

# School of Mechanical Engineering

Course Code : BTME3056

Course Name: Product Design

## Product Planning

GALGOTIAS  
UNIVERSITY

Name of the Faculty: Mr.Lavepreet Singh

Program Name: B.Tech(ME)

# Product Planning

GALGOTIAS  
UNIVERSITY

# Product Development Process

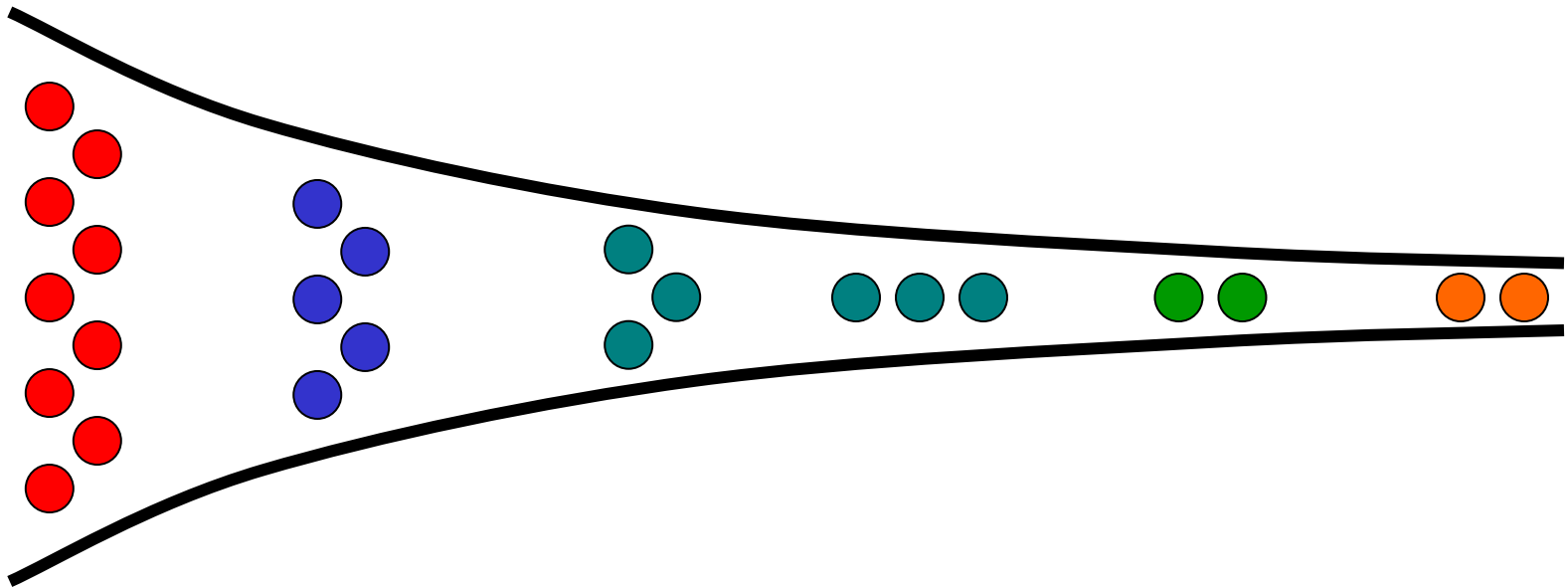
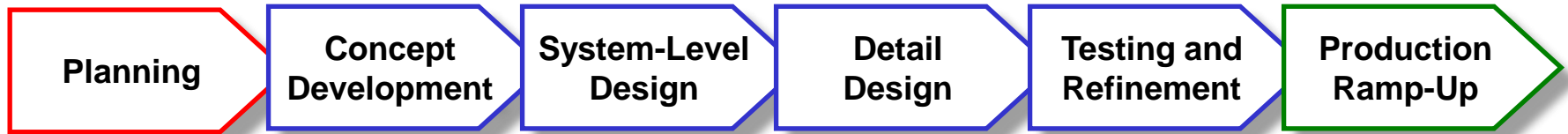


The product planning phase precedes the PD process and determines which PD projects are initiated.

