How test programs and methods evaluate and how to deal with that?

- an old technique in a new coat -

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Contents

1. Intro and growth
2. Customers and QFD
3. Tailored testing and example
4. Conclusions

1. Growing

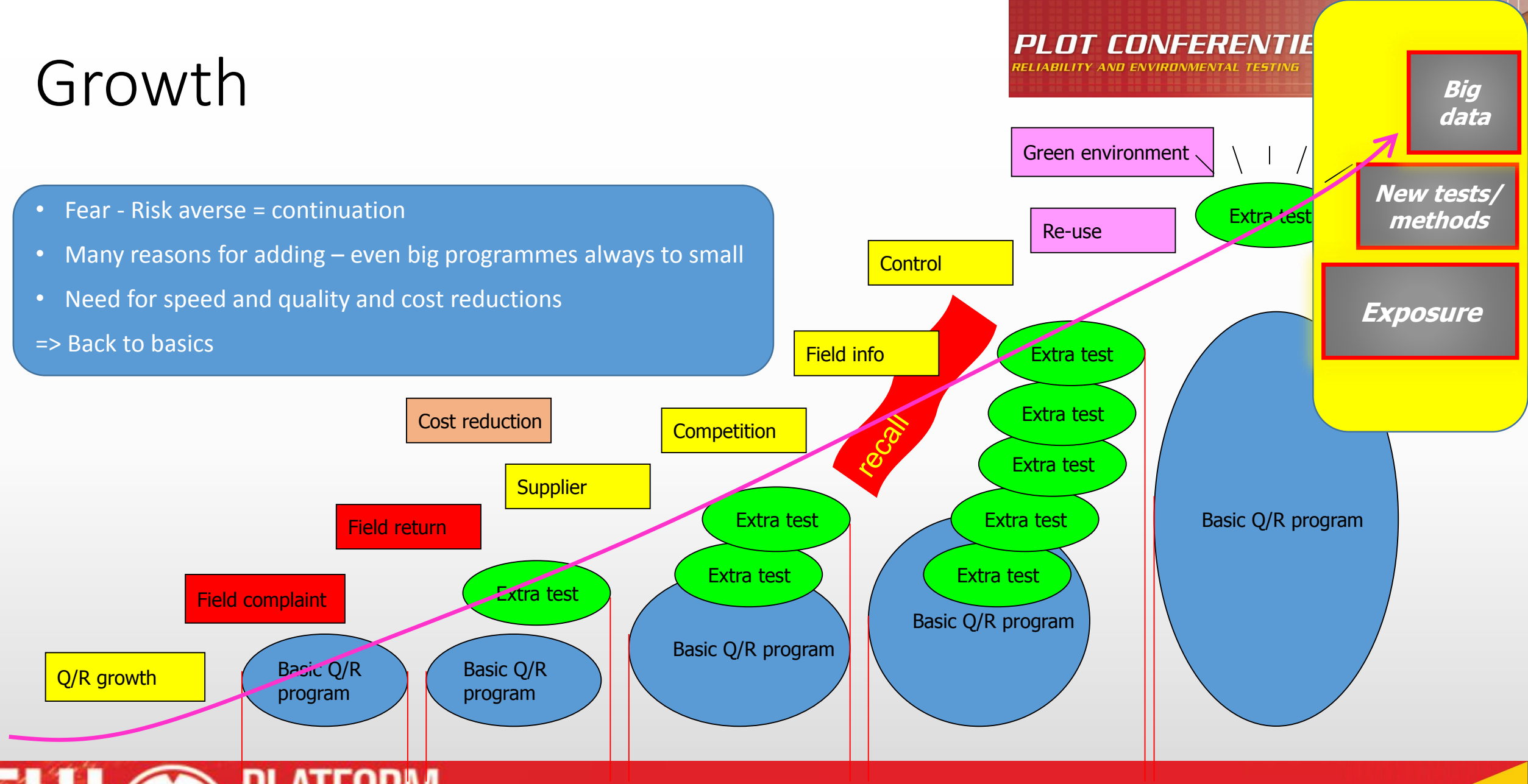
- Why are testplans growing?
- Will it continue?
- How to handle this?

