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TIM 105

HW5

1. **Specialized Bicycle Company (SBC):** Read the case study in the U&E, PD&D text in order to understand how QFD/HOQ is applied in a technology company. Provide at least three main reasons, with supporting evidence, why SBC developed the HOQ. Describe one way that SBC used the HOQ.

Step 1: Define the real problem.

SP1: Provide three reasons why SBC developed the HOQ.

SP2: Describe one way that SBC used the HOQ.

Step 2: Plan how to solve the problem.

Assumptions: I am a student looking to learn about how SBC used the HOQ, and why they developed it. This is being done so I can learn, not for anyone else in particular.

What information is available: In the PD&D book, the product specifications chapter has the case study on SBC.

SP1: Provide three reasons why SPC developed the HOQ.

-- Read the chapter on product specifications to understand why SBC developed the HOQ.

-- Create a list of reasons why they developed the SBC.

SP2: Describe one way that SBC used the HOQ.

-- Read the chapter on product specifications to understand how SBC used the HOQ.

Step 3: Execute the plan.

SP1: Provide three reasons why SBC developed the HOQ.

-- were trying to develop front suspension fork for the mountain bike market that would have more value to recreational cyclists

-- had identified customer needs but faced several challenges in trying to use them in developing a new product

-- needed a way to relay customer needs into precise development targets

-- how could the team and its senior management agree on what would constitute success or failure of the product design

-- how could the team develop confidence that it's intended product would garner a substantial share of the market

-- how could the team resolve trade-offs among product characteristics like cost and weight

SP2: Describe one way that SBC used the HOQ.

-- resolve trade-offs among product characteristics

-- SBC created cost models and a bill of materials to see what their total cost would be with different combinations of inputs

-- performed a cost analysis with each set of inputs to determine which gave them to best profit potential while staying under budget and allowing the suspension fork to be sold at a reasonable price

Reason	Description of how it was implemented
Needed a way to relay customer needs into precise development targets.	SBC came up with the idea of a product needs-matrix that correlated product needs with one or more technical metrics. The team came up with a list of technical metrics that could measure how well they were meeting customer needs, and created a matrix where for each customer needs one or more technical metrics were selected.
Needed a way to see if new product would garner market share when released.	SBC came up with the idea of competitive benchmarking, where they gathered data from competitive products in the market they were entering to see how well the industry was meeting customer needs. They then mapped their expected product's ability to meet these needs against the competition to see if they were providing potential customers a good value. If they were giving customers a good value the team could reasonably expect the new product to do well when released.
Needed a way to resolve inevitable trade-offs between product characteristics and inputs.	SBC created a bill of materials to see what their total cost would be with each combination of inputs, and performed a cost analysis with each set to determine which gave them the best profit potential while staying under budget and allowing the suspension fork to be sold at a reasonable price.

Step 4: Check Your Work.

After hours of research, I am confident that my work makes sense and is correct.

Step 5: Learn and Generalize.

SBC created the HOQ because they needed a way to express customer needs as specific metrics they could shoot for when designing a product. The HOQ also allows them to see how the suspension fork they were developing stacked up to competitors products, and

thus, how well they could expect it to do in the market. In general, the HOQ allows companies to design products with attributes that allow them to make profits while still offering quality products to consumers.

2. **Quality Function Deployment:** Develop a "house of quality" for two of the following products: The "perfect" (humane) mousetrap, CD player, laptop personal-computer, cell-phone, Microsoft Word.

-- I am going to do the mousetrap and the cell-phone

Step 1: Define the real problem.

For each product:

SP1: What are the customer needs, and which of these needs is most important.

SP2: Create a list of technical metrics to judge the performance in satisfying these customer needs.

SP3: Correlate customer needs to technical metrics using a convenience scale.

SP4: Perform technical and customer benchmarking for similar products.

SP5: Set targets for customer needs and technical metrics.

SP6: Using the above info, create the House of Quality.

Step 2: Plan how to solve the problem.

Assumptions: I am a marketing analyst developing two new products and am interested in understanding what I can do to make them as valuable for potential customers as possible. I am creating the houses of quality for management above me to convince them to allow these projects to move forward, and for the engineers on my team so they have a concrete idea of what functions the product needs to perform and what the technical metrics they should try to achieve are.

