

PRODUCT DEVELOPMENT PROCESS: COMMERCIALIZATION

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Product Development Technology Station

Summer School, 6-9 March 2023

Inspired to help people

Product Development Process

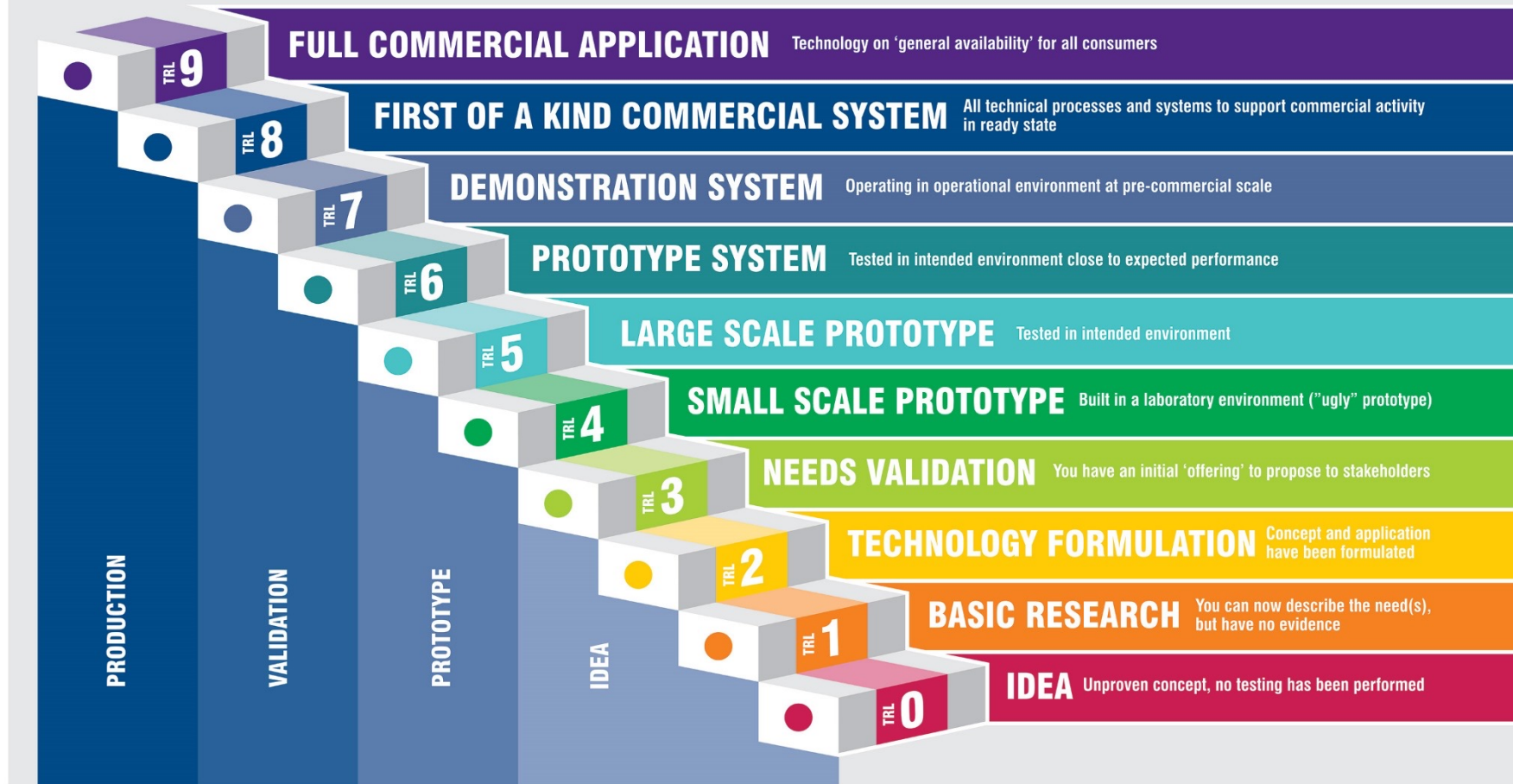


Product Development Process



TECHNOLOGY READINESS LEVELS

How technology ready is your service/product?