# Principles of Product Planning

- Sources of product opportunities
- Opportunity tournaments and filtering
- Downselection (funneling) during PD
- Platform development
- Technology evolution
- Project portfolio balancing
- Resource allocation
- Project launch

# Project Downselection: The PD Process Funnel



# Chapter Example

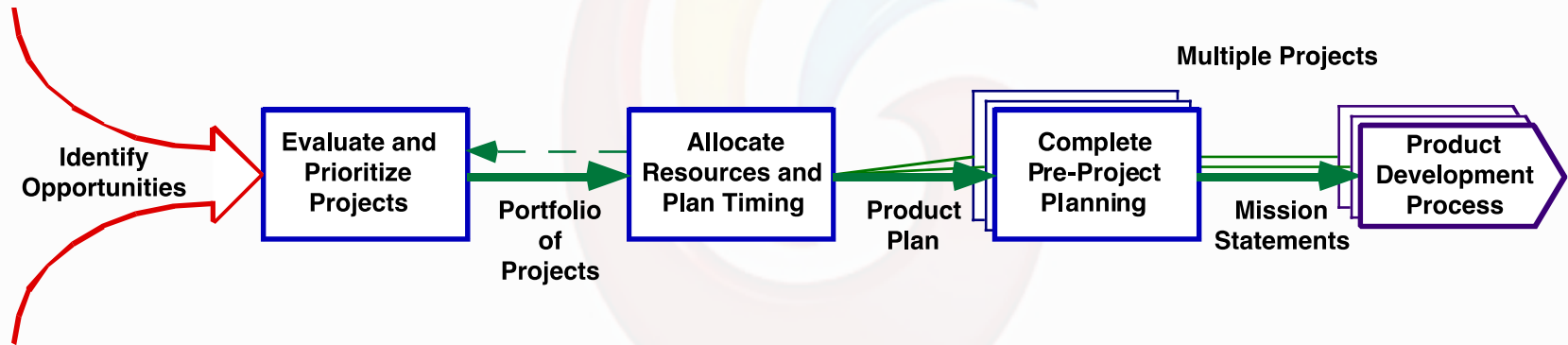


Shark IONFlex

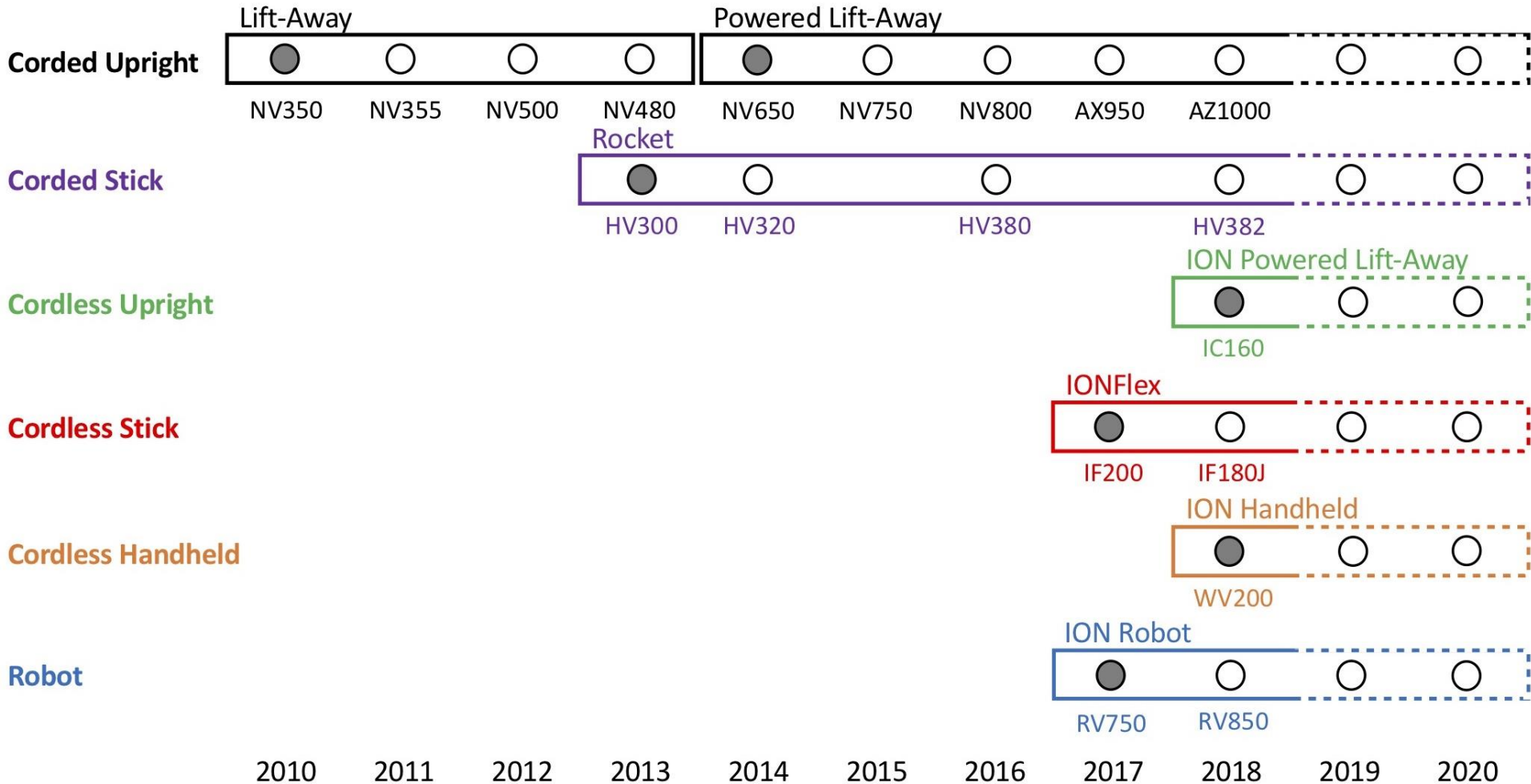


Shark ION Powered Lift-Away

# The Product Planning Process

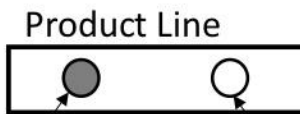