Evolution

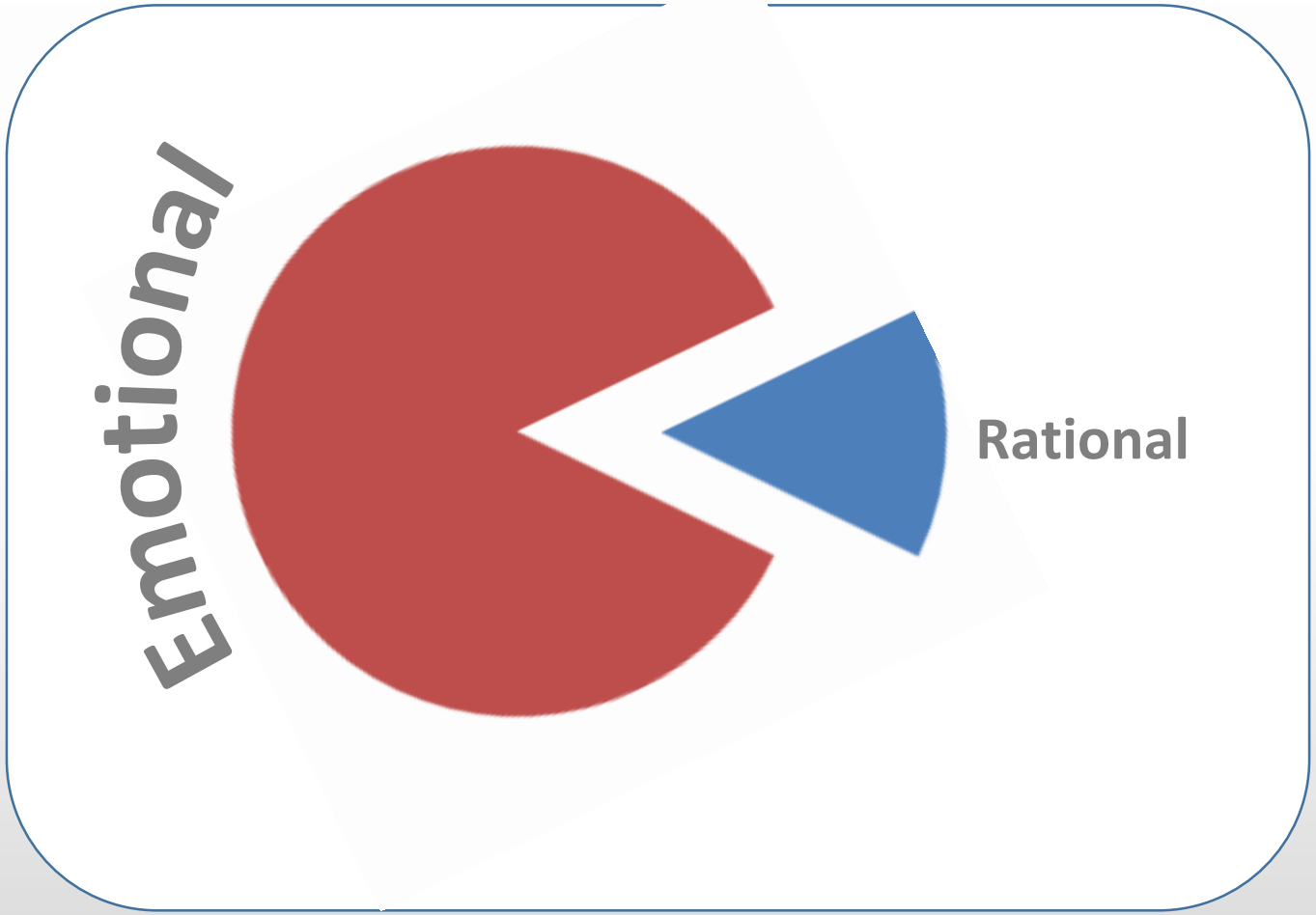
Growth

- Fear - Risk averse = continuation
- Many reasons for adding – even big programmes always to small
- Need for speed and quality and cost reductions

