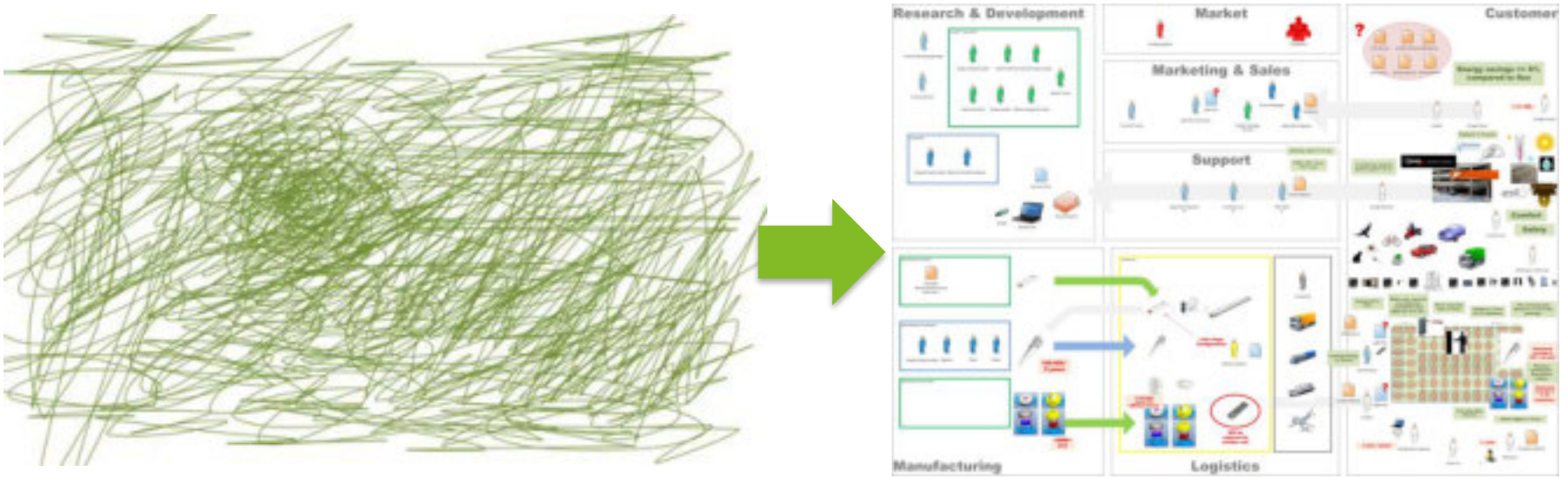
CopenhagenContext

Creating insight and overview: dealing with complexity in testing

Ruud Cox & Huib Schoots



Improve
QUALITY SERVICES

Who are we?