# A Product Plan



## Legend

### Category



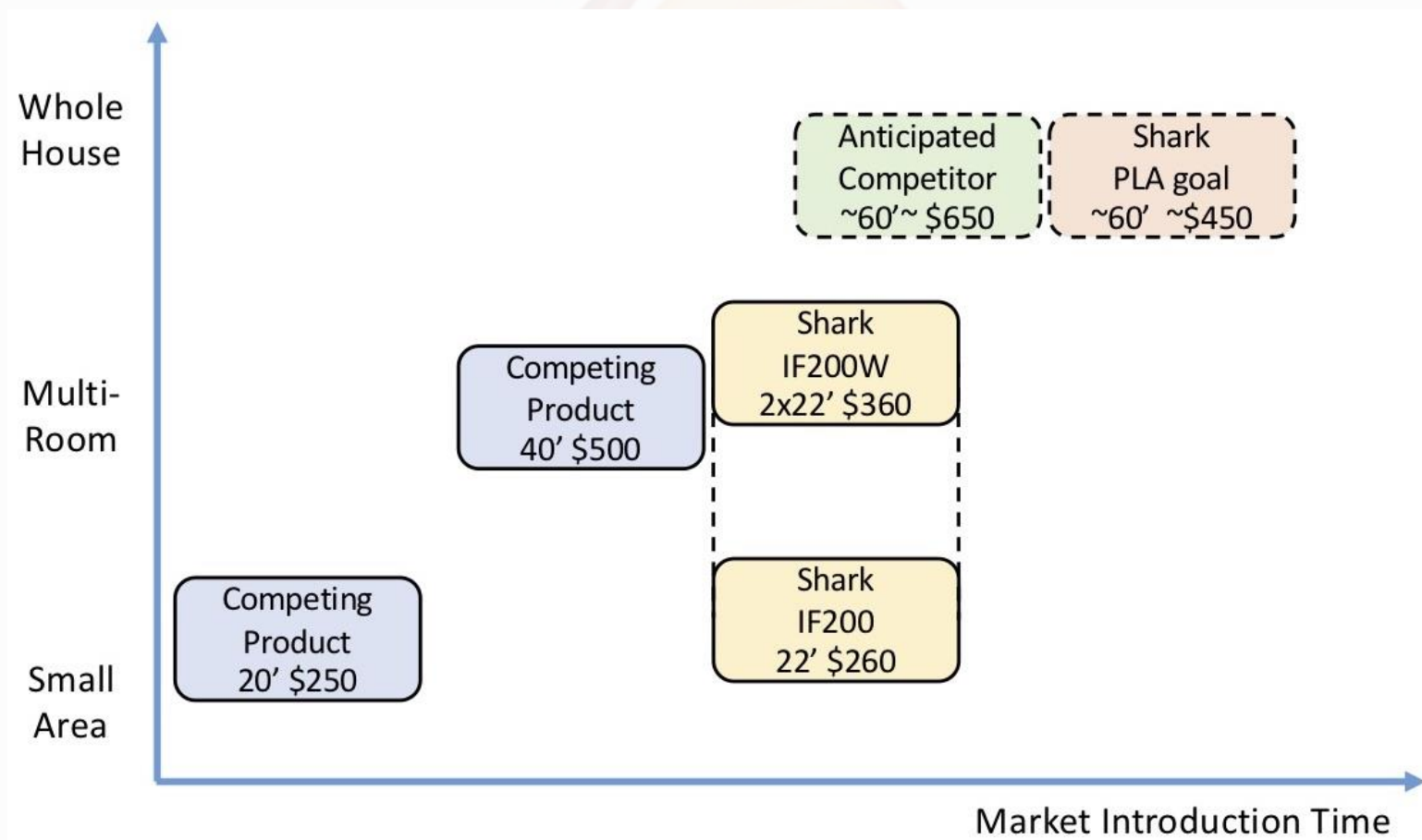
new platform release

Model #s

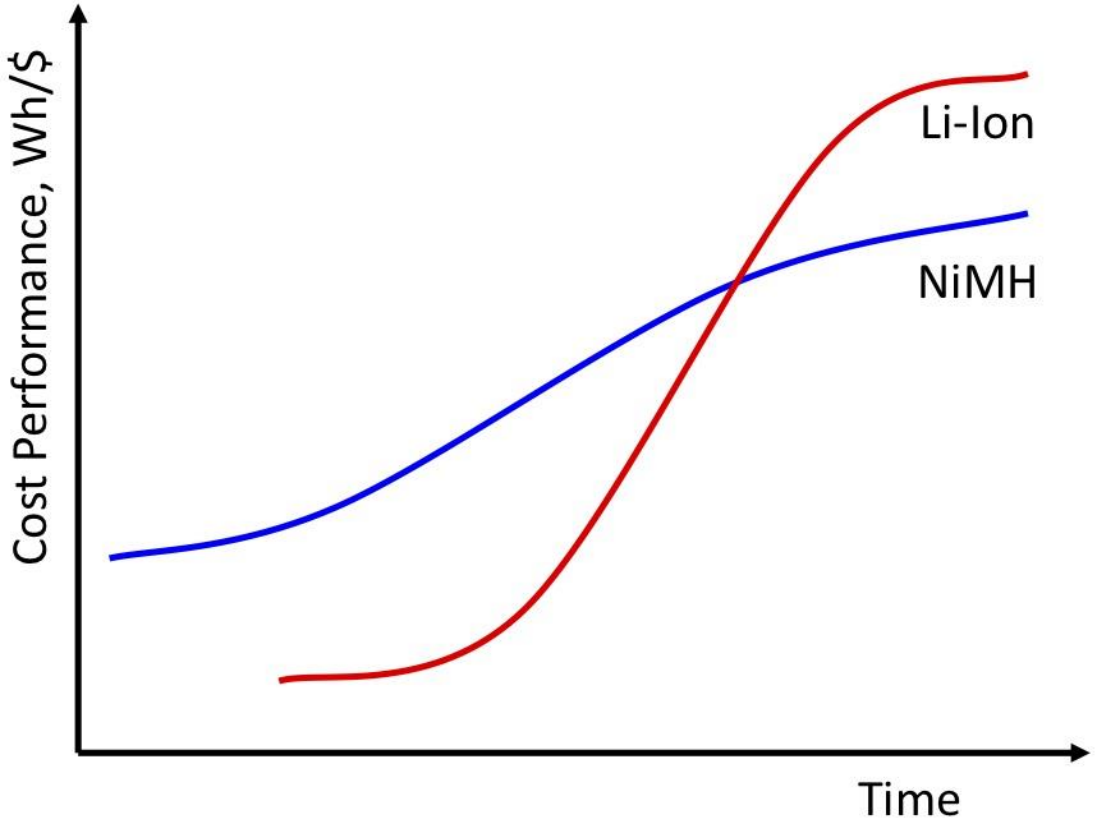
derivative product release



# Market Segment Map



# Technology S-Curves

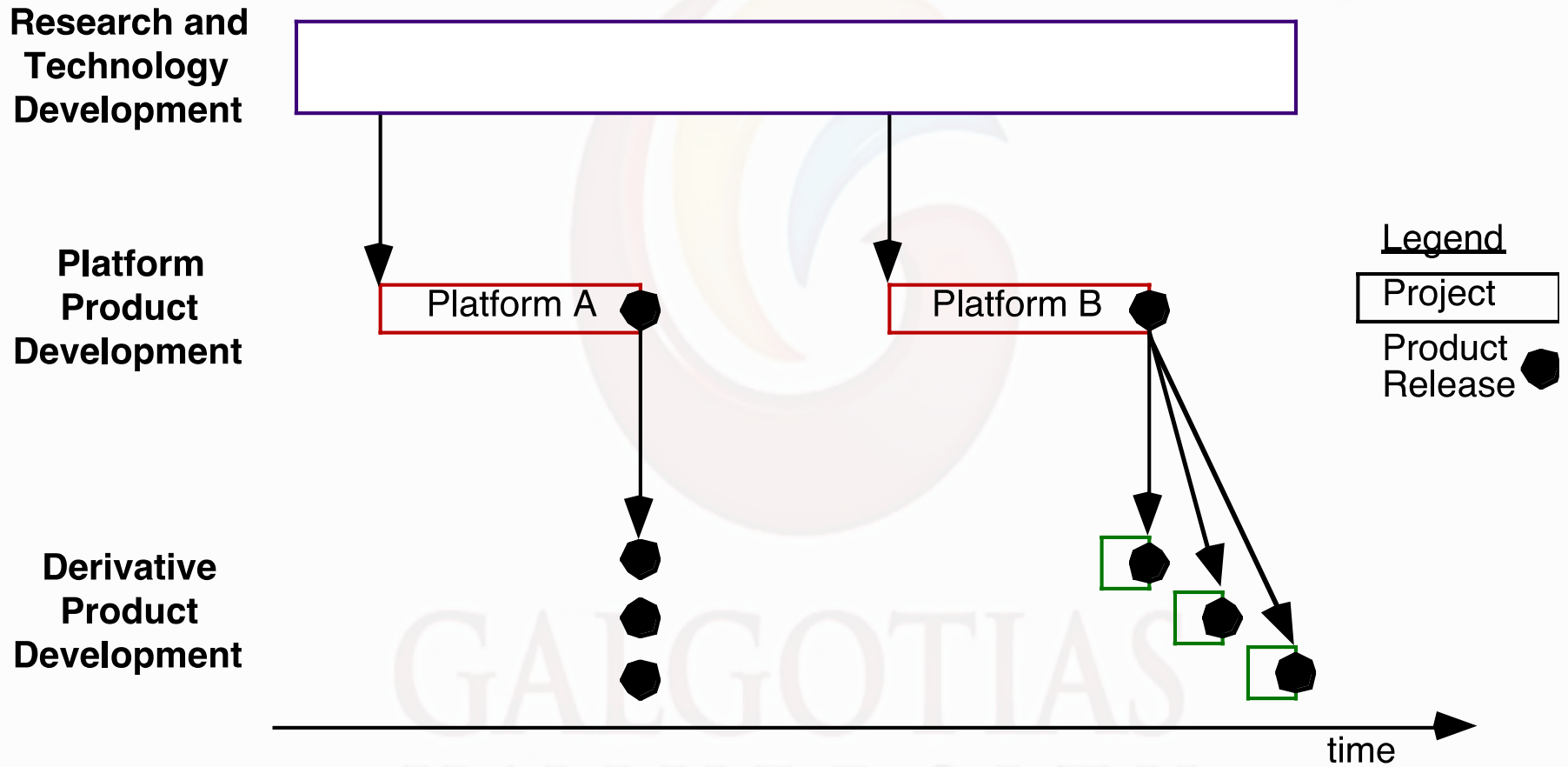


UNIVERSITY

# Product-Technology Roadmap

| Sub-Systems           | Technologies  |                               |  |                         |
|-----------------------|---|-------------------------------|--|-------------------------|
| Battery               | Li-Ion battery pack<br>7 cells, 2.5 Ah                      | Cooled Li-Ion<br>8 cells, 3Ah | New battery chemistry  |                         |
| Motor                 | Brushless DC<br>High efficiency                             | Brushless DC<br>Low noise     | Brushless DC<br>High efficiency  | Higher efficiency       |
| Separation Technology | Cyclone   | Cyclone with HEPA             | Cyclone with HEPA  | Next-generation cyclone |
| Dust Cup              | 0.3L capacity   | 0.2L capacity                 | 0.5L capacity  | TBD                     |
| Cleaning Head         | DuoClean 2.0<br>Standard width                              | DuoClean 2.5<br>Narrow width  | DuoClean 2.0<br>Standard width   | Next-generation nozzle  |
| Convenience Features  | Removable hand vac,<br>MultiFlex wand,<br>Swappable battery |                               | Lift-away pod with powered hose,<br>Swappable battery,<br>Charging options | TBD                     |
|                       | Stick USA   | Stick Japan                   | Powered Lift-Away  | Future Cordless         |
|                       | <b>Cordless Vacuum Projects</b>                             |                               |  |                         |