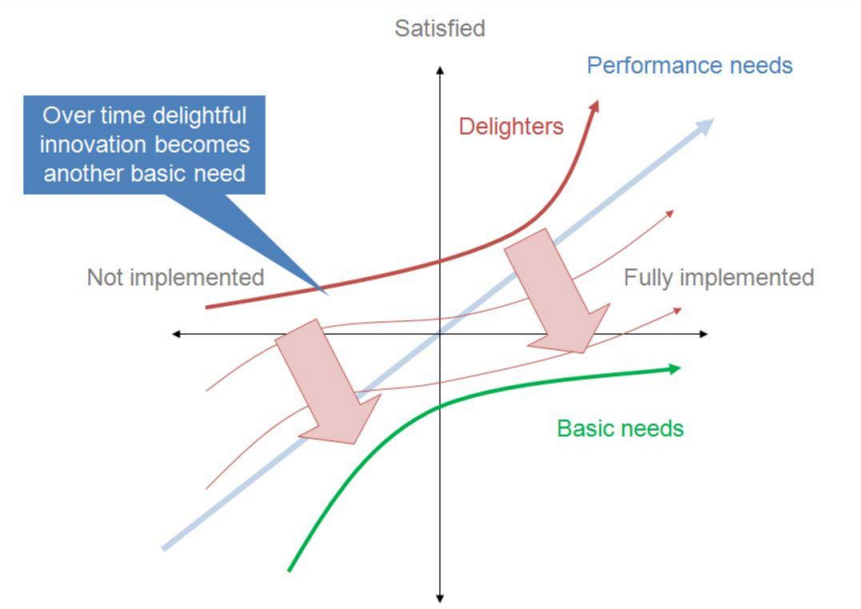
=> Back to basics

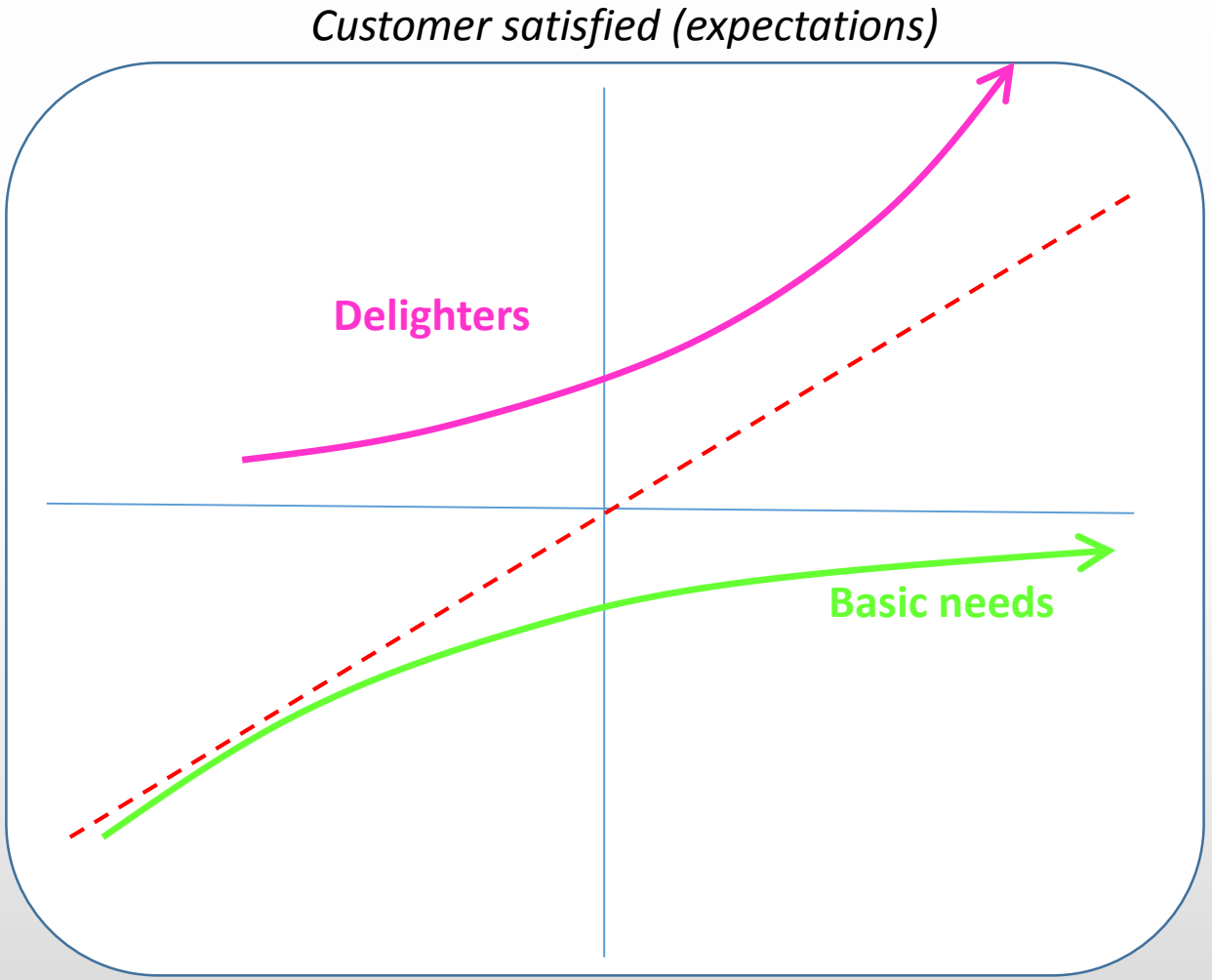


… because it can



Customers … (Kano-model)





… and technicians

- Rational
- Quantification
- Control
- Reliability
- Predictability

2. Quality Function Deployment

- Why are customers so difficult?
- How do we get a handshake?
- What means Quality Function Deployment?