What information is available: The PD&D book describes the necessary processes to create a HOQ. Internet research can help me identify what customer needs and technical metrics for each product should be.

SP1: Ranked Customer Needs.

-- Read the PD&D chapter on identifying customer needs.

-- Perform the process with necessary internet research.

-- Compile a list of customer needs and rank them by order of importance using a convenience scale.

SP2: Technical Metrics.

-- Read the chapter on product specifications.

-- Create a list of technical metrics and assess the importance of each using a convenience scale.

SP3: Correlate customer needs to technical metrics.

-- Read the chapter on product specifications.

-- Create a matrix showing the correlations between customer needs and technical metrics.

-- Create a matrix showing the correlations between technical metrics.

SP4: Benchmarking.

-- Read the chapter on product specifications to understand how to benchmark.

-- Do internet research to understand the benchmarks for similar products within the industry.

-- Create a chart to show how well other companies are performing according to your metrics.

SP5: Set final targets for customer needs and technical metrics.

-- Select the ideal technical metrics to create the greatest profit while still offering the product to customers at a reasonable cost.

SP6: Create the HOQ.

-- Take the matrices from the above steps and combine them into the HOQ for the product.

Step 3: Execute the plan.

For the perfect (humane) mousetrap.

SP1: Ranked Customer Needs.

-- mouse either killed instantly or unconsciously trapped without any fear or distress where it can later be killed easily

-- don't cause the mouse pain killing it slowly

-- no poisonous chemicals that could harm the air in your house or any other pets or small children

-- not a risk to pets and small children

No.	Part	Need	Importance
1	Mouse trap	Capture mouse safely	5
2	Mouse trap	Mouse can't escape	5
3	Mouse trap	No poisonous chemicals	4
4	Mouse trap	Not a risk to pets and small children	3

SP2: Technical metrics.

-- Time to kill

-- Chemicals used?

-- Strength of chemicals

-- Strength of force used to kill mouse

-- Chance of instant kill

Metric #	Need #'s	Metric	Importance	Units
1	1,2	Smoothed entrance (or door)	5	Binary

2	2	Weight of cage	4	ounces
3	3,4	Use of poisonous chemicals	4	Binary
4	1,2,4	Size of opening	3	centimeters
5	1,2,3,4	Endorsed by Humane Society	3	Binary

SP3: Correlate customer needs to technical metrics.

High positive - ●
Medium positive - ○
Medium negative - ◇
High negative - ◆
No correlation -

	Smoothed Entrance	Weight of cage	Use of poisonous chemicals	Size of opening	Endorsed by Humane Society
Capture mouse safely	●	●	◆	●	
Mouse can't escape		●		◇	
No poisonous chemicals			●		●
Not a risk to pets and small children					●

	Smoothed Entrance	Weight of cage	Use of poisonous chemicals	Size of opening	Endorsed by Humane Society
Smoothed entrance (or door)	●			○	○
Weight of cage		●		○	
Use of poisonous			●		◆

chemicals					
Size of opening				●	○
Endorsed by Humane Society					●

SP4: Benchmarking.

Metric #	Need #'s	Metric	Imp	Units	Havahart	Smart Mouse Trap	Mice Cube
1	1,2	Smoothed Entrance (or door)	5	Binary	Yes	Yes	Yes
2	2	Weight of cage	4	ounces	16	5.6	10.1
3	1,2,4	Size of opening	3	Inches	3x3	3x2.5	2x5.75
4	3,4	Use of poisonous chemicals	4	Binary	No	No	No
5	1	Endorsed by Humane Society	3	Binary	No	Yes	No

No.	Part	Need	Havahart	Smart Mouse Trap	Mice Cube
1	Mouse trap	Capture mouse safely	3	4	3
2	Mouse trap	Mouse can't escape	5	3	4
3	Mouse trap	No poisonous chemicals	5	5	5
4	Mouse	Not a risk to pets and	4	4	2

	trap	small children			

SP5: Set target values for technical metrics.

