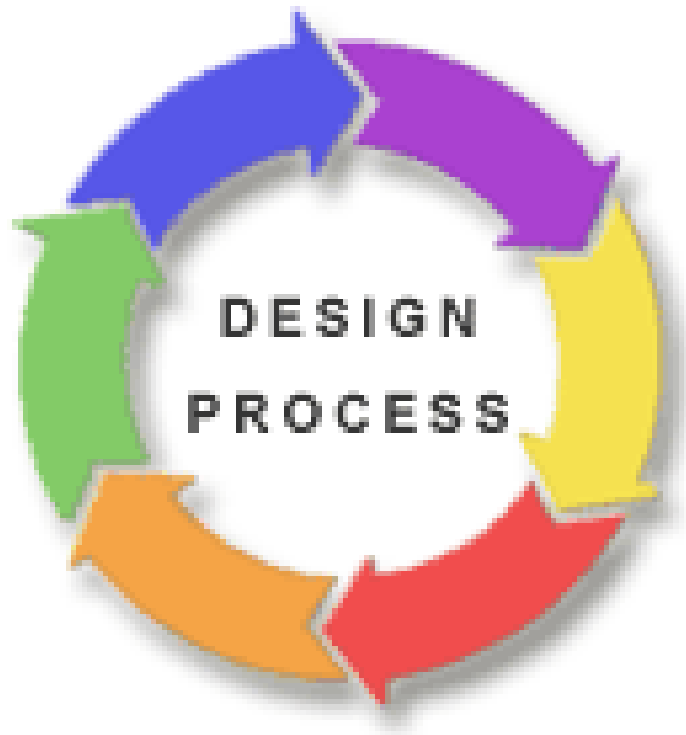


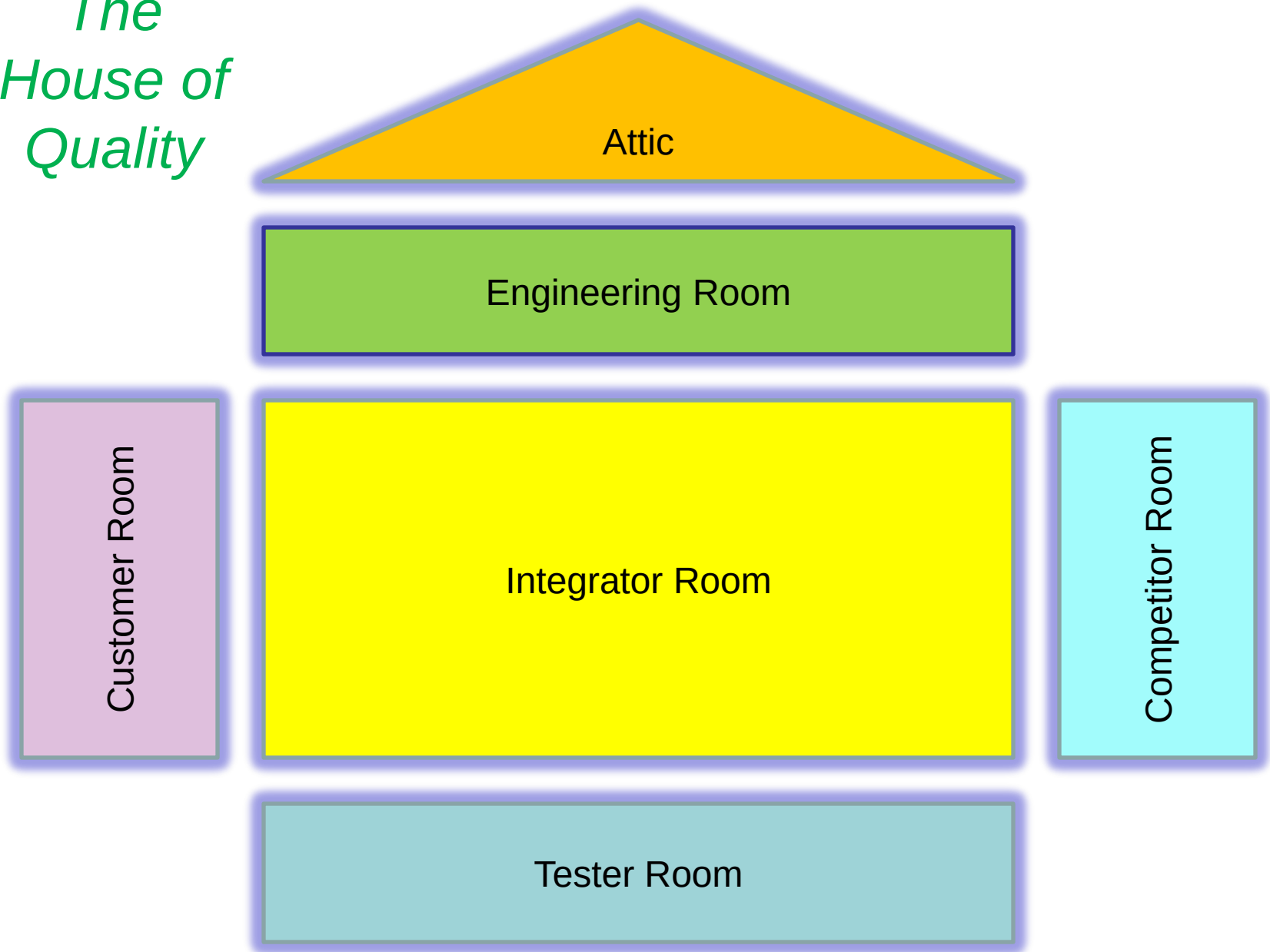
Design Toolkit
Basic Quality Function Deployment (QFD) Model