QFD model

Developers and technicians

- rational behaviour -

- Ratio to test and predict
- Characterization
- Quantitative research possible

Customer and users

- emotional behaviour -

- Emotional behaviour and responses difficult to test
- Extensive market studies, long time, expensive, too late to steer development
- Qualitative research

and Reliability Engineers

Tools

FMECA, RRA, MTBF, QFD, testing etc.

Ratio – control/Feeling - experience

Wow (onbewust)

Rationeel (technisch)

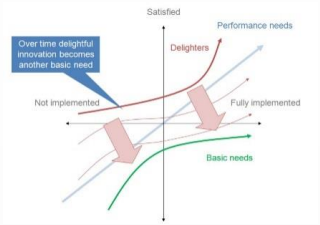
"Emotioneel" (user)

QUALITY FUNCTION DEPLOYMENT (QFD)

Project:

Revisio

Date: 2



* agreed delighters (MS1)

Dissatisfiers in red - brand reputation

TECHNICAL FUNCTIONS

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
VO CUSTOMER RATING																				
6	**VOICE OF CUSTOMER**																			
	Basic needs (Kano)																			
6	5			3	8	6	6	8	7	4	4	6	6	4	5	7	4	6		8
4	4			**2**	7	6			4		4	6	**2**	3	**2**	7	4	6		4
7					8	6	6	8	8									6	6	
7						6	6	8	8									6		
6					8		6		8								**4**	6	6	
	Delighters (Kano)																			
5									6	4	4	6					4			6
6						6	6	8		4	4	6	6		6			6	6	7
7					8	6	6	8	6											
5									6	4	4	6	6		6					
6																		6	6	
7		8	8		8	6	5		8						6				6	
8																				8
6																			6	
	Performance																			
5	5	8	6	3	6	6	4	8	7	4	4	6	6	4	6	7	2	6	6	6
6	4	6	4	4	6	6	4	8	6		7	8	8	7	6	7		6	6	6
	TECHNICAL RATING	***5***	***7***	***6***	***3***	***7***	***6***	***5***	***8***	***7***	***4***	***4***	***6***	***6***	***5***	***5***	***7***	***4***	***6***	***6***

