



Operations Management

Session on New Product Design

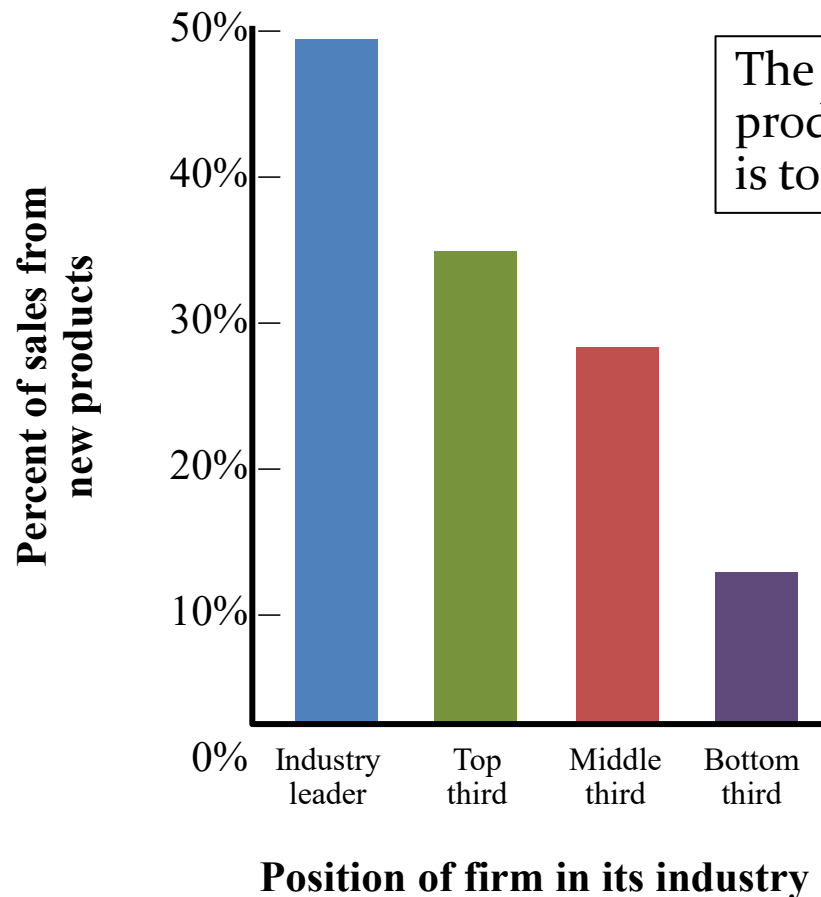
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Strategic Product and Service Design

- The essence of an organization is the goods and services it offers
 - Every aspect of the organization is structured around them
- Product and service design – or redesign – should be closely tied to an organization's strategy



The higher the percentage of sales from new products in the last 5 years, the more likely the firm is to be a leader.

- New products generate substantial revenue
- For example, Apple generates more than 60% of its revenue from products launched newly – “52.1% of total revenue and an increase of 7% relative to FY 2021. iPhone sales were boosted during 2022 thanks to new iPhone models released during that time.”

Facts

- About 46% of resources allocated to NPD are spent on products that are either abandoned or have ceased to pay back an adequate financial return
- Most of the ideas generated do not reach the launch stage, and those that get launched also fail in the market at the rate of 25 to 45%
- About 40% of new products are not getting launched despite the market analysis and product testing; and
- Only 13% of the firms gain profit out of their new product launch.