Quality Function Deployment (QFD)

- A tool which aids designers and engineers to design products which end users or customers desire
- Often referred to as the 'House of Quality', QFD listens to the 'Voice of the Customer'
- Translates end user/customer's wants and desires into product characteristics

The House of Quality



The Four Main Stages of QFD for Product Planning....

1. A matrix is developed to explore the technical attributes of a product which contribute to customer/end user needs.
2. Competing product analysis ranks the performance of existing products in terms of both customer satisfaction and technical performance.
3. Quantitative targets are set for each of the technical attributes of the product
4. These targets are prioritised

The House of Quality

Correlation Matrix
(Interaction between technical
parameters)

How can we achieve it?

Individual technical design requirements on different columns.

‘Importance of different customer
requirements.

What do
customers
want?

Individual
customer
requirements on
different rows.

Translation matrix (AKA relationship matrix)

Relationships between customer requirements and technical
parameters, ranked strong, moderate or weak.

Customer assessment of
competing products.

Technical assessment of competing products

‘How much’ of each technical parameter is required? – Quantitative
specification

‘Importance’ of different technical parameters



Richard J Morgan SMUWTSD

Product Variation / Design Variation

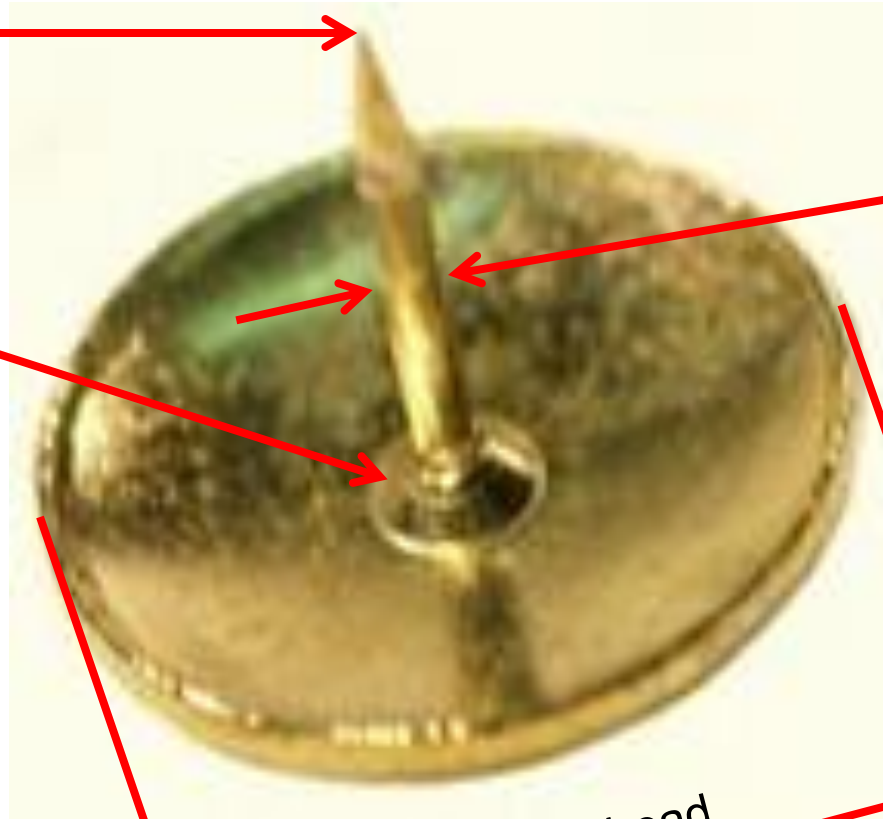


Richard J Morgan SMUWTSD

Design Variables

Sharpness
of pin head

Strength of
join (weld)



Ø of pin

Ø of head

Stage 1: The heart of quality function deployment

		Design requirements			
Customer requirements					

A matrix is developed to explore the technical attributes of a product which contribute to customer/end user needs.

Stage 1: The heart of quality function deployment

		Design requirements			
Customer requirements	Easy to push into board				

A matrix is developed to explore the technical attributes of a product which contribute to customer/end user needs.

Stage 1: The heart of quality function deployment

		Design requirements			
Customer requirements	Easy to push into board				
	Pin does not bend				

A matrix is developed to explore the technical attributes of a product which contribute to customer/end user needs.

Stage 1: The heart of quality function deployment

		Design requirements			
Customer requirements	Easy to push into board				
	Pin does not bend				