Ruud Cox  @ruudcox

Huib  @huibschoots

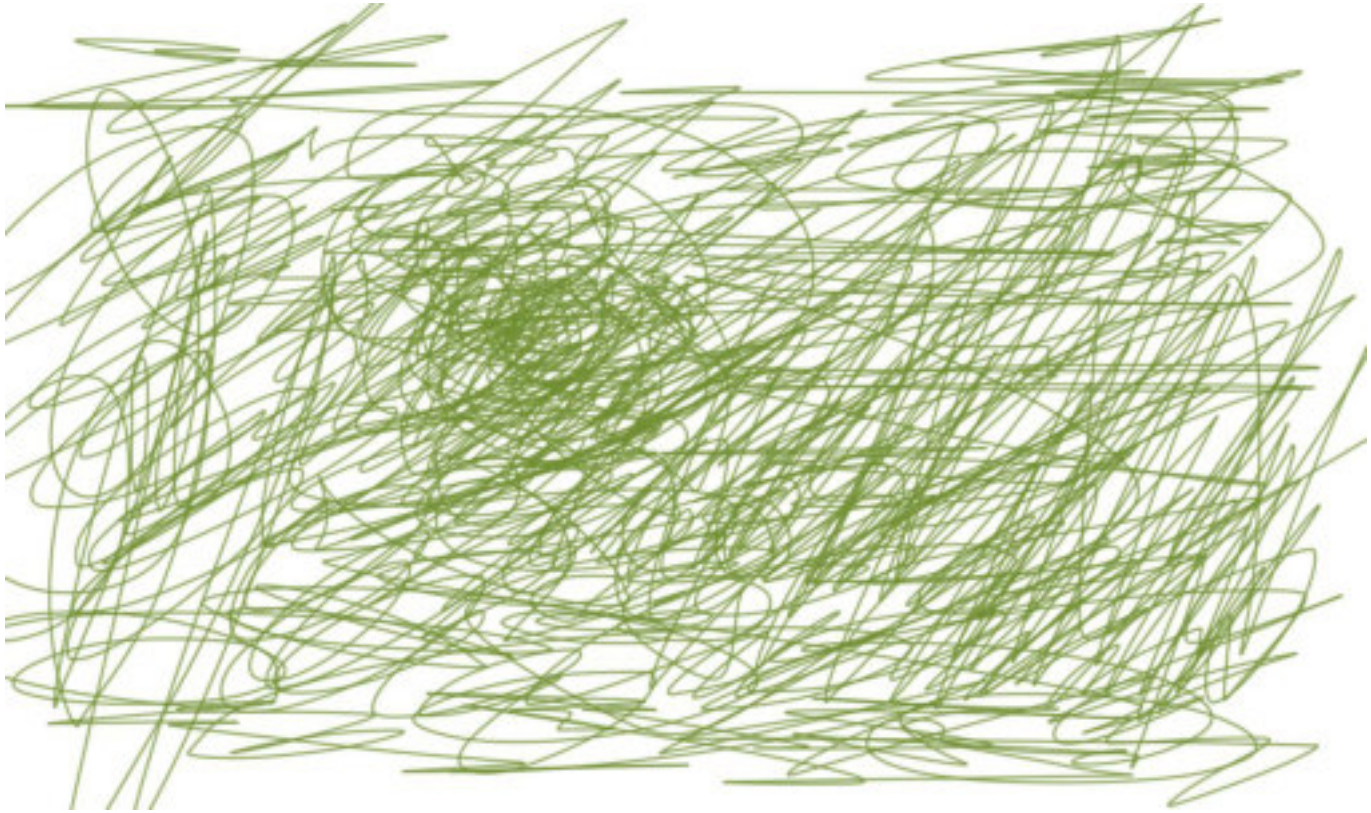
Who are you & why are you here?

- Who are you?
- Why are you here?
- What do you want to learn?

Outline

- What is context?
- How could you analyze your context?
- What factors could be influential?
- How could you model these?
- How could you use context information to inform your testing?

Problem



The context of the product is unclear

Testing

Testers gather information about what the product is in relation to its environment

There is value in a high quality requirements document but it is often not available or maintained and never complete.

Exercise: What is Context?

1. Define context
2. Why is context important?

Any questions?

Debrief

It depends...

1. What exactly do you mean by “it”?
2. On what does it depend?

Context?

What is Context-Driven Testing?

"People evaluating a product by learning about it through experimentation in a manner organized and motivated by a systematic consideration of all the factors that significantly influence the problems and solutions that lie within the scope of their mission."

-- James Bach, Let's Test in 2013: "How do I Know I am Context-Driven?"

What is context?

Definition of *context* in English:

context

NOUN

1 The circumstances that form the setting for an event, statement, or idea, and in terms of which it can be fully understood.

'the proposals need to be considered in the context of new European directives'

+ More example sentences | Synonyms

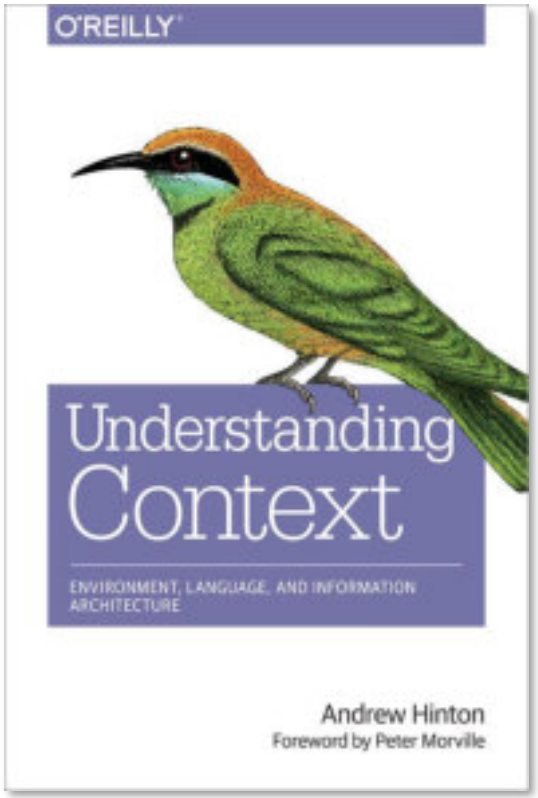
circumstances, conditions, surroundings, factors, state of affairs