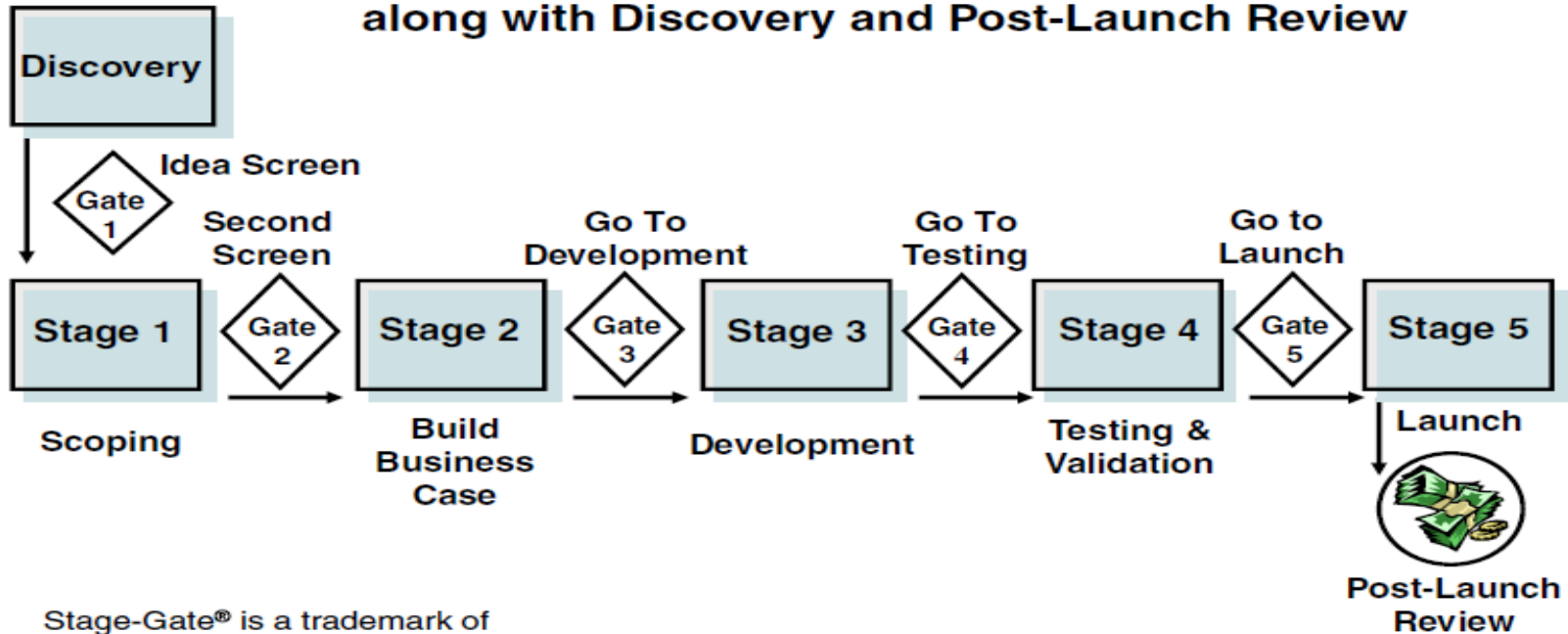
What do you think as the reason for all these failures?

- **SG - <https://youtu.be/FNljaomplDI>**

And that's how it is born 😊

Stage-Gate System of NPD Process

Stage-Gate®: A five stage, five-gate system along with Discovery and Post-Launch Review

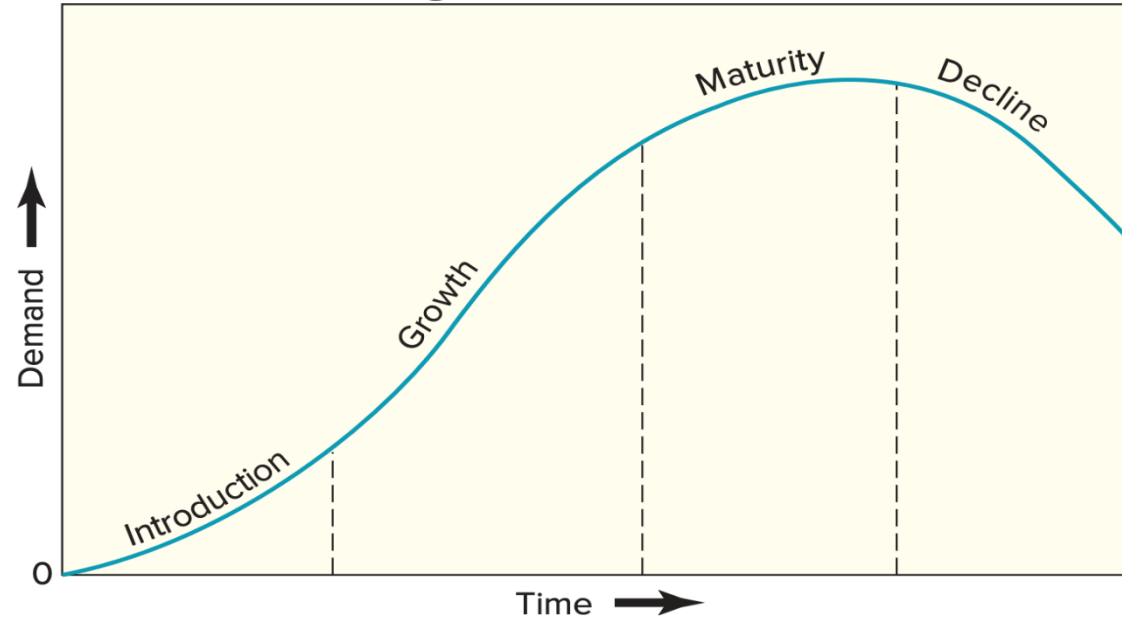


Stage-Gate® is a trademark of Product Development Institute
Source: Cooper, 2001.