PDTS MEDICAL
DEVICE PRODUCT DEVELOPMENT

Inspired to help people

COMMERCIALIZATION

What does commercialization encompass?

- Intellectual property
- Business registration
- Corporate identity
- Branding
- Packaging design
- Manufacturing
- Manufacturing value chain management
- Marketing



PRODUCT DEVELOPMENT



SMALL BATCH INJECTION MOULDING



GRAPHIC DESIGN AND BRANDING



TRAINING



MEDICAL ASSISTIVE DEVICE DEVELOPMENT



MACHINE AND PROCESS DEVELOPMENT



CNC MACHINING



PROTOTYPE DEVELOPMENT

Intellectual property

“Intellectual property refers to creations of the mind, such as inventions; literary and artistic works; designs; and symbols, names and images used in commerce” -

World Intellectual Property Organization

How to protect your IP:

- Patent
- Design registration ®
- Trademark ™
- Copyright ©
- Trade secret



Intellectual property: Patent

A patent grants the holder exclusive rights to decide how or if the IP can be used by others.

Advantages:

- Provides security
- Creates equity
- Intangible asset

Disadvantages:

- Limited time valid (20 years)
- Region bound
- IP publicly disclosed
- High registration & lawyer fees



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(12) **Patent Application Publication** (10) **Pub. No.: US 2018/0152549 A1**
Hobson et al. (43) **Pub. Date: May 31, 2018**

(54) **HANDBELD ELECTRONIC DEVICE WITH CABLE GROUNDING**

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(73) Assignee: **Apple Inc.**, Cupertino, CA (US)

(21) Appl. No.: **15882,010**

(22) Filed: **Jan. 29, 2018**

Related U.S. Application Data

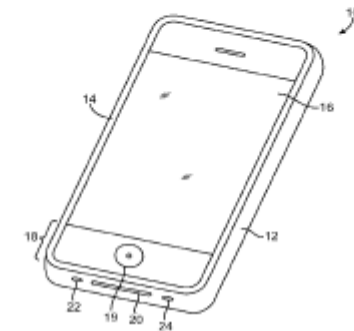
(63) Continuation of application No. 14/266,570, filed on Apr. 30, 2014, which is a continuation of application No. 14/158,403, filed on Jan. 17, 2014, which is a continuation of application No. 13/021,689, filed on Feb. 4, 2011, now Pat. No. 8,681,056, which is a continuation of application No. 11/821,329, filed on Jun. 21, 2007, now Pat. No. 7,889,139.

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CPC **H04M 1/0202** (2013.01); **H01Q 1/243** (2013.01); **H01Q 9/0421** (2013.01); **H04M 1/0266** (2013.01); **H05K 5/0247** (2013.01)

(57) ABSTRACT

A handheld electronic device may be provided that contains a conductive housing and other conductive elements. The conductive elements may form an antenna ground plane. One or more antennas for the handheld electronic device may be formed from the ground plane and one or more associated antenna resonating elements. Transceiver circuitry may be connected to the resonating elements by transmission lines such as coaxial cables. Ferrules may be crimped to the coaxial cables. A bracket with extending members may be crimped over the ferrules to ground the coaxial cables to the housing and other conductive elements in the ground plane. The ground plane may contain an antenna slot. A dock connector and flex circuit may overlap the slot in a way that does not affect the resonant frequency of the slot. Electrical components may be isolated from the antenna using isolation elements such as inductors and resistors.



Intellectual property: Design registration

A design registration may consist of two dimensional patterns and lines or three dimensional features.

Advantages:

- Provides security
- Creates equity
- Intangible asset

Disadvantages:

- Large scope for variation



TU Delft

Intellectual property: Trademark

A trademark is a sign which distinguishes one product/service from another.