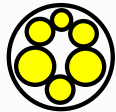
# Platforms vs. Derivatives



# Product-Process Change Matrix

## Extent of Production Process Changes

Research and  
Technology  
Development



New  
Core  
Process

Next  
Generation  
Process

Single  
Department  
Upgrade

Tuning and  
Incremental  
Changes

No  
Process  
Change

Extent of Product Changes

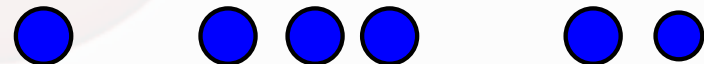
New  
Core  
Product



Next  
Generation  
Product



Addition  
to Product  
Family



Minor  
Product  
Enhancement

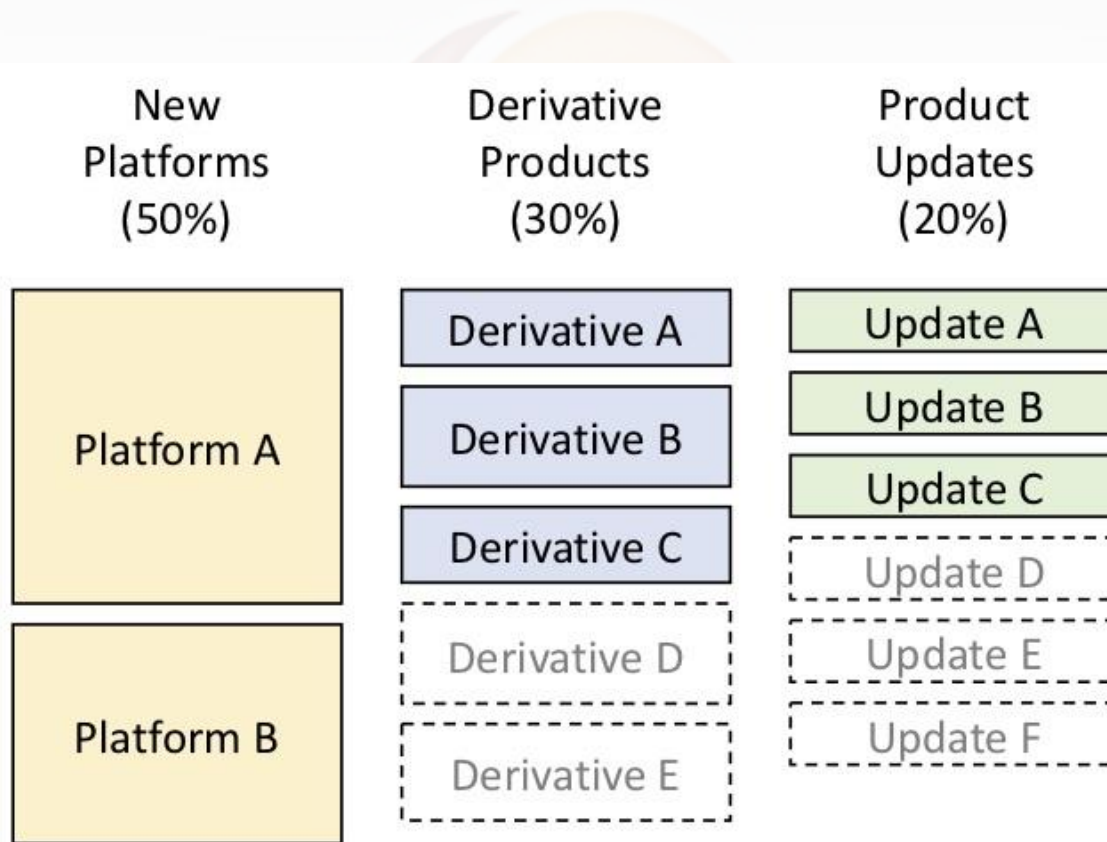


No  
Product  
Change



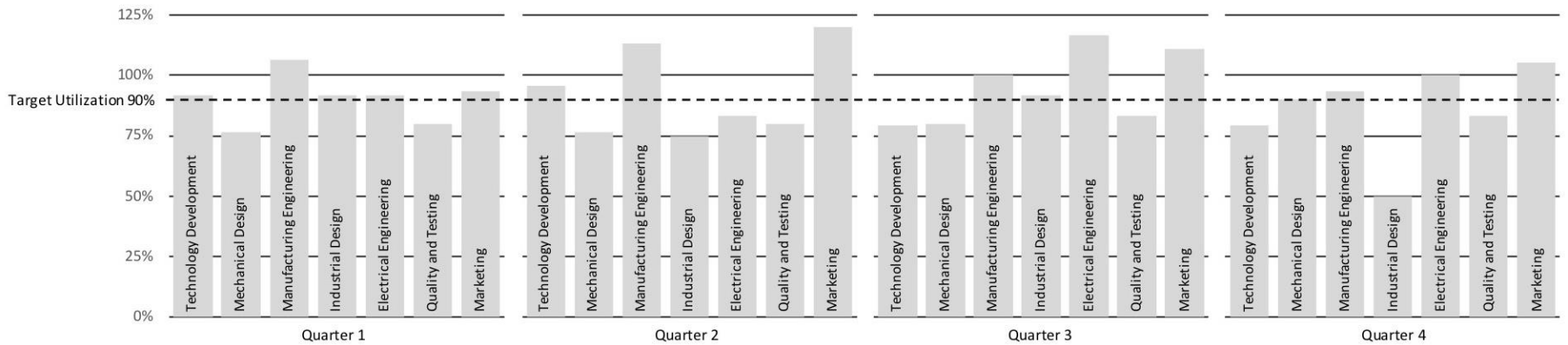
Current  
Product/Process  
Support

# Project Portfolio Planning



# Aggregate Resource Planning

| <i>person-months effort</i> | Quarter 1              |                   |                           |                   |                        |                     |           | Quarter 2              |                   |                           |                   |                        |                     |           | Quarter 3              |                   |                           |                   |                        |                     |           | Quarter 4              |                   |                           |                   |                        |                     |           |
|-----------------------------|------------------------|-------------------|---------------------------|-------------------|------------------------|---------------------|-----------|------------------------|-------------------|---------------------------|-------------------|------------------------|---------------------|-----------|------------------------|-------------------|---------------------------|-------------------|------------------------|---------------------|-----------|------------------------|-------------------|---------------------------|-------------------|------------------------|---------------------|-----------|
|                             | Technology Development | Mechanical Design | Manufacturing Engineering | Industrial Design | Electrical Engineering | Quality and Testing | Marketing | Technology Development | Mechanical Design | Manufacturing Engineering | Industrial Design | Electrical Engineering | Quality and Testing | Marketing | Technology Development | Mechanical Design | Manufacturing Engineering | Industrial Design | Electrical Engineering | Quality and Testing | Marketing | Technology Development | Mechanical Design | Manufacturing Engineering | Industrial Design | Electrical Engineering | Quality and Testing | Marketing |
| Cordless PLA platform       | 6                      | 9                 | 0                         | 1                 | 1                      | 6                   | 1         | 9                      | 12                | 6                         | 2                 | 2                      | 6                   | 3         | 12                     | 15                | 15                        | 6                 | 6                      | 12                  | 6         | 15                     | 21                | 21                        | 6                 | 6                      | 12                  | 6         |