Gates

- ✓ Input
- ✓ Criteria
- ✓ Output
 - ☐ Go
 - ☐ Kill
 - ☐ Hold
 - ☐ Recycle
 - ☐ Conditional Go

Product or Service Life Stages



Should I develop a product completely before I introduce it in the market?

- Introduction – Curiosity item
 - Incomplete development/presence of bugs vs losing out the market
 - A reasonable forecast of initial demand and adequate supply is important
 - High production cost
- Growth
 - Higher reliability and lower costs leading the growth in demand
 - Capacity increment should coincide with the increasing demand
 - Projections of demand growth rate and expected growth period is important
- Maturity
 - Not many design changes are required
 - Low cost and high productivity
 - Opportunity to identify new uses for products – new colours, new features, new themes, etc.
- Decline
 - Discontinue/replace with new ones/ new uses or users

Quality Function Deployment

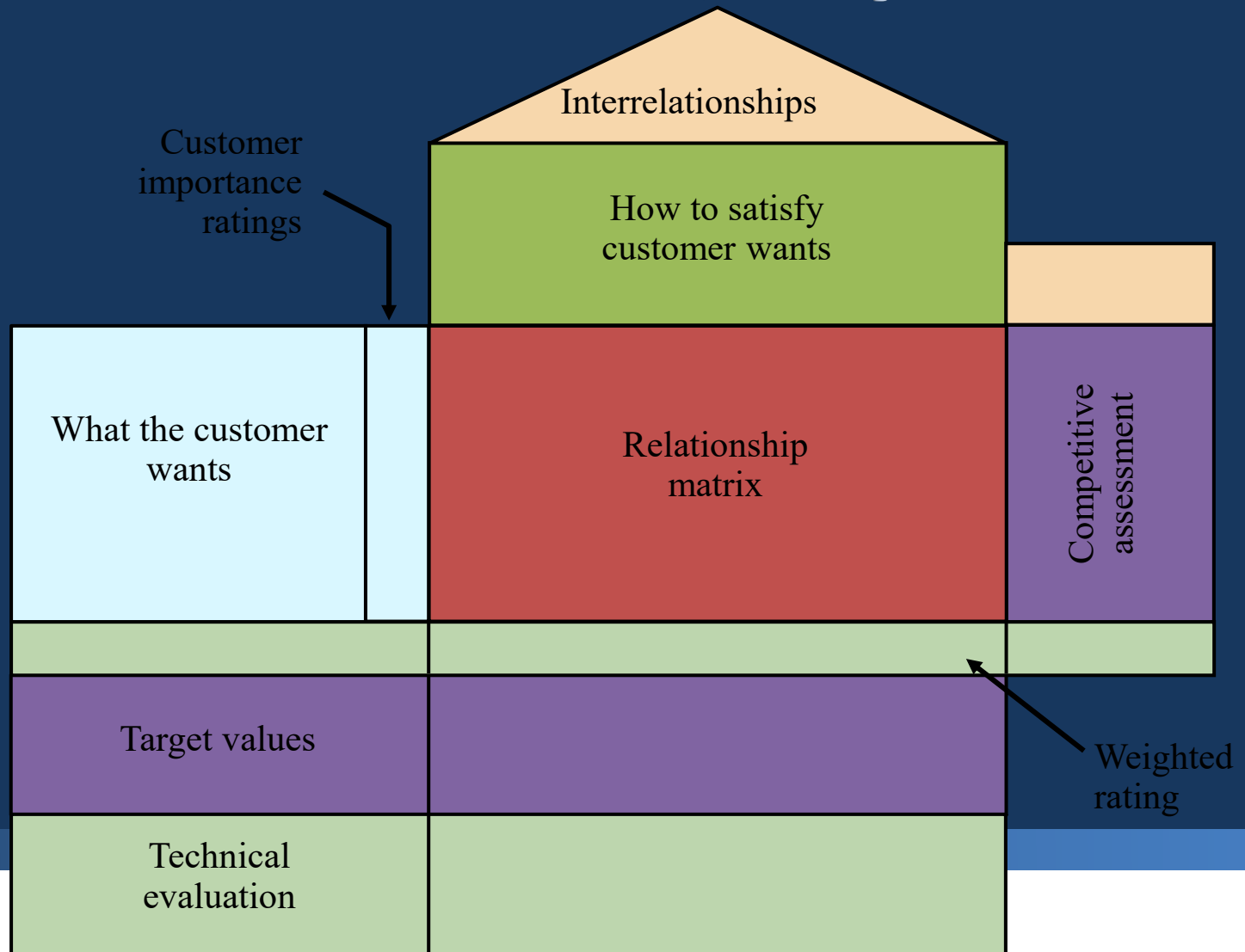
Quality Function Deployment

- **Quality Function Deployment (QFD)**
 - An approach that integrates the “voice of the customer” into both product and service development
 - The purpose is to ensure that customer requirements are factored into every aspect of the process
 - Listening to and understanding the customer is the central feature of QFD