	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
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	Performance																			
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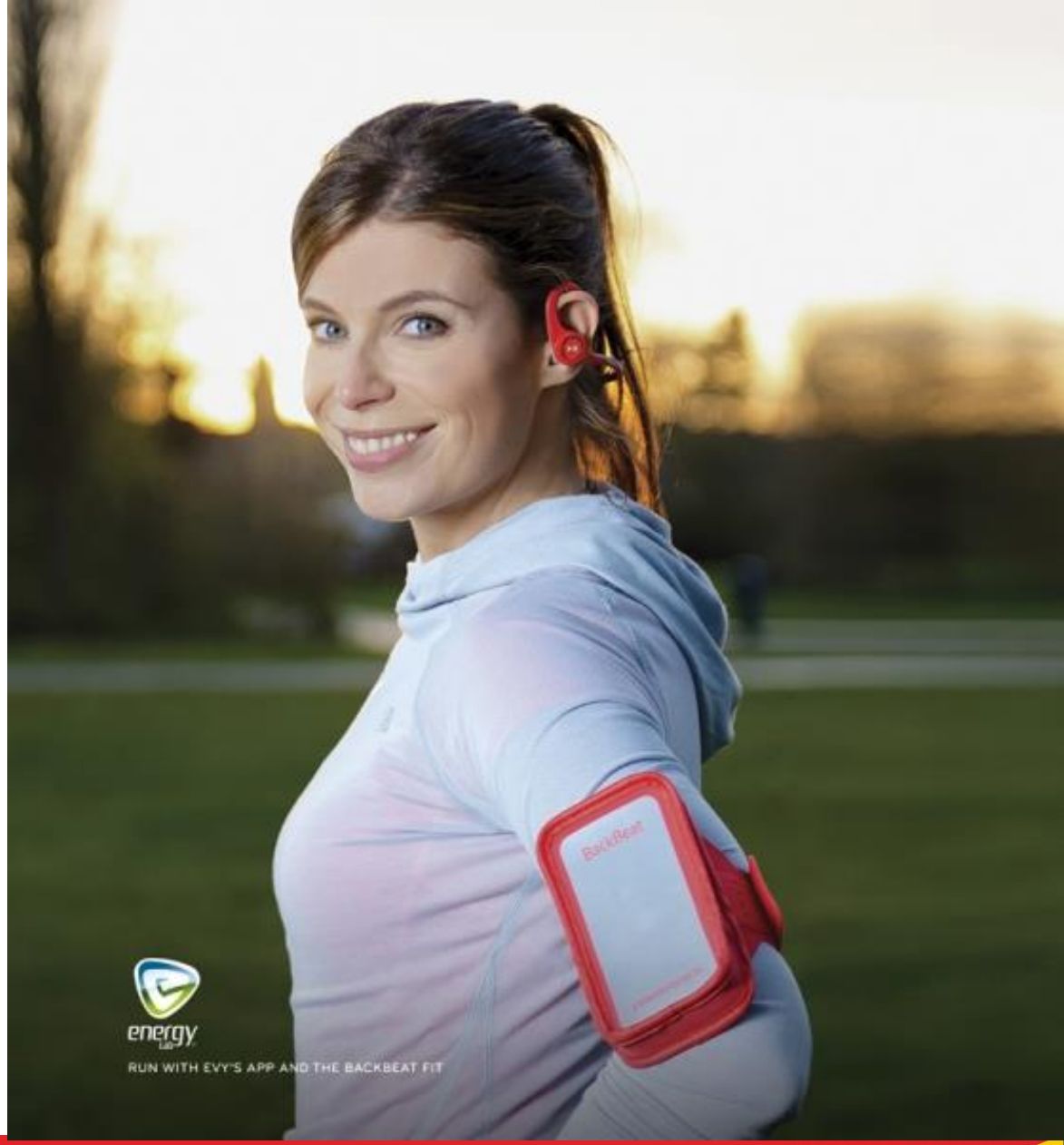
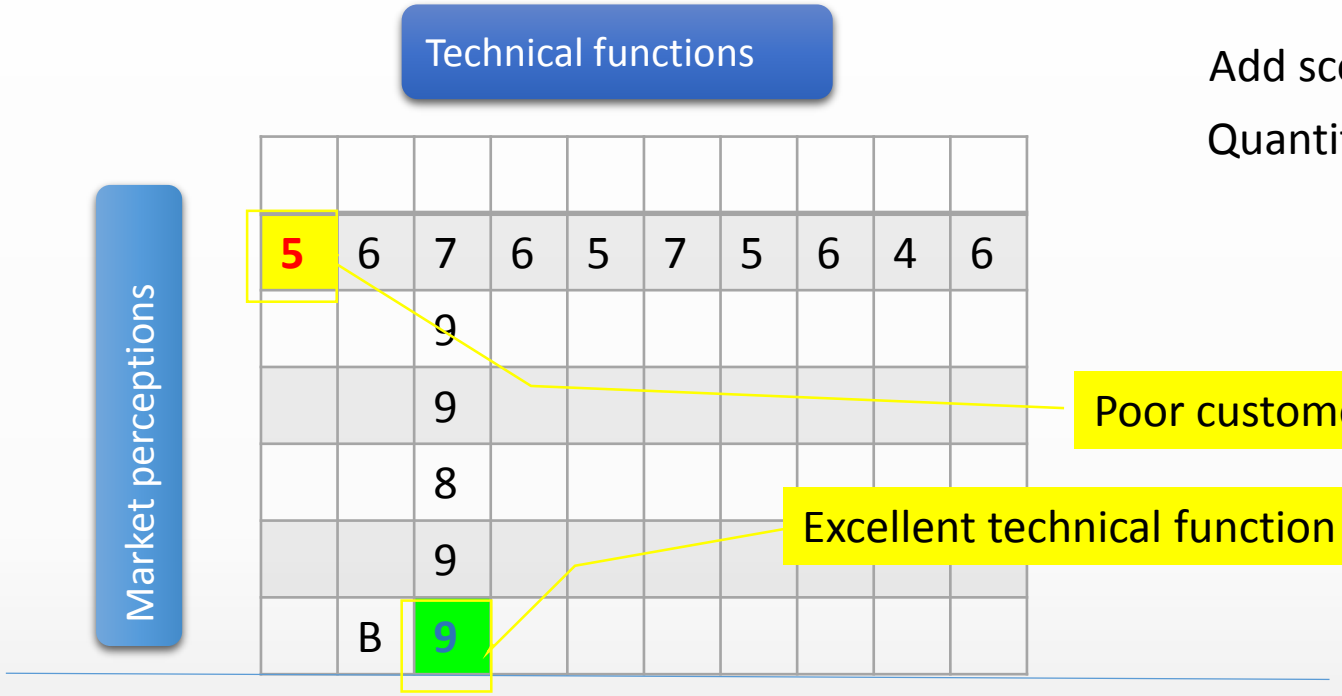
	TECHNICAL RATING	***##***	***##***	***##***																

