

Critical to Quality

Let us map the Value Stream



Making and attending a Dentist's appointment



Monday 2nd November

Phone call to dentist to make appointment. (10 mins waiting, 2min conversation.)

Thursday 19th November

Arrive in Swansea at 13:40pm, 10 minutes searching for car parking space.

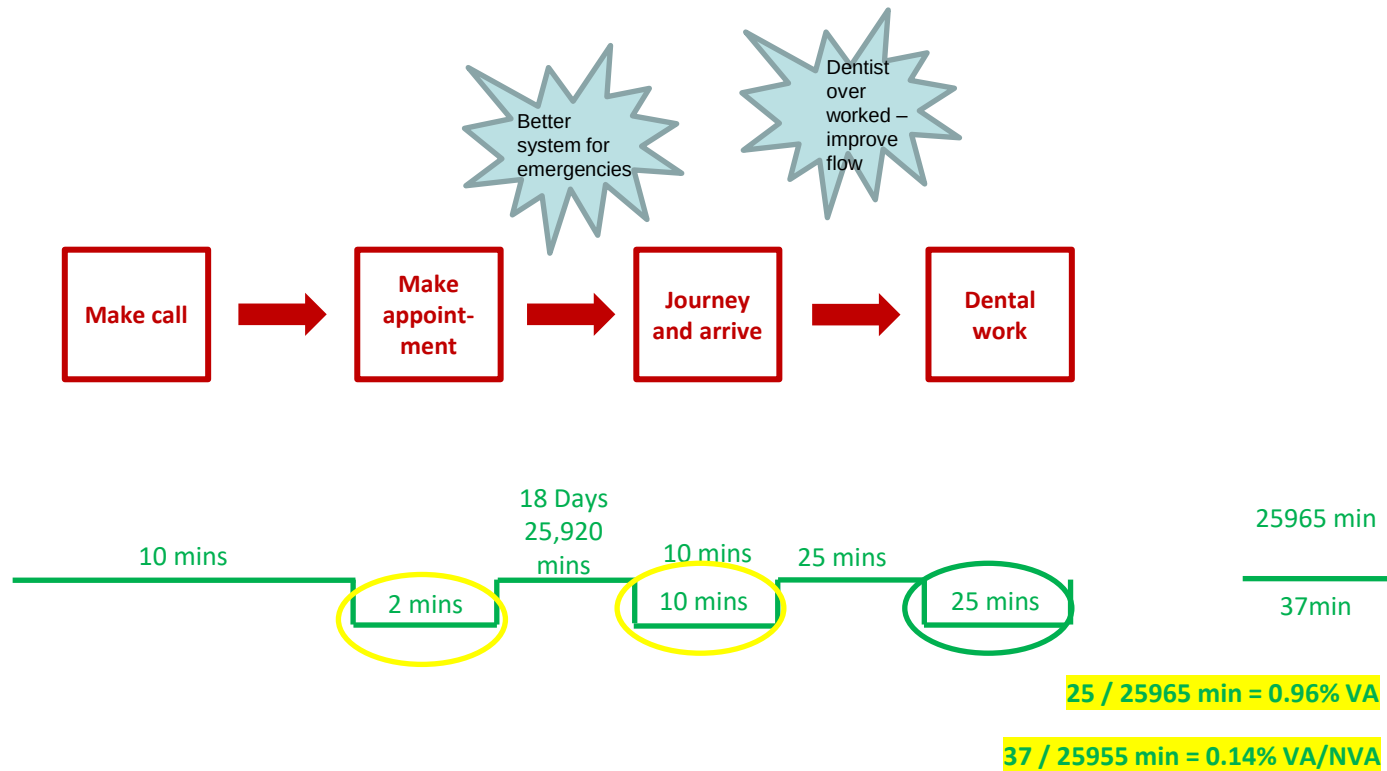
Arrive at Dentist surgery for 2pm appointment after walking from car park.

Dentist running behind schedule so in Waiting Room for 25 minutes.

Sitting in the dreaded dentist chair by 2:25pm for drilling to start.

Back at Reception by 2:50pm to book follow-up appointment for additional work identified.