Quality Function Deployment

1. Identify customer *wants*
2. Identify *how* the good/service will satisfy customer wants (characteristics, features or attributes)
3. Relate customer wants to product *hows*
4. Identify relationships between the firm's "*How*" and customer's "*What*"
5. Develop *our* importance ratings
6. Evaluate competing products
7. Compare performance to desirable technical attributes

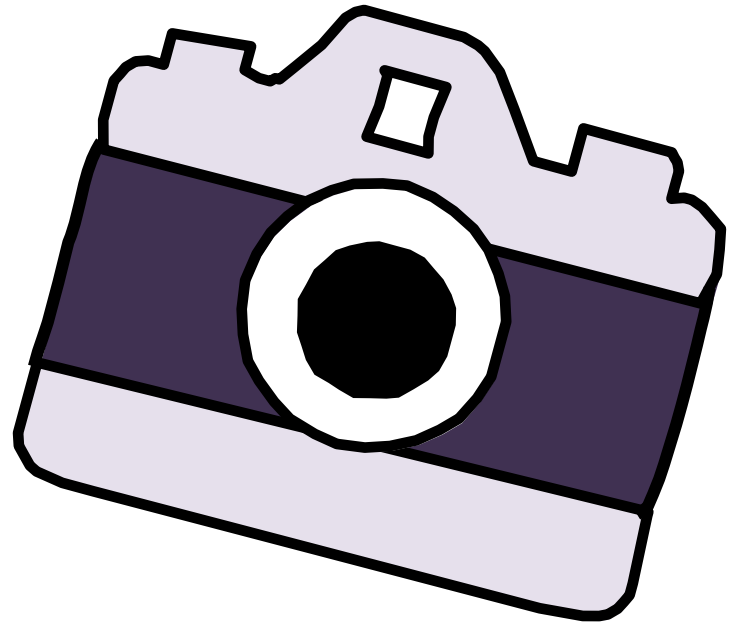
QFD House of Quality



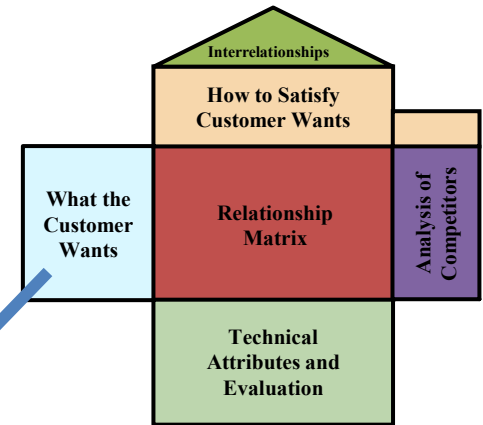
House of Quality Example

Your team has been charged with designing a new camera for Great Cameras, Inc.

The first action is
to construct a
House of Quality



House of Quality Example



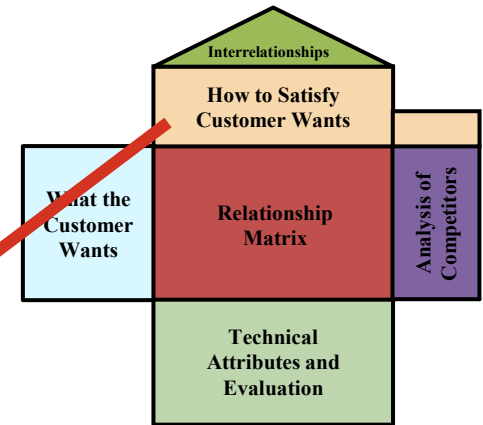
What the customer wants

Lightweight	3
Easy to use	4
Reliable	5
Easy to hold steady	2
High resolution	1

Customer importance rating
(5 = highest)

House of Quality Example

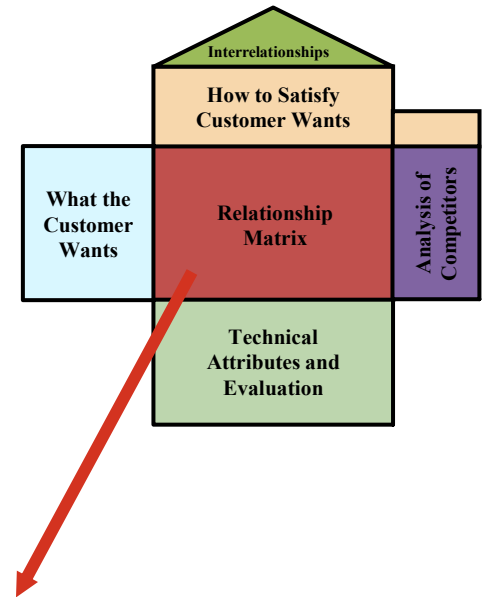
Low electricity requirements
Aluminum components
Auto focus
Auto exposure
High number of pixels
Ergonomic design



