
General purpose equipment	Special equipment aids in use of assembly line	Special purpose equipment	Rapid changeover on flexible equipment

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Process Focus (Low volume, high variety)	Repetitive Focus (Modular)	Product Focus (High-volume, low-variety)	Mass Customization (High-volume, high-variety)
Operators are broadly skilled	Employees are modestly trained	Operators are less broadly skilled	Flexible operators are trained for the necessary customization
Many job instructions as each job changes	Repetition reduces training and changes in job instructions	Few work orders and job instructions because jobs standardized	Custom orders require many job instructions

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Process Focus (Low volume, high variety)	Repetitive Focus (Modular)	Product Focus (High-volume, low-variety)	Mass Customization (High-volume, high-variety)
Raw material inventories high	JIT procurement techniques used	Raw material inventories are low	Raw material inventories are low
Work-in-process is high	JIT inventory techniques used	Work-in-process inventory is low	Work-in-process inventory driven down by JIT, lean production

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Process Focus (Low volume, high variety)	Repetitive Focus (Modular)	Product Focus (High-volume, low-variety)	Mass Customization (High-volume, high-variety)
Units move slowly through the plant	Movement is measured in hours and days	Swift movement of unit through the facility is typical	Goods move swiftly through the facility
Finished goods made to order	Finished goods made to frequent forecast	Finished goods made to forecast and stored	Finished goods often build-to-order (BTO)

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Process Focus (Low volume, high variety)	Repetitive Focus (Modular)	Product Focus (High-volume, low-variety)	Mass Customization (High-volume, high-variety)
Scheduling is complex, trade-offs between inventory, availability, customer service	Scheduling based on building various models from a variety of modules to forecasts	Relatively simple scheduling, establishing output rate to meet forecasts	Sophisticated scheduling required to accommodate custom orders

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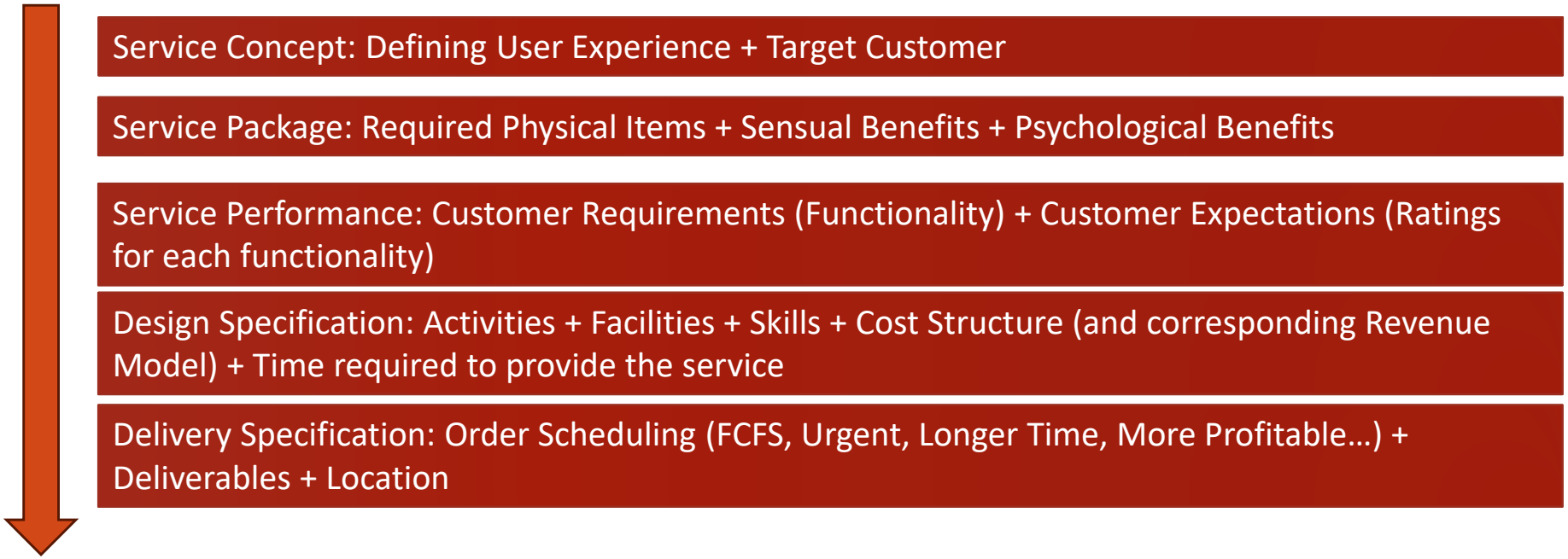
Process Focus (Low volume, high variety)	Repetitive Focus (Modular)	Product Focus (High-volume, low-variety)	Mass Customization (High-volume, high-variety)
Fixed costs low, variable costs high	Fixed costs dependent on flexibility of the facility	Fixed costs high, variable costs low	Fixed costs high, variable costs must be low
Costing estimated before job, known only after the job	Costs usually known due to extensive experience	High fixed costs mean costs dependent on utilization of capacity	High fixed costs and dynamic variable costs make costing a challenge