| Stick optimizations         | 9                      | 3                 | 9                         | 1                 | 0                      | 3                   | 2         | 6                      | 3                 | 6                         | 0                 | 2                      | 3                   | 3         | 4                      | 4                 | 3                         | 0                 | 2                      | 3                   | 3         | 4                      | 3                 | 3                         | 0                 | 1                      | 3                   | 3         |
| Japan stick                 | 2                      | 6                 | 9                         | 1                 | 1                      | 6                   | 2         | 1                      | 3                 | 12                        | 1                 | 1                      | 6                   | 3         | 1                      | 1                 | 9                         | 0                 | 1                      | 1                   | 2         | 0                      | 0                 | 3                         | 0                 | 0                      | 1                   | 1         |
| Cordless hand vac           | 2                      | 3                 | 12                        | 2                 | 3                      | 3                   | 3         | 6                      | 3                 | 12                        | 2                 | 2                      | 3                   | 3         | 1                      | 3                 | 9                         | 1                 | 2                      | 3                   | 3         | 0                      | 3                 | 12                        | 0                 | 1                      | 3                   | 3         |
| Cordless upright            | 3                      | 2                 | 18                        | 6                 | 6                      | 6                   | 6         | 1                      | 2                 | 15                        | 4                 | 3                      | 6                   | 6         | 1                      | 1                 | 9                         | 4                 | 3                      | 6                   | 6         | 0                      | 0                 | 3                         | 0                 | 4                      | 6                   | 6         |
| Resource Demand             | 22                     | 23                | 48                        | 11                | 11                     | 24                  | 14        | 23                     | 23                | 51                        | 9                 | 10                     | 24                  | 18        | 19                     | 24                | 45                        | 11                | 14                     | 25                  | 20        | 19                     | 27                | 42                        | 6                 | 12                     | 25                  | 19        |