How to Satisfy Customer Wants

House of Quality Example

-  High relationship
-  Medium relationship
-  Low relationship



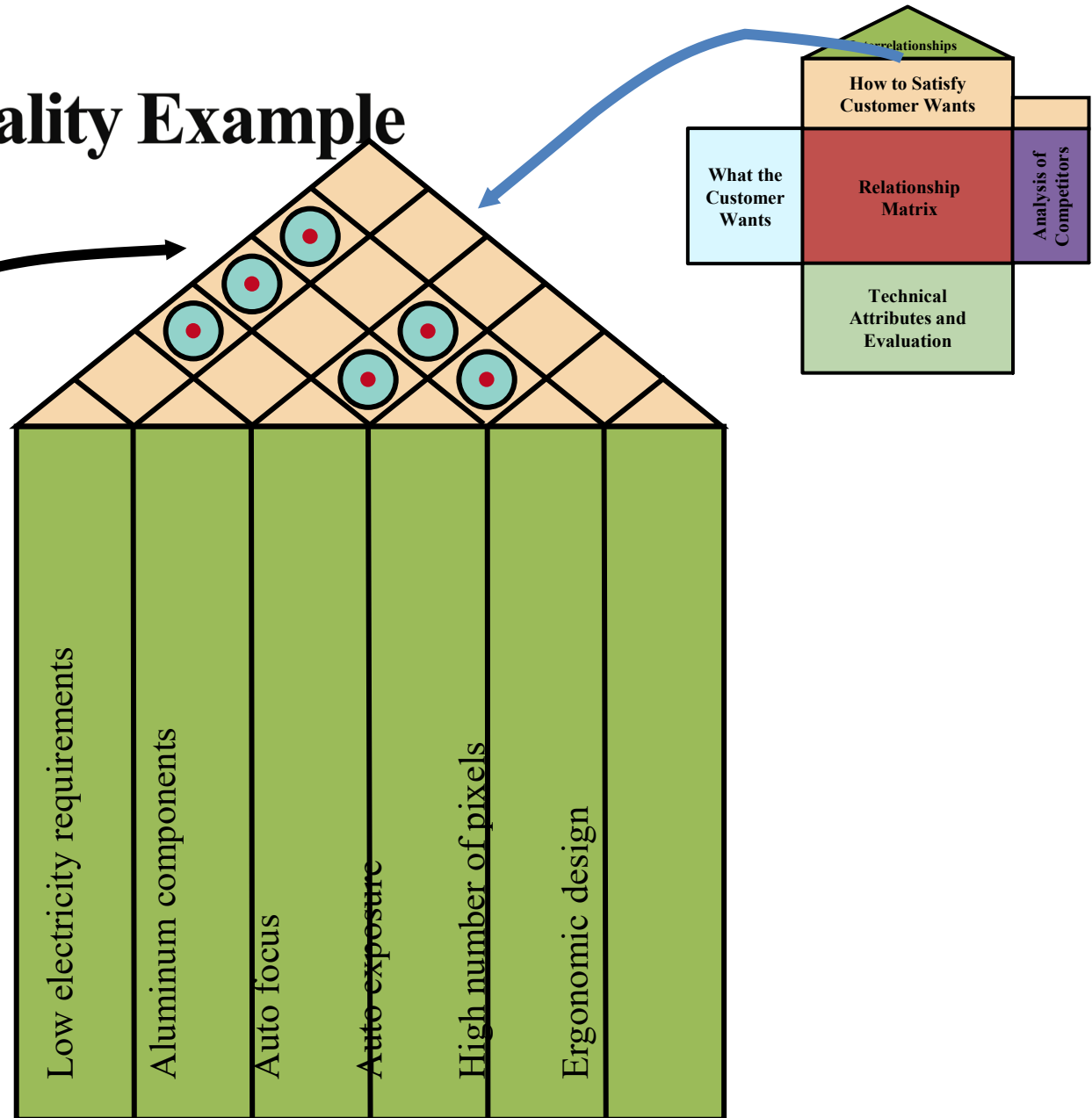
Lightweight	3	●	●				●
Easy to use	4	●		●	●	●	●
Reliable	5	●		●	●	●	
Easy to hold steady	2						●
High resolution	1					●	