frame of reference, contextual relationship

Oxford living dictionary: http://en.oxforddictionaries.com/definition/context

What is context?

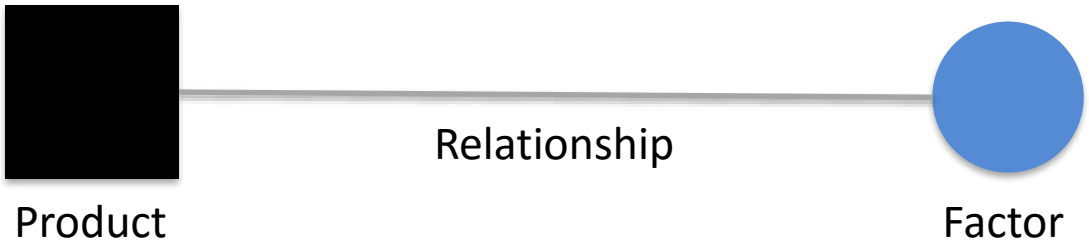
"Whenever we're trying to figure out what one thing means in relation to something else, we say we're trying to understand its context."



Understanding context - Andrew Hinton

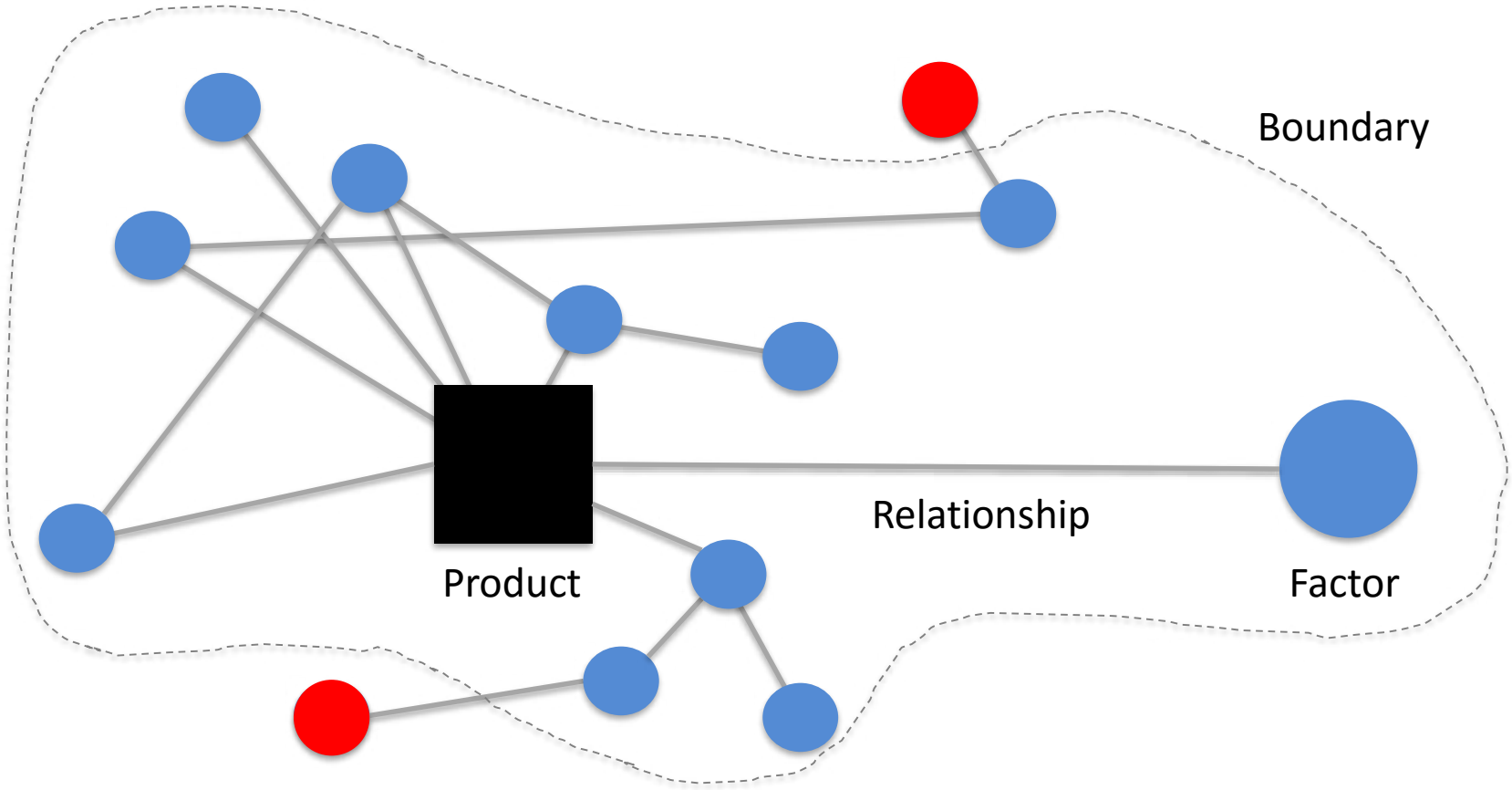
What are we looking for?