	Low price				

A matrix is developed to explore the technical attributes of a product which contribute to customer/end user needs.

Stage 1: The heart of quality function deployment

		Design requirements			
		+ Diameter of head			
Customer requirements	Easy to push into board				
	Pin does not bend				
	Low price				

A matrix is developed to explore the technical attributes of a product which contribute to customer/end user needs.

Stage 1: The heart of quality function deployment

		Design requirements			
		+ Diameter of head	+ Diameter of pin		
Customer requirements	Easy to push into board				
	Pin does not bend				
	Low price				

A matrix is developed to explore the technical attributes of a product which contribute to customer/end user needs.

Stage 1: The heart of quality function deployment

		Design requirements			
		+ Diameter of head	+ Diameter of pin	+ Strength of join	
Customer requirements	Easy to push into board				
	Pin does not bend				
	Low price				

A matrix is developed to explore the technical attributes of a product which contribute to customer/end user needs.

Stage 1: The heart of quality function deployment

		Design requirements			
		+ Diameter of head	+ Diameter of pin	+ Strength of join	+ Sharpness of pin
Customer requirements	Easy to push into board				
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		Design requirements			
		+ Diameter of head	+ Diameter of pin	+ Strength of join	+ Sharpness of pin
Customer requirements	Easy to push into board				
	Pin does not bend				
	Low price				

Key:
 Strong positive

A matrix is developed to explore the technical attributes of a product which contribute to customer/end user needs.

Stage 1: The heart of quality function deployment

		Design requirements			
		+ Diameter of head	+ Diameter of pin	+ Strength of join	+ Sharpness of pin
Customer requirements	Easy to push into board				
	Pin does not bend				
	Low price				

Key:

-  Strong positive
-  Weak positive

A matrix is developed to explore the technical attributes of a product which contribute to customer/end user needs.

Stage 1: The heart of quality function deployment

		Design requirements			
		+ Diameter of head	+ Diameter of pin	+ Strength of join	+ Sharpness of pin
Customer requirements	Easy to push into board				
	Pin does not bend				
	Low price				

Key:

-  Strong positive
-  Weak positive
-  Weak negative

A matrix is developed to explore the technical attributes of a product which contribute to customer/end user needs.