Relationship matrix

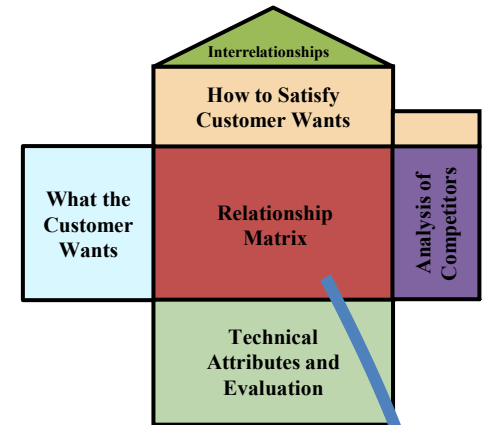


House of Quality Example

Relationships between the things we can do



House of Quality Example

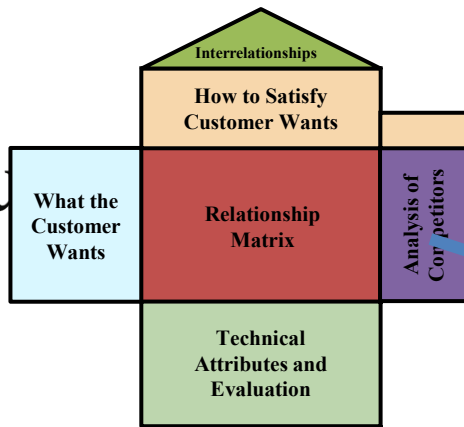


Lightweight	3	●	○				●
Easy to use	4	●		○	○	○	○
Reliable	5	○		○	○	○	
Easy to hold steady	2						○
High resolution	1					○	
Our importance ratings		22	9	27	27	32	25

Weighted rating

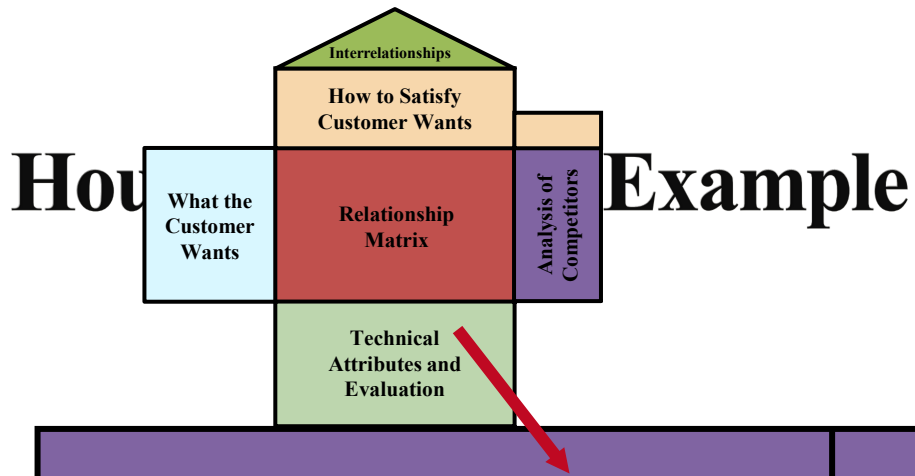


How to Example



How well do competing products meet customer wants

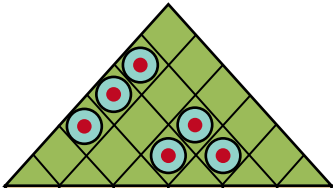
				Company A	Company B
Lightweight	3	●	●	G	P
Easy to use	4	●	●	G	P
Reliable	5	●	●	F	G
Easy to hold steady	2			G	P
High resolution	1			P	P
Our importance ratings	22		5		



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

House of Quality Example

Completed
House of
Quality

									
		Low electricity requirements	Aluminum components	Auto focus	Auto exposure	High number of pixels	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
High resolution	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		
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House of Quality Sequence

Deploying resources through the organization in response to customer requirements