Example

- How it works in practice



And… insight

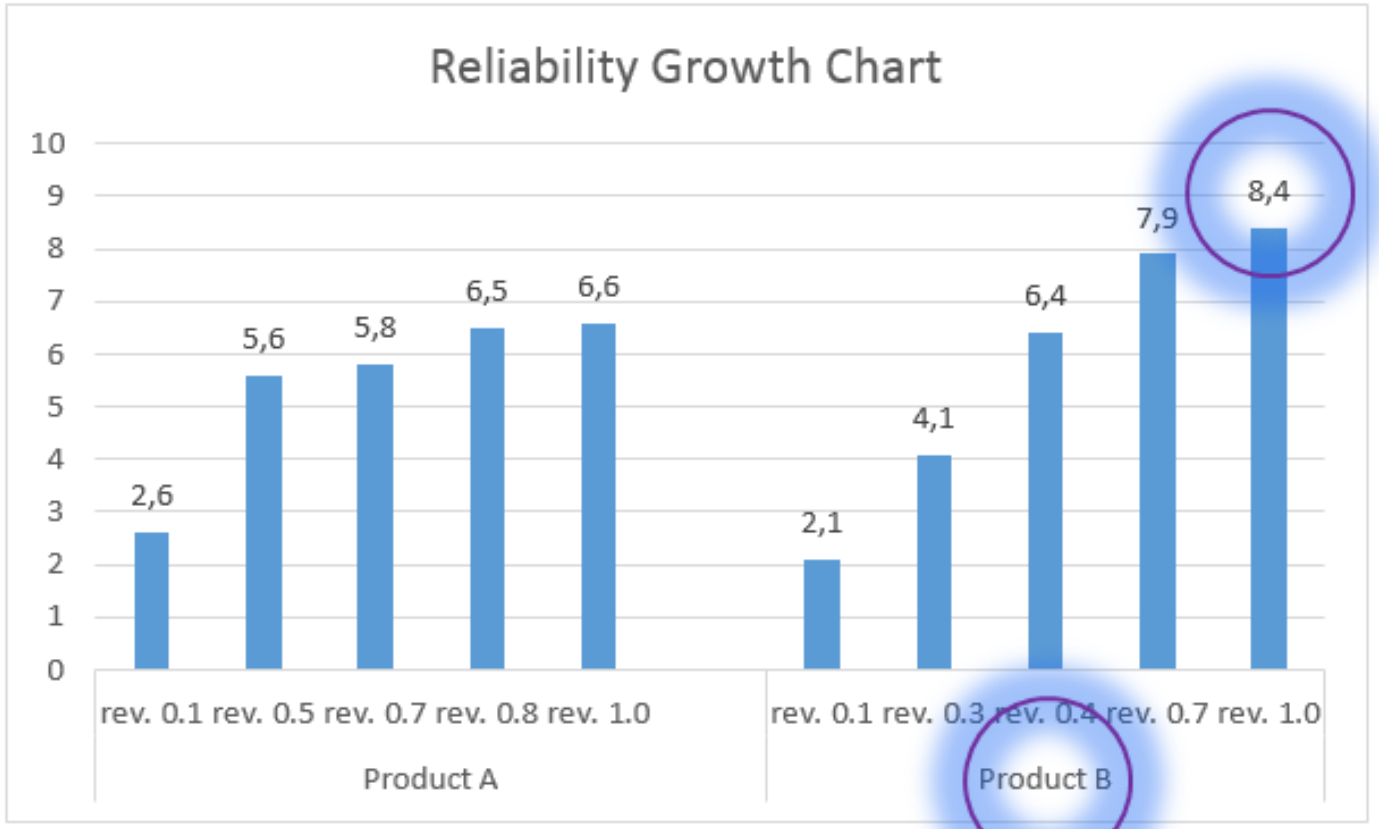


Add score/numbers

Quantification – product maturity for use

shamed red ‘smiling’

Alt. Reliability “growth”



QFD

Quality Function Deployment pro's

1. **Focus and Insight**
   - VoC + delighters
   - Transferfunction/Relation E & R
2. **Quantification**
   - Score matrix
3. **Relationships clear**
   - One function more relations
   - Strength of relation

Quality Function Deployment con's

1. **VoC study**
   - Basic needs
   - Delighters
2. **Transfer to functional blocks/risks**
   - Language (technicians)
3. **Stuck to standard programs**
   - Customer requirements w/o use case

3. Tailored Testing

- How to incorporate testing in QFD?
- What are the basics for test tailoring?
- How does it work in practice?