- Factors that have a relationship with “the product”



- All of them?

Factors that matter



- What factors influence the product and how?
- What factors are influenced by the product and how?

Exercise: Going to the conference

This morning you walked from your hotel to the conference. Consider your mobile phone as the product. Let's look at the context…

1. Create a model of factors that matter using stickies (1 factor per sticky)
2. For each factor think about:
   - Why is this factor important?
   - What is the relationship with the product?

Any questions?

What is a factor?

Definition of *factor* in English:

factor

NOUN

1 A circumstance, fact, or influence that contributes to a result.

'his skill was a factor in ensuring that so much was achieved'

'she worked fast, conscious of the time factor'

+ More example sentences | − Synonyms

element, part, component, ingredient, strand, constituent, point, detail, item, feature, facet, aspect, characteristic, consideration, influence, circumstance, thing, determinant

Oxford living dictionary: http://en.oxforddictionaries.com/definition/factor

What is a relationship?

Definition of *relationship* in English:

relationship

NOUN

1 The way in which two or more people or things are connected, or the state of being connected.

'the study will assess the relationship between unemployment and political attitudes'

+ More example sentences | − Synonyms

connection, relation, association, link, correlation, correspondence, parallel, tie-in, tie-up, alliance, bond, interrelation, interconnection

View synonyms

Oxford living dictionary: http://en.oxforddictionaries.com/definition/relationship

Debrief

Why do we need this?

- To determine what you could test ...
  - Factors
  - Relations
  - Risks & value
  - Test missions
- The better you understand **the product's ecosystem**, the better you evaluate the product ...
- What about the unknown unknowns?

Deep knowledge

- Assumptions:
  - We know our context well enough
  - We are the experts
  - We are right

full steam ahead!

- Actively working to gain deep understanding how customers work, what the context is they work in (and we work in) and through this deep understanding ideas emerge!

An Introduction to Product Discovery - Teresa Torres
http://www.producttalk.org/2016/08/opportunity-solution-tree/