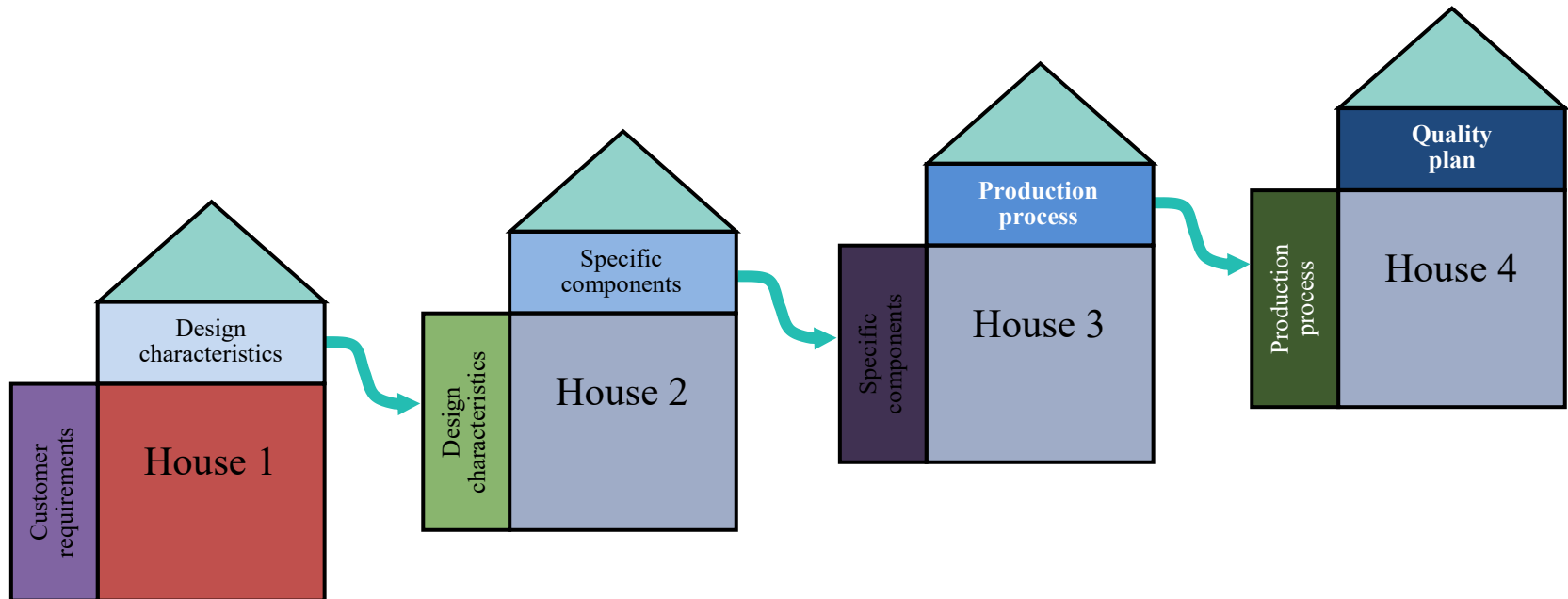
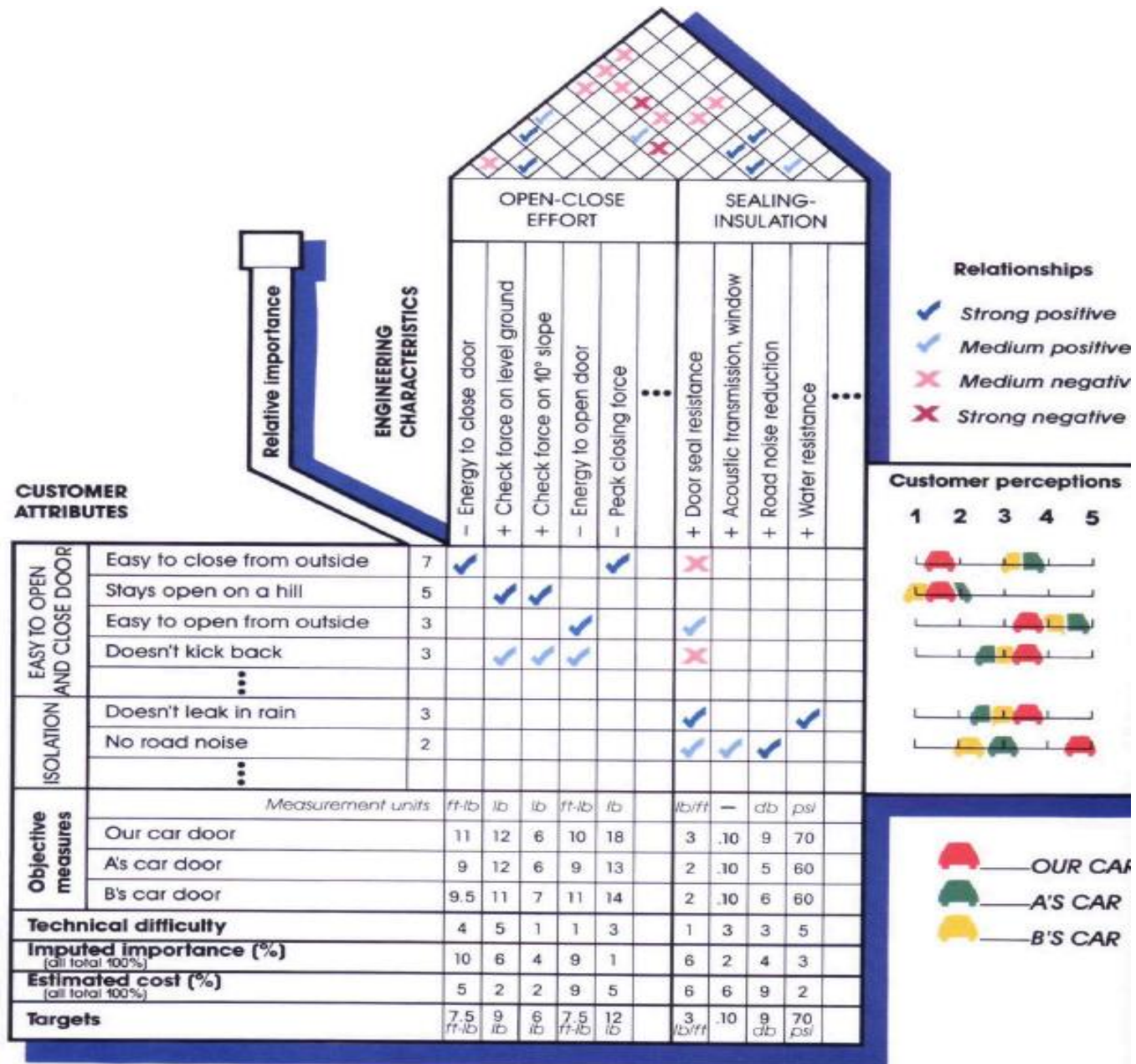