Stage 1: The heart of quality function deployment

		Design requirements			
		+ Diameter of head	+ Diameter of pin	+ Strength of join	+ Sharpness of pin
Customer requirements	Easy to push into board				
	Pin does not bend				
	Low price				

Key:

-  Strong positive
-  Weak positive
-  Weak negative
-  Strong negative

A matrix is developed to explore the technical attributes of a product which contribute to customer/end user needs.

Stage 1: The heart of quality function deployment

		Design requirements			
		+ Diameter of head	+ Diameter of pin	+ Strength of join	+ Sharpness of pin
Customer requirements	Easy to push into board	●			
	Pin does not bend				
	Low price				

Key:



Strong positive



Weak positive



Weak negative



Strong negative

A matrix is developed to explore the technical attributes of a product which contribute to customer/end user needs.

Stage 1: The heart of quality function deployment

		Design requirements			
		+ Diameter of head	+ Diameter of pin	+ Strength of join	+ Sharpness of pin
Customer requirements	Easy to push into board				
	Pin does not bend				
	Low price				

Key:



Strong positive



Weak positive



Weak negative



Strong negative

A matrix is developed to explore the technical attributes of a product which contribute to customer/end user needs.

Stage 1: The heart of quality function deployment

		Design requirements			
		+ Diameter of head	+ Diameter of pin	+ Strength of join	+ Sharpness of pin
Customer requirements	Easy to push into board	●	●		●
	Pin does not bend				
	Low price				

Key:



Strong positive



Weak positive



Weak negative



Strong negative

A matrix is developed to explore the technical attributes of a product which contribute to customer/end user needs.

Stage 1: The heart of quality function deployment

		Design requirements			
		+ Diameter of head	+ Diameter of pin	+ Strength of join	+ Sharpness of pin
Customer requirements	Easy to push into board	●	●		●
	Pin does not bend		●		
	Low price				

Key:



Strong positive



Weak positive



Weak negative



Strong negative

A matrix is developed to explore the technical attributes of a product which contribute to customer/end user needs.

Stage 1: The heart of quality function deployment

		Design requirements			
		+ Diameter of head	+ Diameter of pin	+ Strength of join	+ Sharpness of pin
Customer requirements	Easy to push into board				
	Pin does not bend				
	Low price				

Key:



Strong positive



Weak positive



Weak negative



Strong negative

A matrix is developed to explore the technical attributes of a product which contribute to customer/end user needs.

Stage 1: The heart of quality function deployment

		Design requirements			
		+ Diameter of head	+ Diameter of pin	+ Strength of join	+ Sharpness of pin
Customer requirements	Easy to push into board				
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A matrix is developed to explore the technical attributes of a product which contribute to customer/end user needs.

Stage 1: The heart of quality function deployment

		Design requirements			
		+ Diameter of head	+ Diameter of pin	+ Strength of join	+ Sharpness of pin
Customer requirements	Easy to push into board	●	●		●
	Pin does not bend		●	●	
	Low price	●	●		

Key:

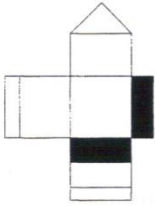
- Strong positive
- Weak positive
- Weak negative
- Strong negative

A matrix is developed to explore the technical attributes of a product which contribute to customer/end user needs.