Trademarks can be:

- Words
- Letters
- Numbers
- Drawings
- Symbols
- 3D shapes
- Sounds
- Fragrances
- Colours
- etc.



TM VS ®

™ denotes a trademark that has **not** been registered

® denotes a **registered** trademark

Intellectual property: Copyright

Copyright is a term describing the rights of creators to protect their literary or artistic works.

Copyright works include:

- Books
- Images
- Music
- Paintings
- Sculpture
- Films
- Computer programs
- Advertisements
- Maps
- etc.

Thief stealing a laptop computer Stock Photo by ©AndreyPopov 18926903

Images may be subject to copyright. [Learn More](#)



Intellectual property: Trade secret

What qualifies as a trade secret?

- Information must be **valuable**
- Known only to a **small number of persons**
- Steps should be taken to **keep** information secret

Advantages:

- Provides high level of security
- Ensures durable competitive advantage

Disadvantages:

- Strict agreements in place
- Costly to keep secret (espionage)
- Possibility of reverse engineering



Coca Cola recipe



KFC Spice mix

Business registration

Why register a business?

- Financial assistance – business loan/government funding
- Business name protection
- Tax benefits stupid!



Companies and Intellectual property Commission

www.cipc.co.za

Corporate Identity & Branding

Corporate identity is a visual representation of the company

Branding is the process of creating this visual representation

Consult a Graphic Designer for branding and Corporate Identity

www.pdts.co.za

Corporate Identity & Branding

What is in a logo?



Corporate Identity & Branding

What is in a logo?



→ Playful

Corporate Identity & Branding

What is in a logo?



Corporate Identity & Branding

What is in a logo?



→ Playful →



Corporate Identity & Branding

What is in a logo?



→ Playful →



→ Serious

Corporate Identity & Branding

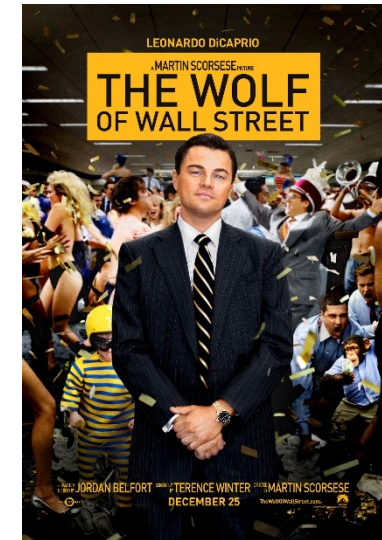
What is in a logo?



→ Playful →



→ Serious →

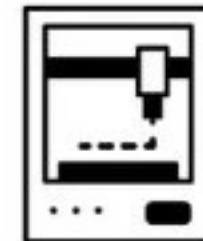


Manufacturing

Determining the appropriate manufacturing process

What to keep in mind:

- Market capitalization
- Intended use
 - Functionality
 - Materials
 - Regulatory
- Overall size of the device
- Break-even analysis



Market capitalization

How to estimate market size:

1. Define your target customer

- For whom is this product **specifically** designed

2. Estimate the number of target customers

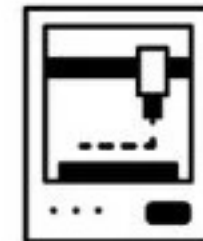
- Use **public databases** to determine customer base

3. Determine penetration rate

- **High penetration** – mandated by law/regulations
- **Low penetration** – specialized purpose

4. Calculate market volume

- *Market volume = Number of target customers × Penetration rate*



Market capitalization

How to estimate market size:

1. Define your target customer

1. For whom is this device **specifically** designed = Dentists in the Free State

2. Estimate the number of target customers

1. Use **public databases** to determine customer base = 84 dentist in FS (GEMS) \approx 252

3. Determine penetration rate

1. **High penetration** – mandated by law/regulations

2. **Low penetration** – specialized purpose = Low penetration ie. 25%

4. Calculate market volume

1. *Market volume = Number of target customers \times Penetration rate*

= $252 \times 0,25$

= 63 market cap

Intended use

1

Functionality

- How should it function?
- For how long should it function?