EXHIBIT III

Customer attributes and bundles of CAs for a car door



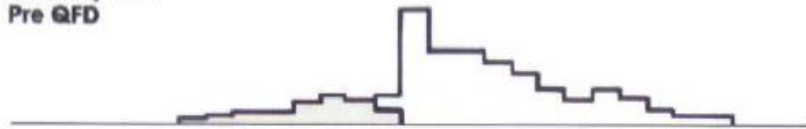


Improvements from QFD implementation

EXHIBIT I

Startup and preproduction costs at Toyota Auto Body before and after QFD

January 1977
Pre QFD



April 1984
Post QFD
(39% of pre QFD costs)

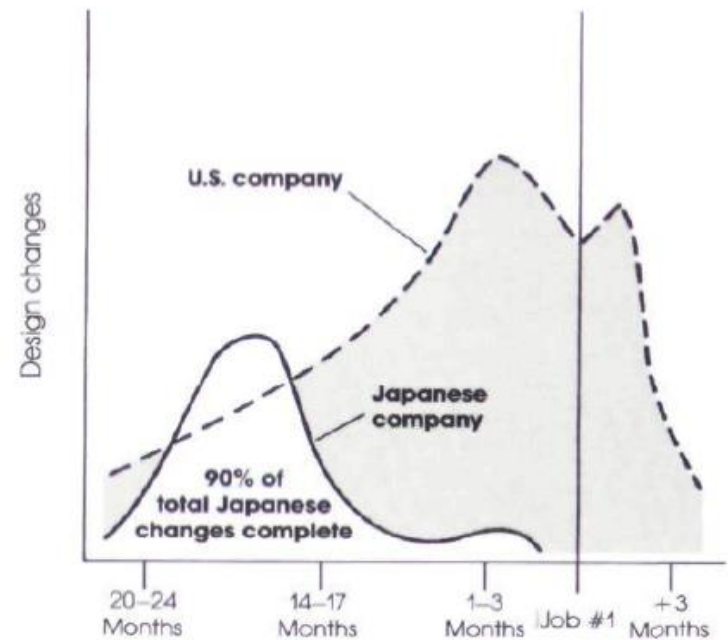


□ Preproduction costs
□ Startup costs

Source for Exhibits I and II: Lawrence P. Sullivan, "Quality Function Deployment," *Quality Progress*, June 1986, p. 39. © 1986 American Society for Quality Control. Reprinted by permission.

EXHIBIT II

Japanese automaker with QFD made fewer changes than U.S. company without QFD



Kano Model

Kano Model

- **Basic quality**
 - Refers to customer requirements that have only limited effect on customer satisfaction if present, but lead to dissatisfaction if absent
- **Performance quality**
 - Refers to customer requirements that generate satisfaction or dissatisfaction in proportion to their level of functionality and appeal
- **Excitement quality**
 - Refers to a feature or attribute that was unexpected by the customer and causes excitement

The Kano Model – As Time Passes



Kano Model + QFD?