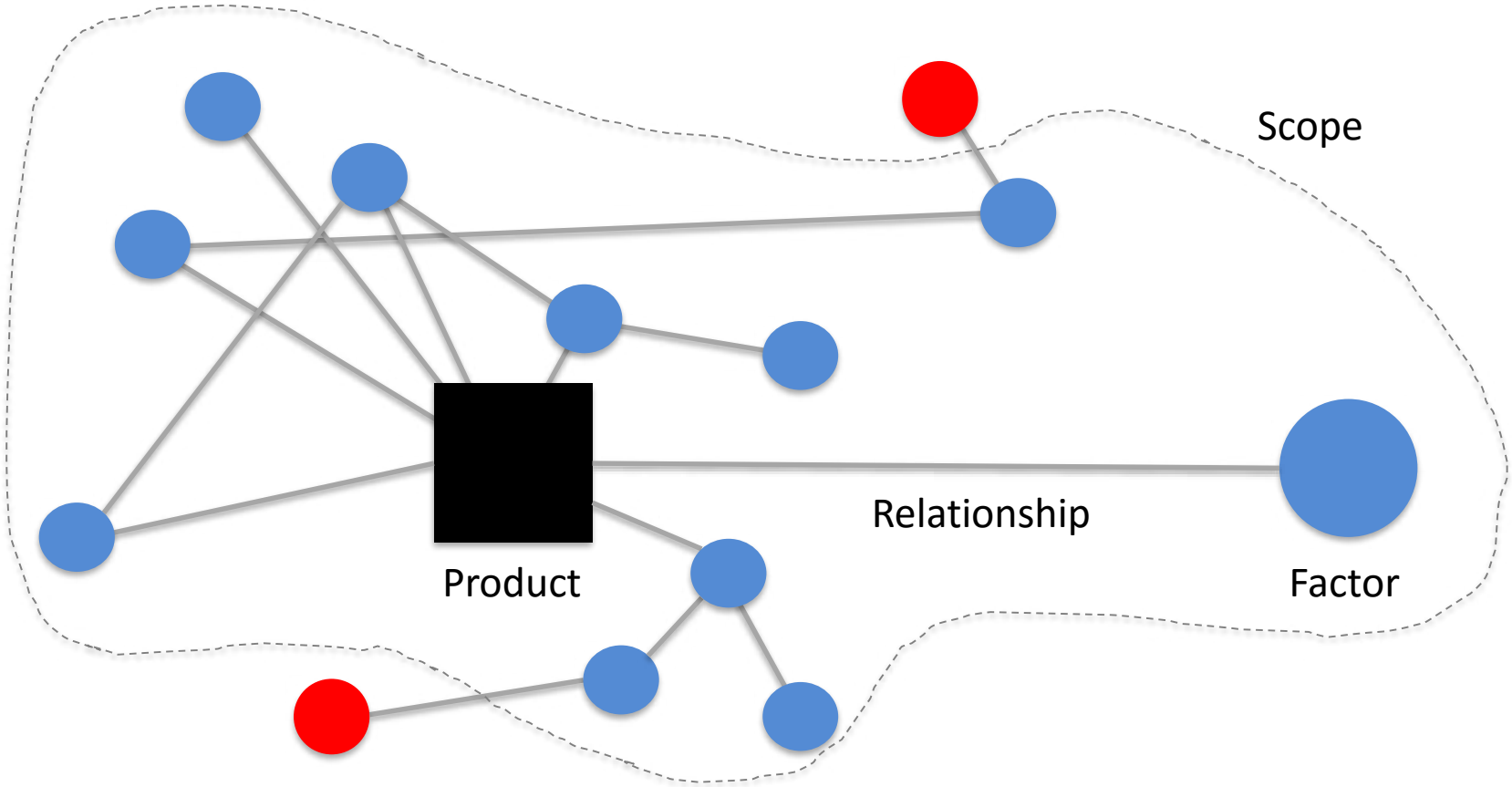
Exploration & discovery

- Rather than assuming we know enough → go out emerge yourself in the full context
- Be honest
  - How well do you really know?
  - We live in the land of vaguery
  - We are wrong quite often
- Complexity: always there is more to know we already know → If it fails, it fails on details.