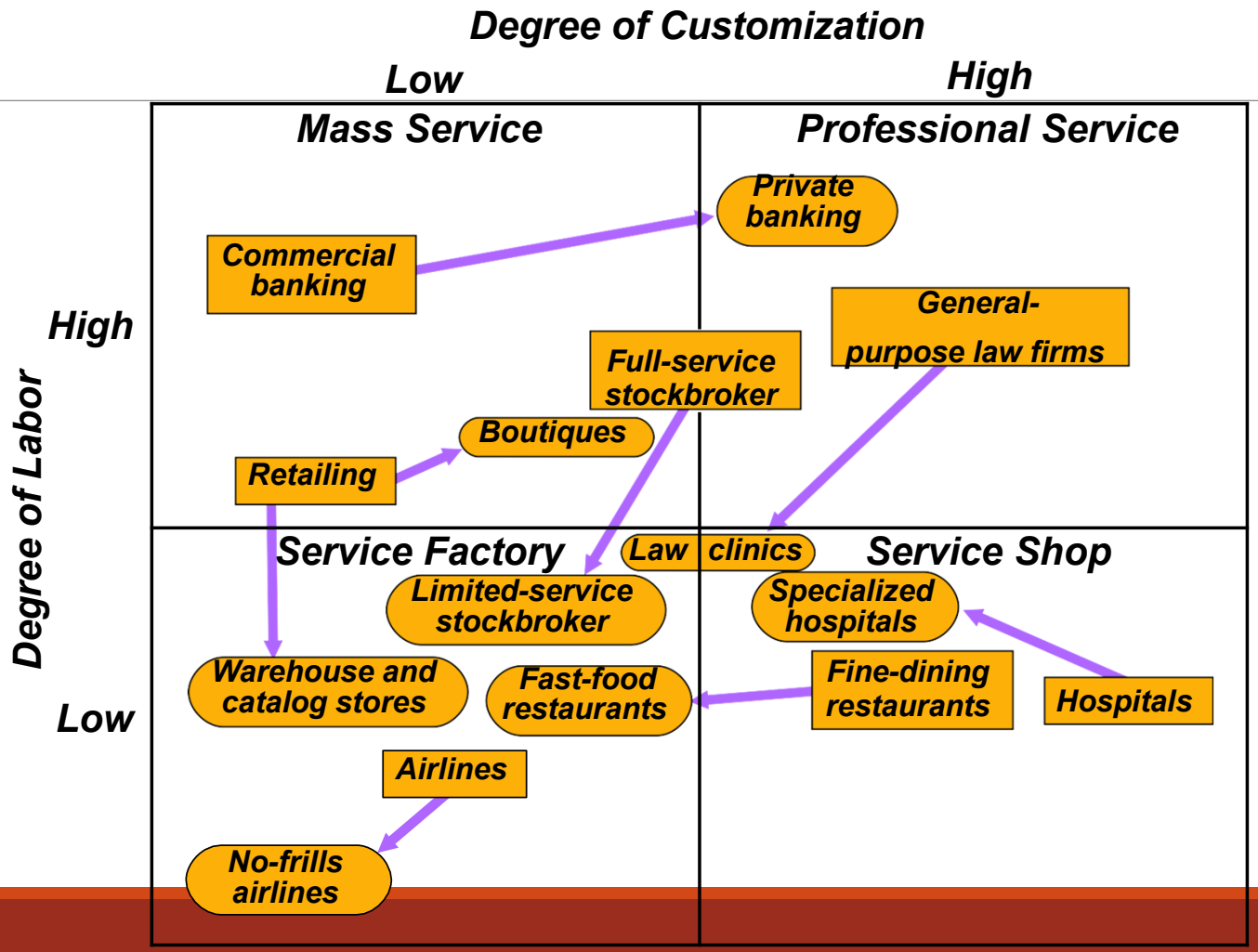
LESSON 5

PRODUCT MANAGERS NEED TO UNDERSTAND THE MAIN DIFFERENCES IN DESIGNING A PRODUCT AND A SERVICE

Service Design Process



SERVICE-PROCESS MATRIX



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Mass Service and Professional Service

- ***Labor involvement is high***
- ***Selection and training highly important***
- ***Focus on human resources***
- ***Personalized services***
- ***Relevant Front-office processes***

Service Factory and Service Shop

- ***Automation of standardized services***
- ***Low labor intensity responds well to process technology and scheduling***
- ***Tight control required to maintain standards***
- ***Relevant Back-office processes***