The concept based on QFD

Voice of customer
- basic needs
- expectations
- surprises (wow)

Adding technical functions (control)

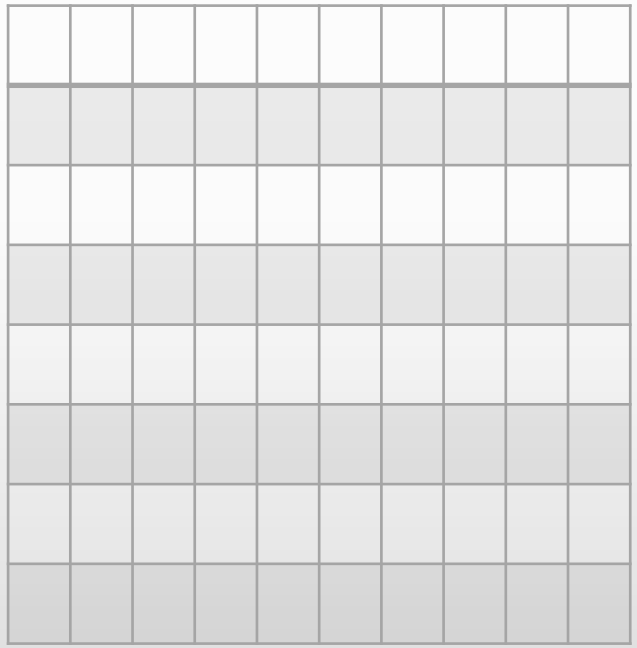
Voice of technicians
- basic functions
- technical modules

Voice of customer
- basic needs
- expectations
- surprises (wow)

And reliability/testing?

Voice of customer
- basic needs
- expectations
- surprises (wow)

Voice of technicians
- basic functions
- technical modules



Reliability Evaluation
- analysis
- testing

- Technical functions are
  - understood – (Physics of Failure)
  - testable
  - quantifyable

Lost from QFD – add Reliability

Technical functions

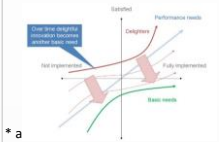
Market perception

Reliability Evaluation

RELIABILITY FUNCTION DEPLOYMENT (RFD)

Project:
Revision:
Date:

Colored cells means that this item is affected
Legend: 1 = poor 10 = excellent, current ratings presents opinion of design team



* a
Dissatisfiers in red - brand reputation

VOICE OF CUSTOMER	MISSION PROFILE	VO CUSTOMER RATING
Basic needs (Kano)		
Good looking design*	All day use. Good looking cus	6
		4
		7
		7
		6
Delighters (Kano)		
Fit & stability*	Positioning capsules (turn)	5
		6
		7
		5
		6
		7
		8
		6
Performance		
Reliability experience & return rate		5
Production quality/output		6
	TECHNICAL RATING	

TECHNICAL FUNCTIONS

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
5			3	8	6	6	8	7	4	4	6	6	4	5	7	4	6		8
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								6	4	4	6	6		6					
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	8	8		8	6	5		8						6			6		
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5	8	6	3	6	6	4	8	7	4	4	6	6	4	6	7	2	6	6	6		4
6	4	6	4	4	6	6	4	8	6		7	8	8	7	6	7		6	6	6	
5	*7*	*6*	*3*	*7*	*6*	*5*	*8*	*7*	*4*	*4*	*6*	*6*	*5*	*5*	*7*	*4*	*6*	*6*	*6*	*6*	*4*	*8*	*##*	*##*	*##*