Stage 1: The heart of quality function deployment

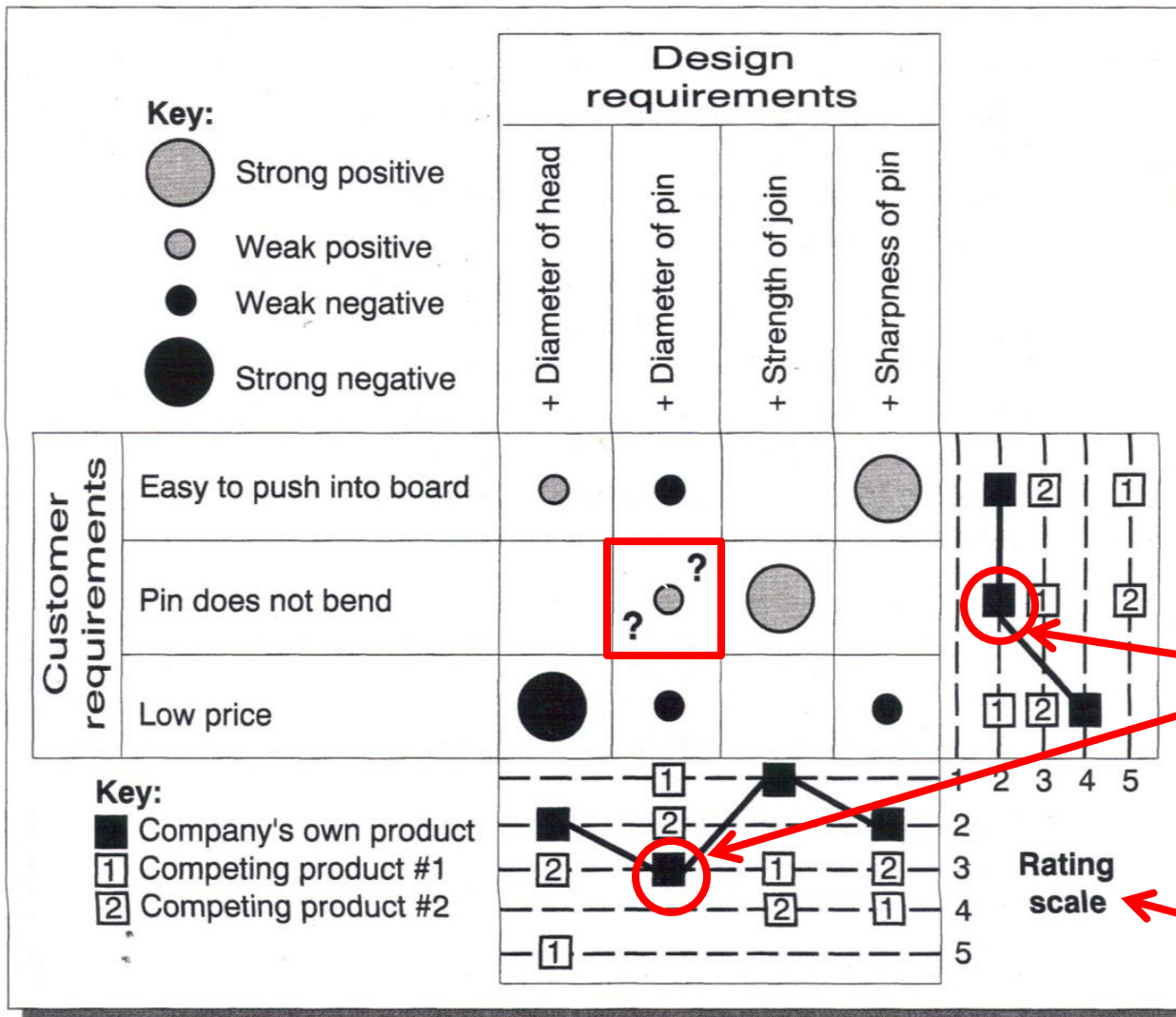
		Design requirements			
		+ Diameter of head	+ Diameter of pin	+ Strength of join	+ Sharpness of pin
Customer requirements	Easy to push into board				
	Pin does not bend				
	Low price				

A matrix is developed to explore the technical attributes of a product which contribute to customer/end user needs.



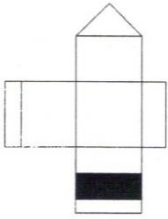
Stage 2: The competing product analysis

Competing product analysis ranks the performance of existing products in terms of both customer satisfaction and technical performance.