2

Materials

- What materials will be used?
- What is the material's environmental impact?

3

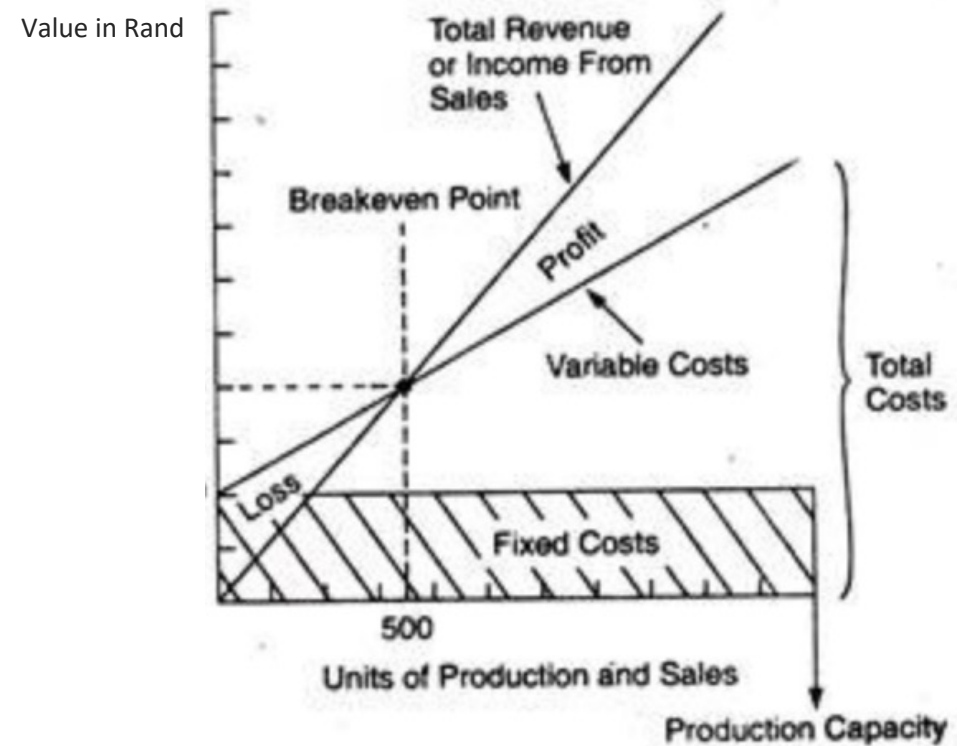
Regulatory

- Are certain laws or regulations applicable?

Break-even analysis

The Break-even analysis is a technique used to determine the point at which a project will cover its costs.

$$\begin{aligned}\text{Break-even point} &= \frac{\text{Total fixed costs}}{\text{Price per unit} - \text{Variable cost per unit}} \\ &= \frac{R10\,000}{(R40 - R20)} \\ &= 500 \text{ units}\end{aligned}$$



Adapted from: <https://www.businessmanagementideas.com/>

Break-even analysis

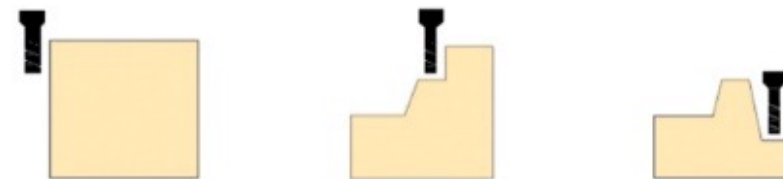
Strategies to lower manufacturing costs:

- Reduce the lead time of manufacturing
- Reduce the total number of parts
- Try to eliminate assembly of items
- Apply Just-in-time (JIT) manufacturing techniques
- Use cost effective materials
- Use the correct manufacturing process

Manufacturing techniques

Subtractive manufacturing:

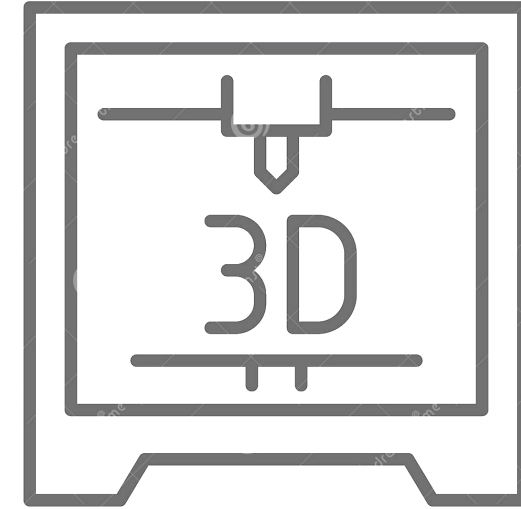
- Lathe
- Mill (3-axis to 5-axis)
- Turn-mill
- Wire EDM
- Spark EDM
- Surface grinding
- Plastic injection moulding
- Metal injection moulding
- Plate laser cutter
- Tube laser cutter
- Tube bender
- Casting
- Vacuum forming
- Vacuum casting
- Welding
- Punching
- Drilling
- Metal stamping
- Rolling



Additive manufacturing

Additive manufacturing:

- Powder based
 - Direct metal laser sintering
 - Selective laser sintering
 - Selective laser melting
- Liquid based
 - Stereolithography
- Solid based
 - Fused deposition modelling
 - Wire and arc additive manufacturing



3D PRINTER

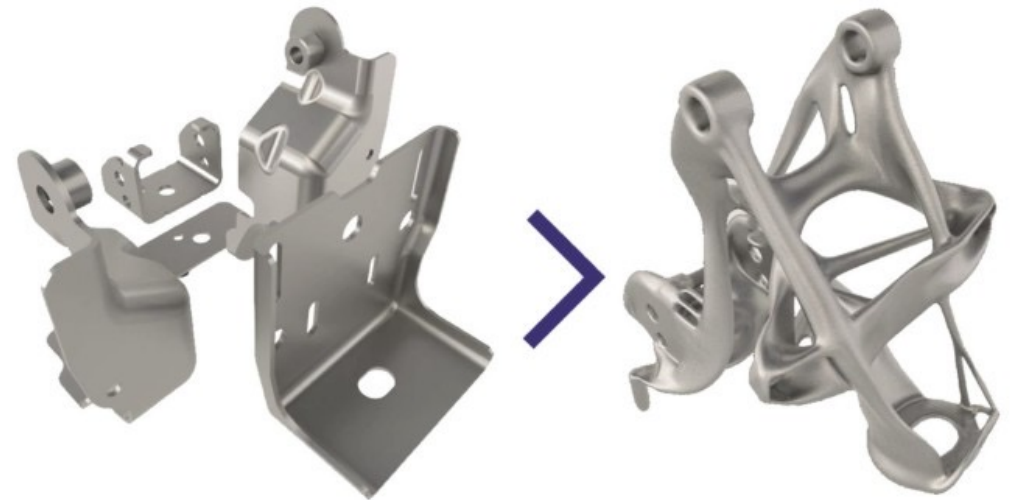
Additive manufacturing

Advantages:

- Short lead time (24h)
- Part consolidation
- Batch size control (JIT)
- Complex shape manufacturing
- Reduced material waste
- Reduced part weight
- Assembled parts

Disadvantages:

- May require post-processing
- Expensive
- Limited part size



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PDTs MEDICAL

DEVICE PRODUCT DEVELOPMENT

Inspired to help people

THANK YOU

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