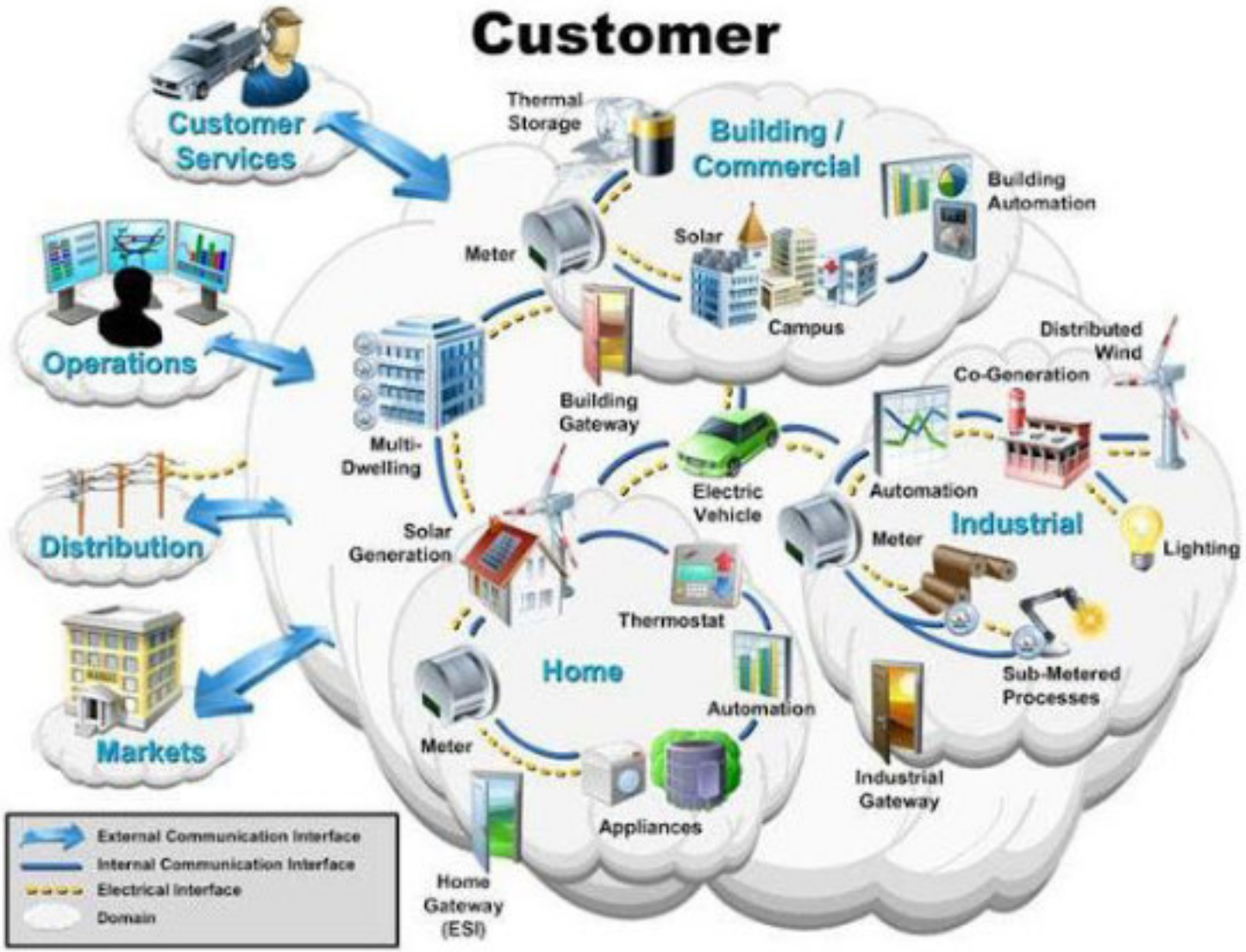
Slow down and move forward with caution!

An Introduction to Product Discovery - Teresa Torres
http://www.producttalk.org/2016/08/opportunity-solution-tree/