Conflict

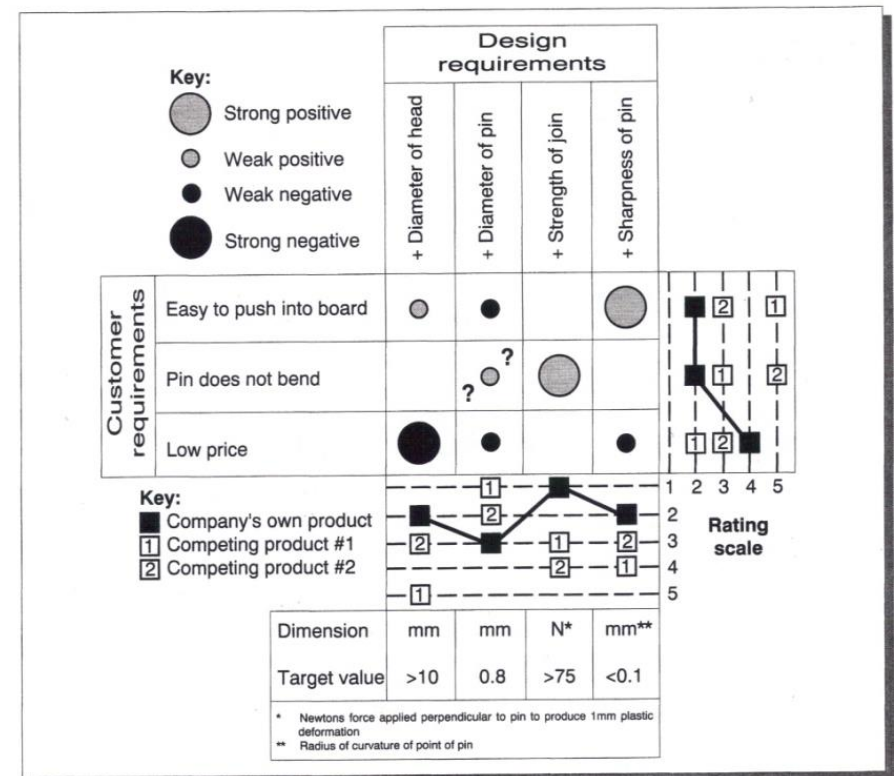
Rating scale key
1 – worst
5 – best

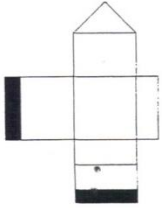


Stage 3: Setting quantitative targets

	Company's own product	Competing product #1	Competing product #2	Target value
Diameter of head	7mm	10.5mm	8.5mm	>10mm
Diameter of pin	1.1mm	0.8mm	0.9mm	0.8mm
Strength of join	55N	70N	75N	>75N
Sharpness of pin	0.2mm	0.1mm	0.15mm	<0.1mm