| Resource Capacity           | 24                     | 30                | 45                        | 12                | 12                     | 30                  | 15        | 24                     | 30                | 45                        | 12                | 12                     | 30                  | 15        | 24                     | 30                | 45                        | 12                | 12                     | 30                  | 18        | 24                     | 30                | 45                        | 12                | 12                     | 30                  | 18        |
| Capacity Utilization        | 92%                    | 77%               | 107%                      | 92%               | 92%                    | 80%                 | 93%       | 96%                    | 77%               | 113%                      | 75%               | 83%                    | 80%                 | 120%      | 79%                    | 80%               | 100%                      | 92%               | 117%                   | 83%                 | 111%      | 79%                    | 90%               | 93%                       | 50%               | 100%                   | 83%                 | 106%      |



UNIVERSITY

## Mission Statement: Cordless Powered Lift-Away Vacuum

### Product Description

- New powered lift-away cordless upright vacuum platform for whole-house cleaning

### Benefit Proposition

- Large battery capacity and dust cup suitable for multi-room and whole-house cleaning
- Swappable battery pack, with multiple charging options including a charging stand
- Powered lift-away form factor for convenient floor and detail cleaning

### Key Business Goals

- Launch in Fall, 2018
- Competitive pricing allowing for target sales volume and margins
- Consistent 5-star customer reviews
- Grow cordless market share and segment penetration

### Primary Market

- US household multi-room and whole house cleaning

### Assumptions and Constraints

- Swappable lithium-ion battery pack
- Upright form factor with lift-away pod
- Powered hose for motorized lift-away
- Carpet and hard floor cleaning with a single DuoClean head

### Stakeholders

- Major retailers
- New and existing customers
- Marketing and sales
- Manufacturing supply chain





# References

1. Karl T. Ulrich and Steven D. Eppinger (2009), Product Design and Development, 4<sup>th</sup> Edition, Tata McGraw-Hill Publishing Company Limited, ISBN: 978-0-070-14679-2
2. Stephen C. Armstrong (2005), Engineering and Product development Management– The Holostic Approach, Cambridge University Press, ISBN: 978-0-521-01774-9.
3. IbrahimZeid (2006), Mastering CAD/CAM, 2<sup>nd</sup> Edition, Tata McGraw-Hill, ISBN: 978-0-070-63434-3.
4. [Anoop Desai](#), [Anil Mital](#) and [Anand Subramanian](#) (2007), Product Development: A Structured Approach to Consumer Product Development, Design, and Manufacture, 1<sup>st</sup> Edition, Butterworth-Heinemann, ISBN: 978-0-750-68309-8.

UNIVERSITY

A large, faded logo of Galgotias University is centered in the background. It features a circular emblem with three curved, overlapping bands in shades of yellow, blue, and red, creating a sense of motion or a stylized 'G'.

**Thank you**

GALGOTIAS  
UNIVERSITY