Metric #	Need #'s	Metric	Units	Value
1	1,2	Smoothed entrance (or door)	Binary	Yes
2	2	Weight of cage	ounces	16 oz.
3	3,4	Use of poisonous chemicals	Binary	No
4	1,4	Size of opening	centimeters	3.5x3.5
5	1	Endorsed by Humane Society	Binary	Yes

SP6: Create the HOQ.

-- done on a separate sheet of paper

For the cell-phone:

SP1: Ranked customer needs.

-- rank on a scale of 1-10

No.	Part	Need	Importance
1	Cell Phone	Easy to use	9
2	Cell Phone	Ability to make phone calls/send text messages	10
3	Cell Phone	Connect to the internet/3g or 4g	9
4	Cell Phone	Can play videos	7
5	Cell Phone	Store and play music	7
6	Cell Phone	Good battery life	8
7	Cell Phone	Take photos and videos	9

SP2: Technical Metrics.

-- rank from 1-10

Metric #	Need #'s	Metric	Importance	Units
1	1	Time switching between apps	5	Seconds
2	1	How often phone has to be restarted	7	Times/Day
3	2,3	Cellular connectivity	10	Binary

4	2	Messaging System	10	Binary
5	4	Video player	10	Binary
6	5	MP3 Player	10	Binary
7	6	Battery Life	8	Hours
8	7	Camera/Camcorder	9	Binary

SP3: Correlate customer needs to technical metrics.

High positive - ●
Medium positive - ○
Medium negative - ◇
High negative - ◆
No correlation -

	Time Switching between apps	How often phone has to be restarted	Cellular connectivity	Messaging System	Video Player	MP3 player	Battery Life	Camera /Camcorder
Easy to use	●	●						
Ability to make phone calls/send text messages			●	●				
Connect to the internet/ 3g or 4g			●					
Can play videos					●		◆	
Store and play						●		

music								
Good battery life					◆		●	
Take photos and videos								●

High positive - ●
Medium positive - ○
Medium negative - ◇
High negative - ◆
No correlation -

	Time switching between apps	How often phone has to be restarted	Cellular connectivity	Messaging System	Video Player	MP3 player	Battery Life	Camera/Camcorder
Time switching between apps	●		○					
How often phone has to be restarted		●	○				○	
Cellular			●	○			◇	

connectivity								
Messaging System				●				
Video player					●		◇	
MP3 Player						●		
Battery Life							●	
Camera /Camcorder								●

SP4: Benchmarking.

Metric #	Need #'s	Metric	Imp	Units	Apple iPhone 10	Samsung Galaxy S8
1	1	Time switching between apps	5	Seconds	5	7
2	1	How often phone has to be restarted	7	Times/Week	Usually 0 sometimes 1	Usually 0 sometimes 1
3	2,3	Cellular connectivity	10	Binary	Yes	Yes
4	2	Messaging System	10	Binary	Yes	Yes
5	4	Video player	10	Binary	Yes	Yes
6	5	MP3 Player	10	Binary	Yes	Yes
7	6	Battery Life	8	Hours	12	14
8	7	Camera/Camcorder	9	Binary	Yes	Yes

No	Metric	Apple iPhone 10	Samsung Galaxy S8
1	Time switching between apps	8	7
2	How often phone has to be restarted	9	9
3	Cellular connectivity	10	10
4	Messaging System	10	10
5	Video player	9	8
6	MP3 Player	9	7
7	Battery Life	7	5
8	Camera/Camcorder	9	6

SP5: Set target values for technical metrics.

Metric #	Need #'s	Metric	Units	Value
1	1	Time switching between apps	Seconds	3
2	1	How often phone has to be restarted	Times/Week	0
3	2,3	Cellular connectivity	Binary	Yes
4	2	Messaging System	Binary	Yes
5	4	Video player	Binary	Yes
6	5	MP3 Player	Binary	Yes
7	6	Battery Life	Hours	16
8	7	Camera/Camcorder	Binary	Yes

SP6: Draw the HOQ.

-- done on a separate sheet.

Step 4: Check Your Work.

After hours of research, I am confident that my work makes sense and is correct.

Step 5: Learn and Generalize.

From creating the House of Quality (HOQ) for the mousetrap and cell-phone I learned how to set product goals based on customer needs.