Quantitative targets are set for each of the technical attributes of the product



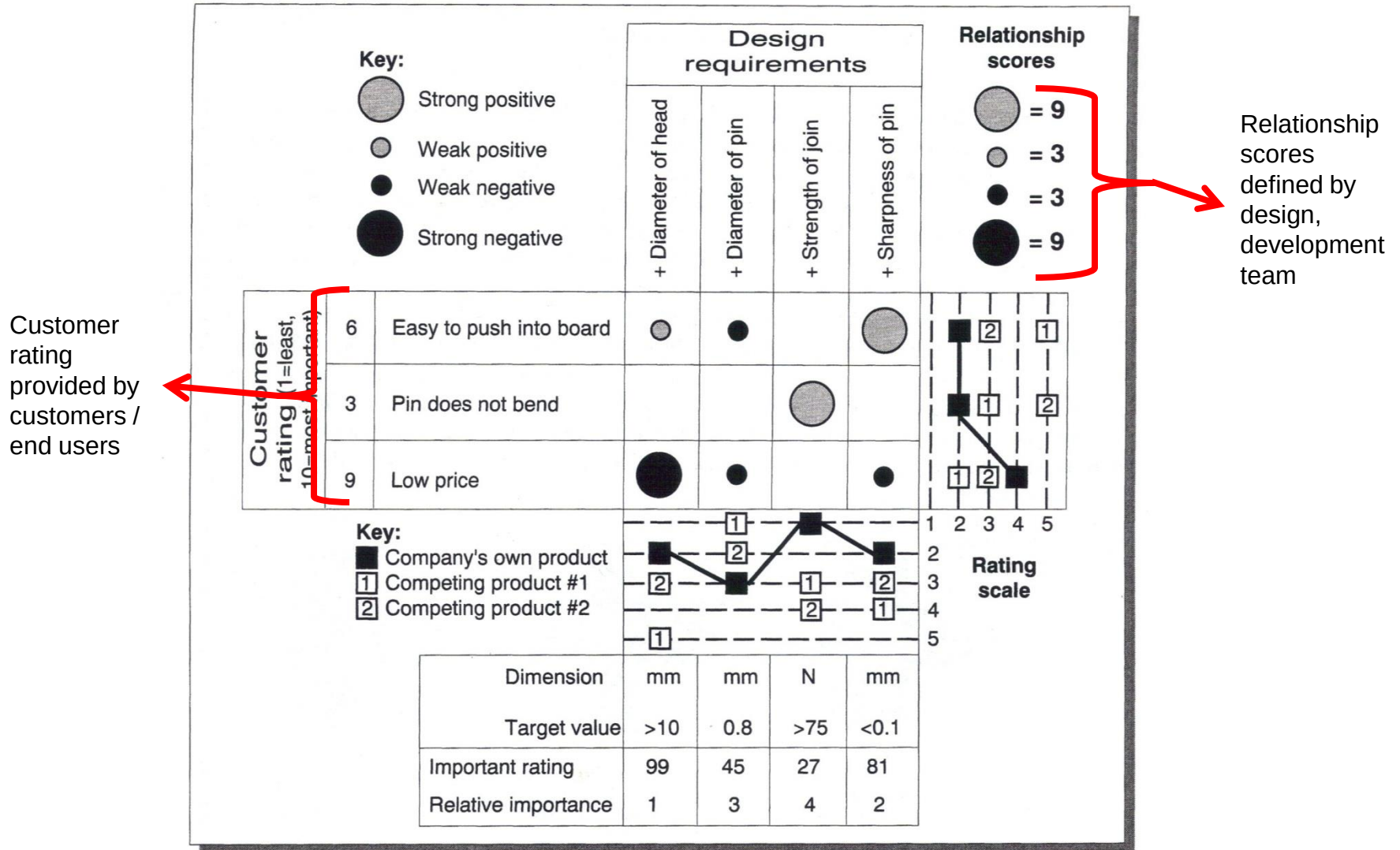


Stage 4: Prioritising the design targets

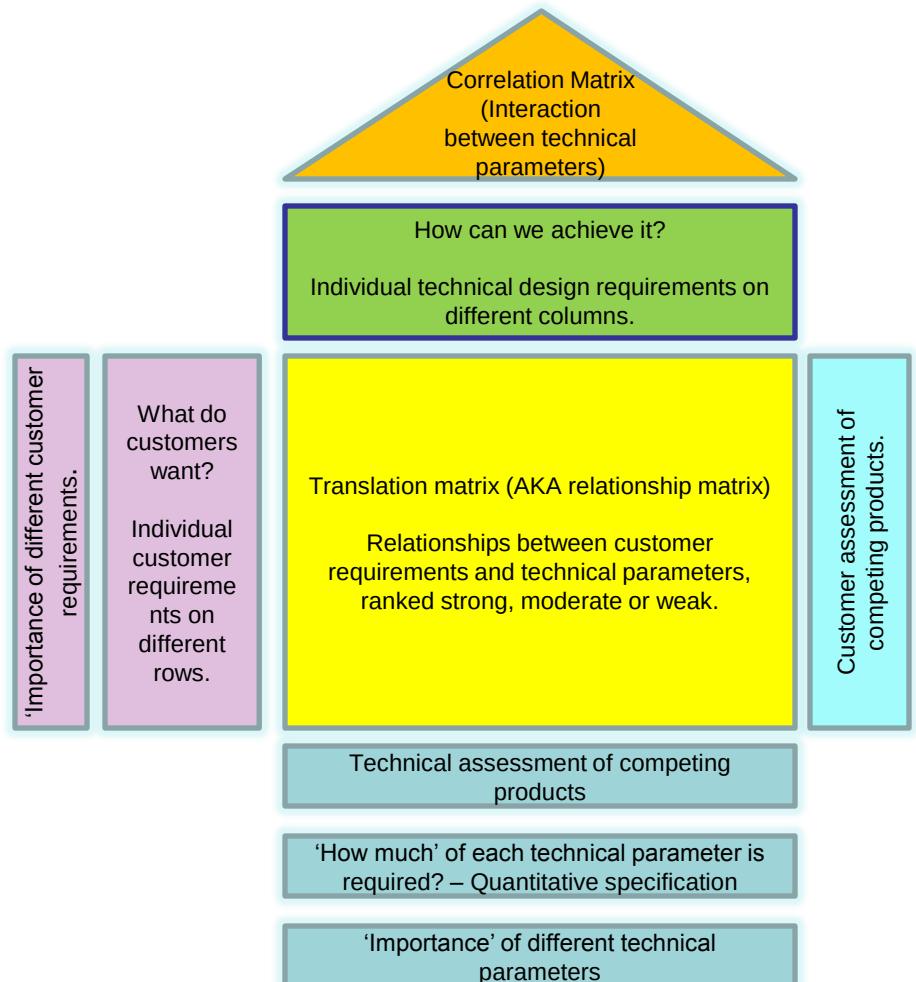
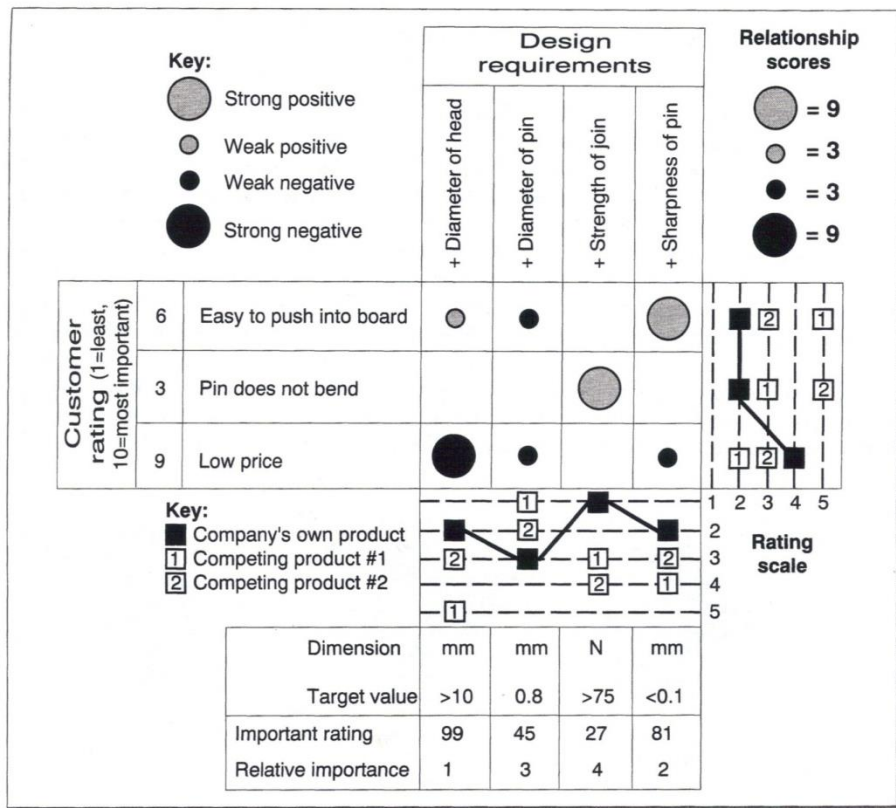
The quantitative targets for technical attributes are prioritised

			Design requirement #1
Customer rating = 8	Customer requirement #1	Relationship between customer requirement #1 & design requirement #1	 = 9
Customer rating = 3	Customer requirement #2	Relationship between customer requirement #2 & design requirement #1	 = 3
Importance rating for design requirement	Sum of the relationship scores times the customer rating = $(9 \times 8) + (3 \times 3) = 81$		

Quality function deployment – beyond product planning



Quality function deployment – beyond product planning



Quality function deployment – beyond product planning

Using QFD throughout the whole design process - street of quality