Product Ecology



Product Ecology



Models

- **A model is an idea, activity, or object…**

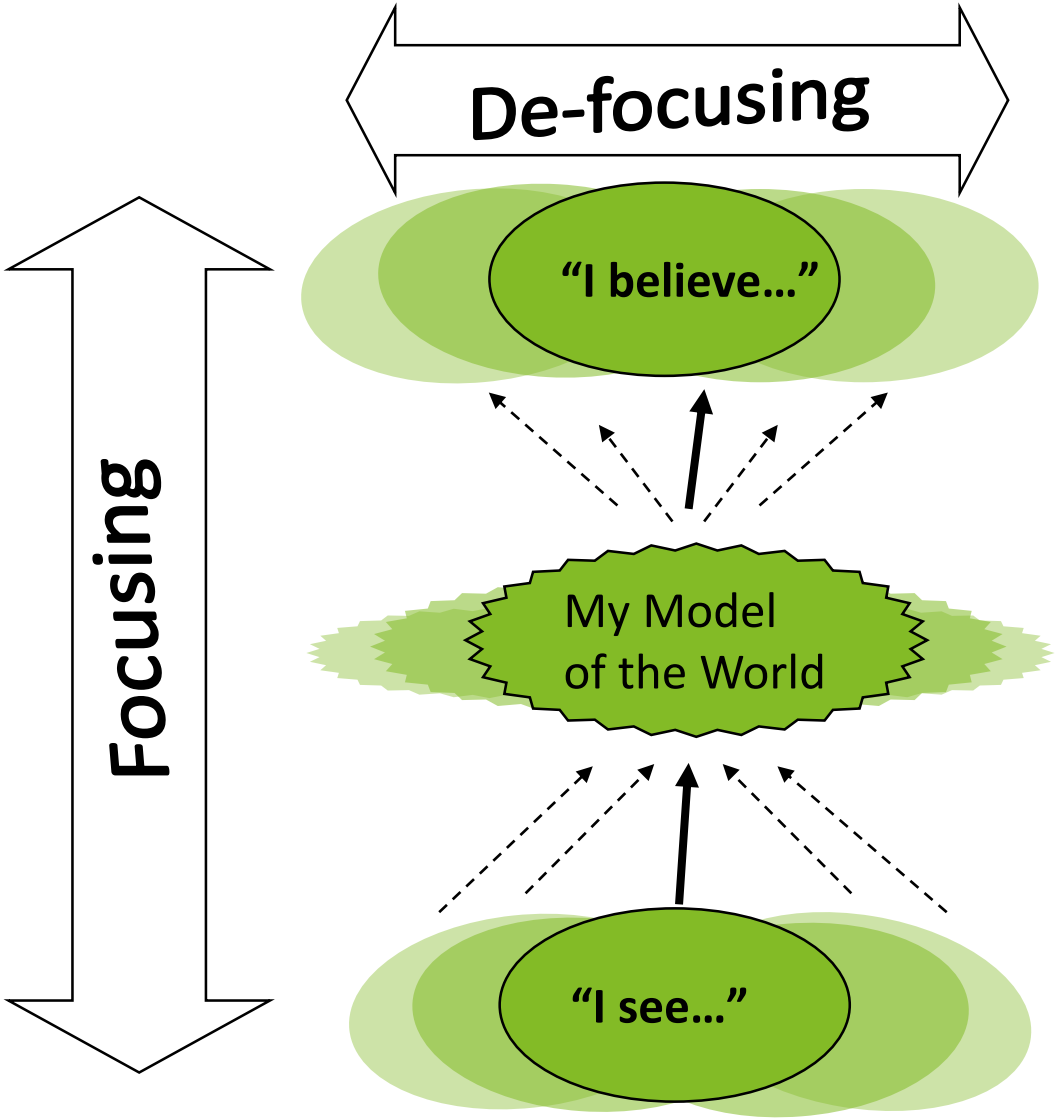
  such as an idea in your mind, a diagram, a list of words, a spreadsheet, a person, a toy, an equation, a demonstration, or a program…

- **…that represents another idea, activity, or object.**

  such as something complex that you need to work with or study.

- **…A GOOD model is one that helps you understand or manipulate the thing that it represents.**
  - A map helps navigate across a terrain.
  - "2 + 2 = 4" is a model for adding two apples to a basket that already has two apples in it.
  - Atmospheric models help predict where hurricanes will go.
  - A fashion model helps people to understand how clothing would look on actual humans.
  - Your beliefs about what you test are a model of what you test.

Models link observation & inference



- **Testers must distinguish observation from inference!**
- Our mental models form the link between them
- Defocusing is lateral thinking.
- Focusing is logical (or "vertical") thinking.

Product Ecology

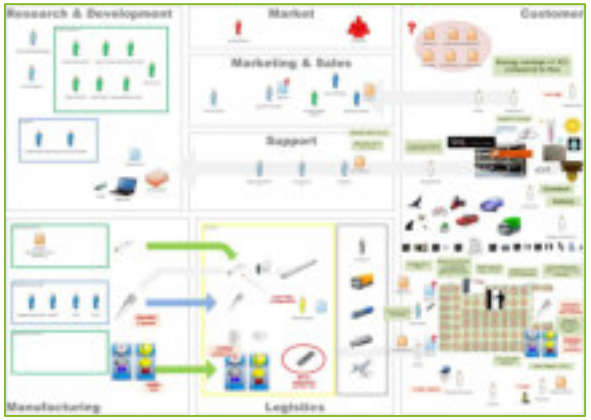
A model, a visualization to understand the complexity surrounding the product.