Dentist Appointment



Define 5 - Voice of the Customer (VoC) and Critical to Quality (CTQ)

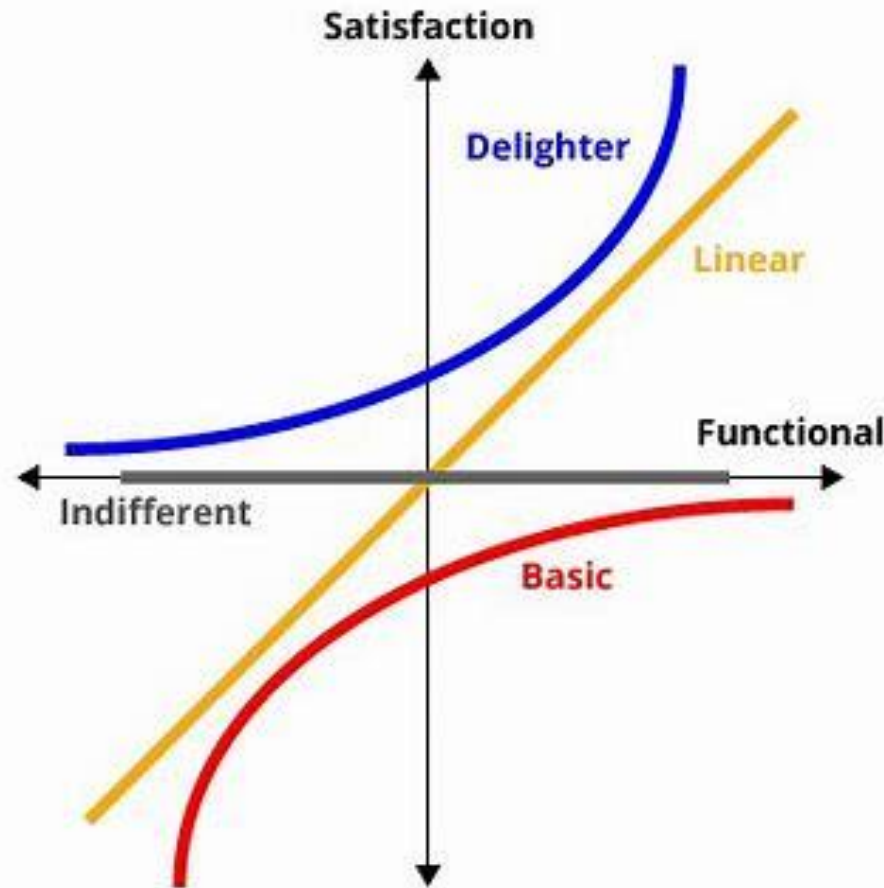


The Kano Model

Is a model which helps to prioritise either products or service characteristics (or features) which effect customer satisfaction

Includes five categories which can effect customer satisfaction and dissatisfaction

The Kano Model



Noriaki Kano b1940 Tokyo, writer, engineer and educator in the field of Quality Management

The Kano Model

Features to include:

Basic

Basic features customer expects – will dissatisfy them if absent

Excitement (Delight)

Will excite the customer disproportionately if present, might not notice if not there!

Performance (linear)

Will excite customer proportionally, can be linear

Features to avoid:

Indifferent

Features customer may not care about

Dissatisfaction

Features which will upset the customer

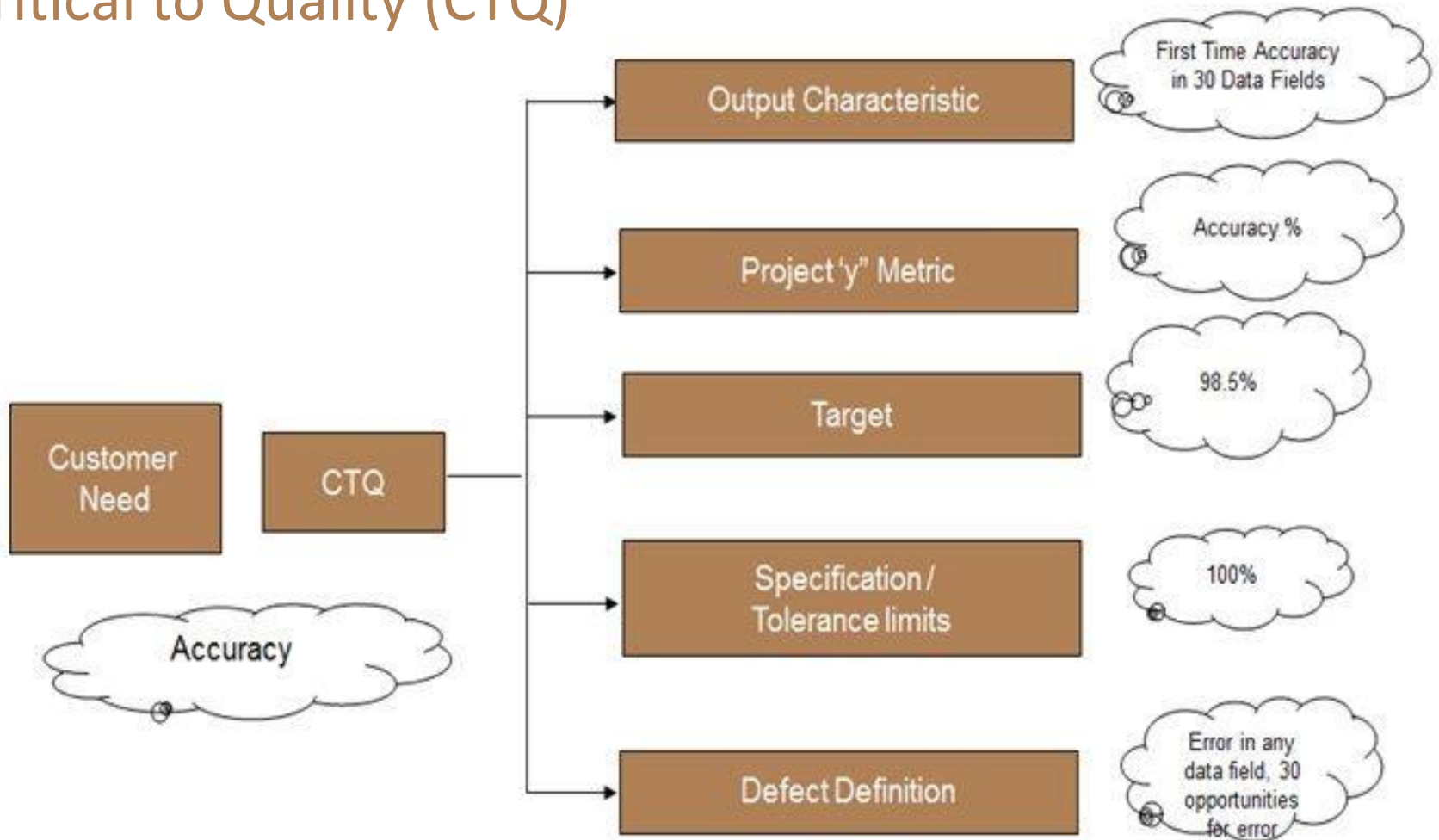
Voice of the Customer (VoC)