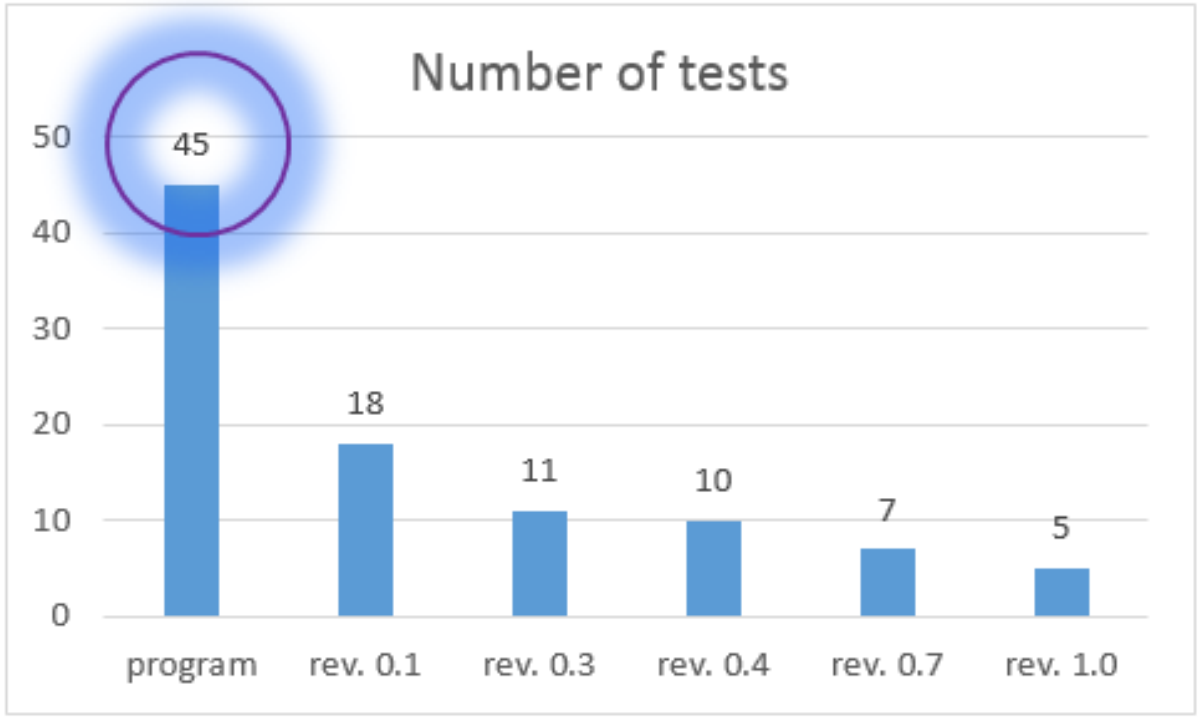
RISKS

TEST RESULTS	EVALUATION/TEST	CONDITIONS
FAIL	VIsual inspection	
FAIL	Packaging inspection	
PASS	Tumbling test	1 m
PASS	Moisture test	IPx2, IPx4
3 dec.	Salt mist test	24 hrs
3 dagen OK	Sweat test	5 + 60 min
	Durability pouch test	2400 x
	Cable/bend relief rob.	
3-dec	Halogen test	Cl
Vervalt, want tumble goed	~~Vibration/shock test~~	~~6 hr~~
4-dec	Thermal shock	

Example

- How it works in practice

Test reduction



note: second product in product line.

Tailored testing

Tailored testing pro's

1. **More value of test**
   - Effectiveness score
   - "always pass" removed
   - insight what you test (Tech.Funct.)
2. **Less tests and prioritizing**
   - Only tests with value for function
3. **Direct relation to customer**
   - Customer affected issues first
   - Fast benefits from test

Tailored testing con's

1. **Tailored testing competence**
   - Experience
   - PoF
2. **Oustide confort zone**
   - Language (technicians)
   - Insecure - fear
3. **Extra work**
   - Next to standard programs
   - Miss out benefits

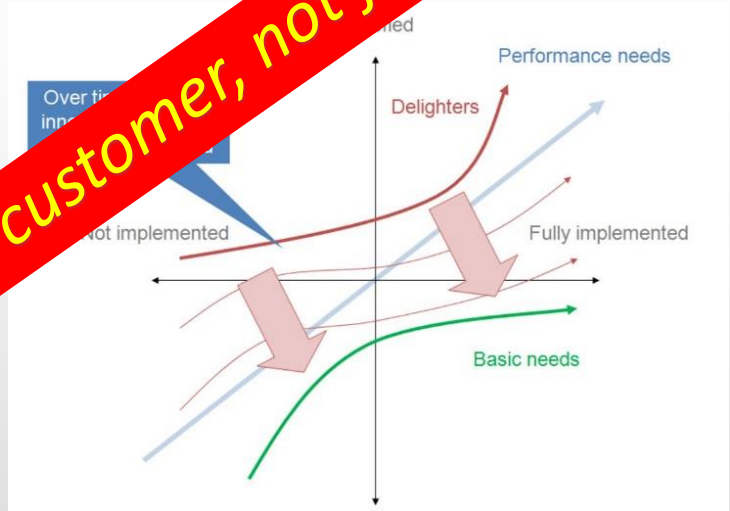
Conclusion

- **Growth of data is given, especially in big data and social data, but to control**
  - customer power
  - customer is strange.... (Kano, emotional)

- **QFD helpfull tool, not only for quality but as well for reliability and testing**
  - to trigger customer expectations and give overview and insight
  - to rationalize in technical terms and baseline for test tailoring
  - to quantify how you perform, show status and progress

- **Test tailoring can help to keep effective and less testing**
  - shows effectiveness of test (better 3x specific than general)
  - helps with prioritation
  - points you at black spots (no test for a function)

Test for the customer, not for the plan



QFD & TT

- An old technique in a new look