The Kano Model

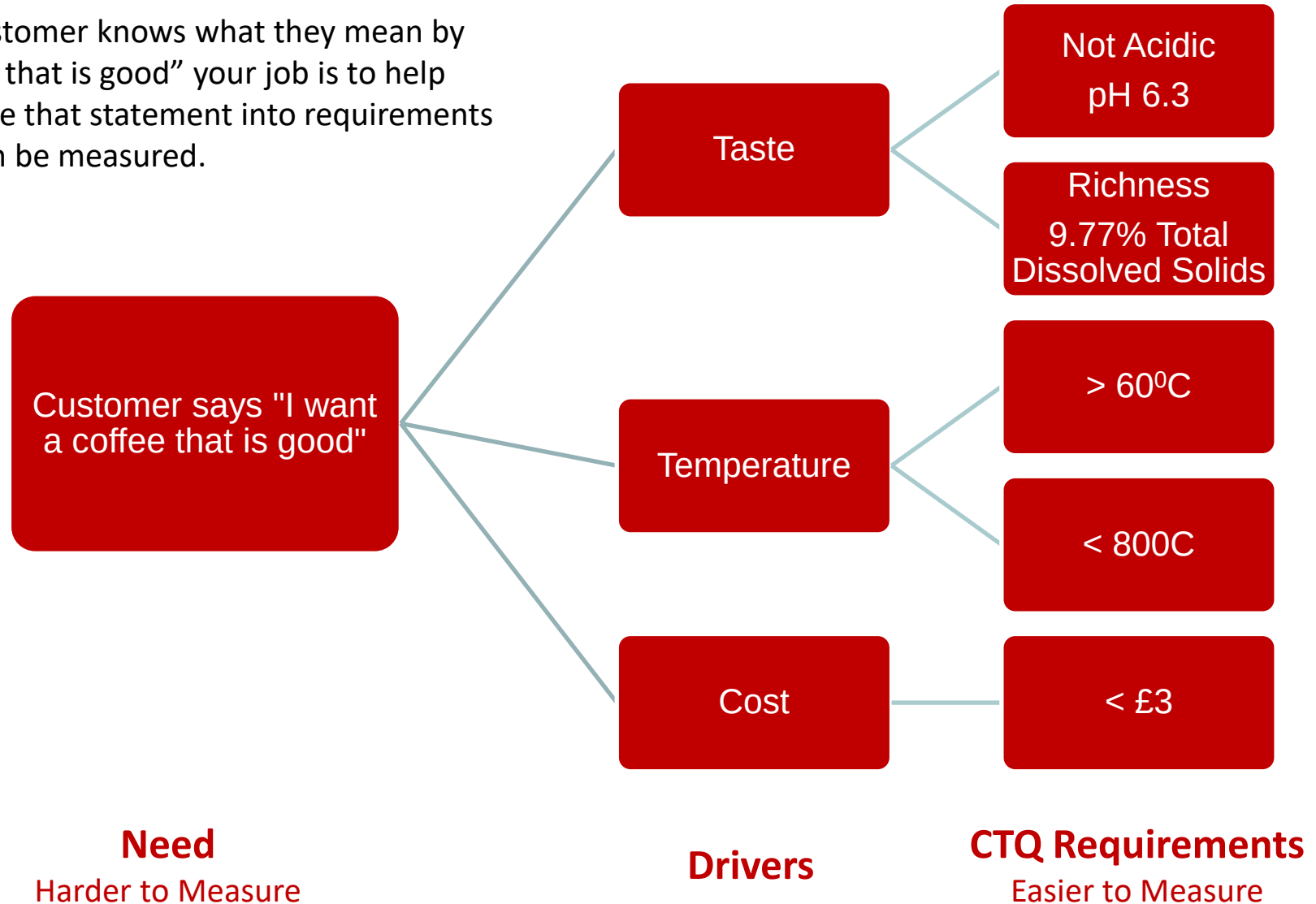


Level 5 – Continuous Improvement with Industry 4.0

Critical to Quality (CTQ)



The Customer knows what they mean by "Coffee that is good" your job is to help translate that statement into requirements that can be measured.



Voice of the Customer

Requirement

The 'Big' Y

Voice of the Customer

Key Customer Issues

Critical Customer Requirement (CCR)

Critical to Quality (CTQ)

Goal Statement from Project Charter

Example

Increase Sales

Sales quotes takes too long.

Get quotes in a timely manner.

Quote should be received by customer in 14 days or less.

Cycle time for quote.

95% of all quotes should be delivered to customer in 14 days from customer's request for quotation.

Critical Customer Requirements

Critical to Quality

Some ways we can measure the process performance

- Defects Per Million Opportunities
- First-pass yield
- Defects Per Unit
- Throughput Yield

Defects Per Million Opportunities (DPMO)

$$\text{DPMO} = \text{Units} / (\text{Critical Characteristics} * \text{Errors Detected}) \\ = 74 / (4 * 600) * 10^6 = 30,833$$

Units	Process Step	Critical Characteristics	Errors Detected	Items with Error(s)	DPMO
600	1	4	74	51	30,833
600	2	3	103	98	57,222
600	3	1	67	66	111,667
600	4	3	157	86	87,222
600	5	1	44	43	73,333

$$\text{First-Pass Yield} = 1 - (\text{Items with Error(s)} / \# \text{ Units})$$
$$= 1 - (51 / 600) = 92\%$$

Units	Process Step	Critical Characteristics	Errors Detected	Items with Error(s)	DPMO	First-pass Yield
600	1	4	74	51	30,833	92
600	2	3	103	98	57,222	84
600	3	1	67	66	111,667	89
600	4	3	157	86	87,222	86
600	5	1	44	43	73,333	93

DPU = # Errors Detected / # Units

DPU = 74 / 600 = 0.12

Units	Process Step	Critical Characteristics	Errors Detected	Items with Error(s)	DPMO	First-pass Yield	DPU
600	1	4	74	51	30,833	92	0.12
600	2	3	103	98	57,222	84	0.17
600	3	1	67	66	111,667	89	0.11
600	4	3	157	86	87,222	86	0.26
600	5	1	44	43	73,333	93	0.07

Throughput Yield = 1- (Errors Detected / # Units)
Throughput Yield = 1- (74 / 600) = 88%

Units	Process Step	Critical Characteristics	Errors Detected	Items with Error(s)	DPMO	First-pass Yield	DPU	Throughput Yield (%)
600	1	4	74	51	30,833	92	0.12	88
600	2	3	103	98	57,222	84	0.17	83
600	3	1	67	66	111,667	89	0.11	89
600	4	3	157	86	87,222	86	0.26	74
600	5	1	44	43	73,333	93	0.07	93