A product ecology helps us find factors that influence the product and therefore are interesting for testing.

Product Ecology Method

Clarifying and simplifying the complex by:

1. Analyzing the environment from different perspectives
2. Making the invisible visible



Demo: a lighting system for car parks

- Design a lighting system for car parks that consumes less energy than current systems
- Don't compromise on comfort feelings and safety
- ROI <= 2 years

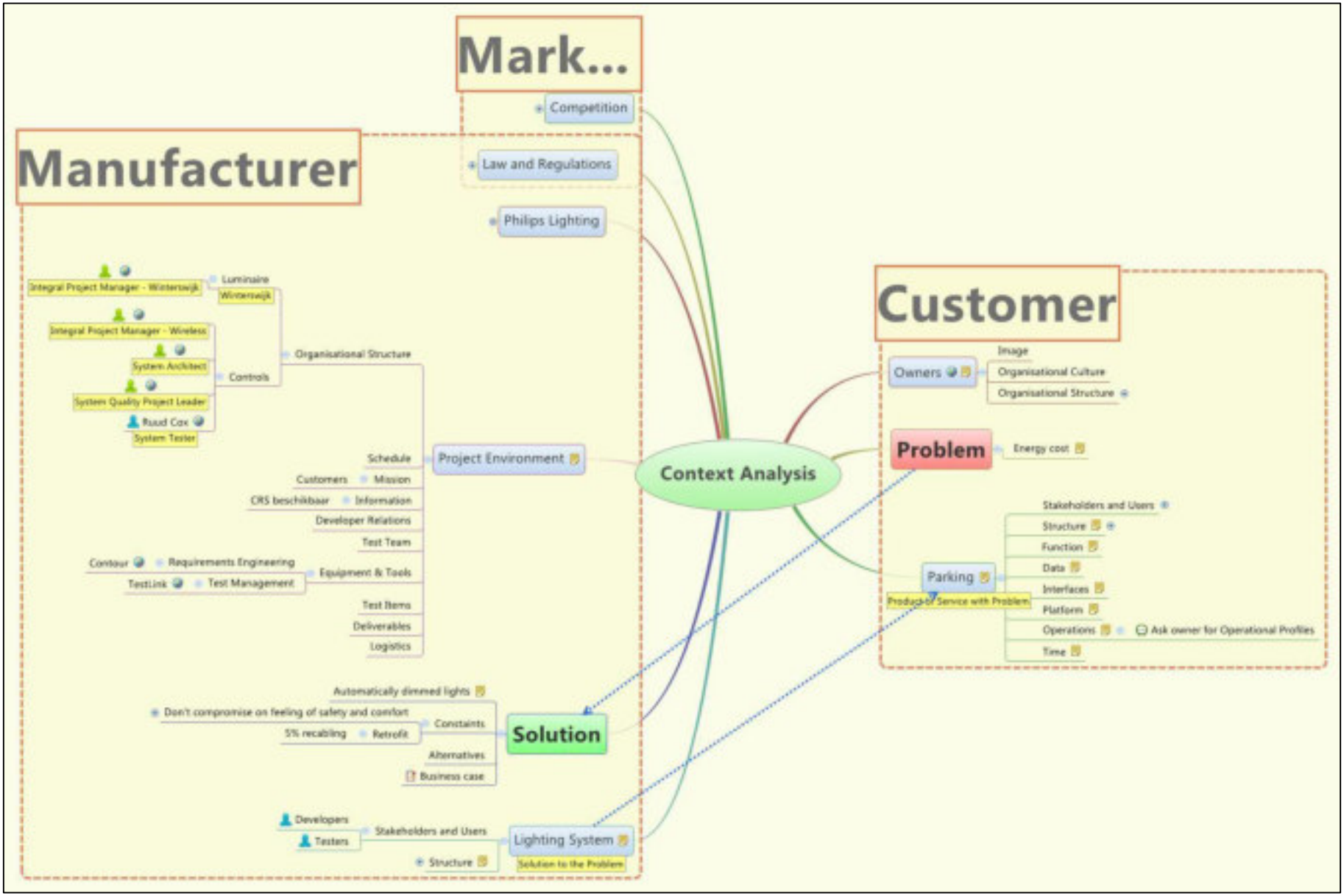


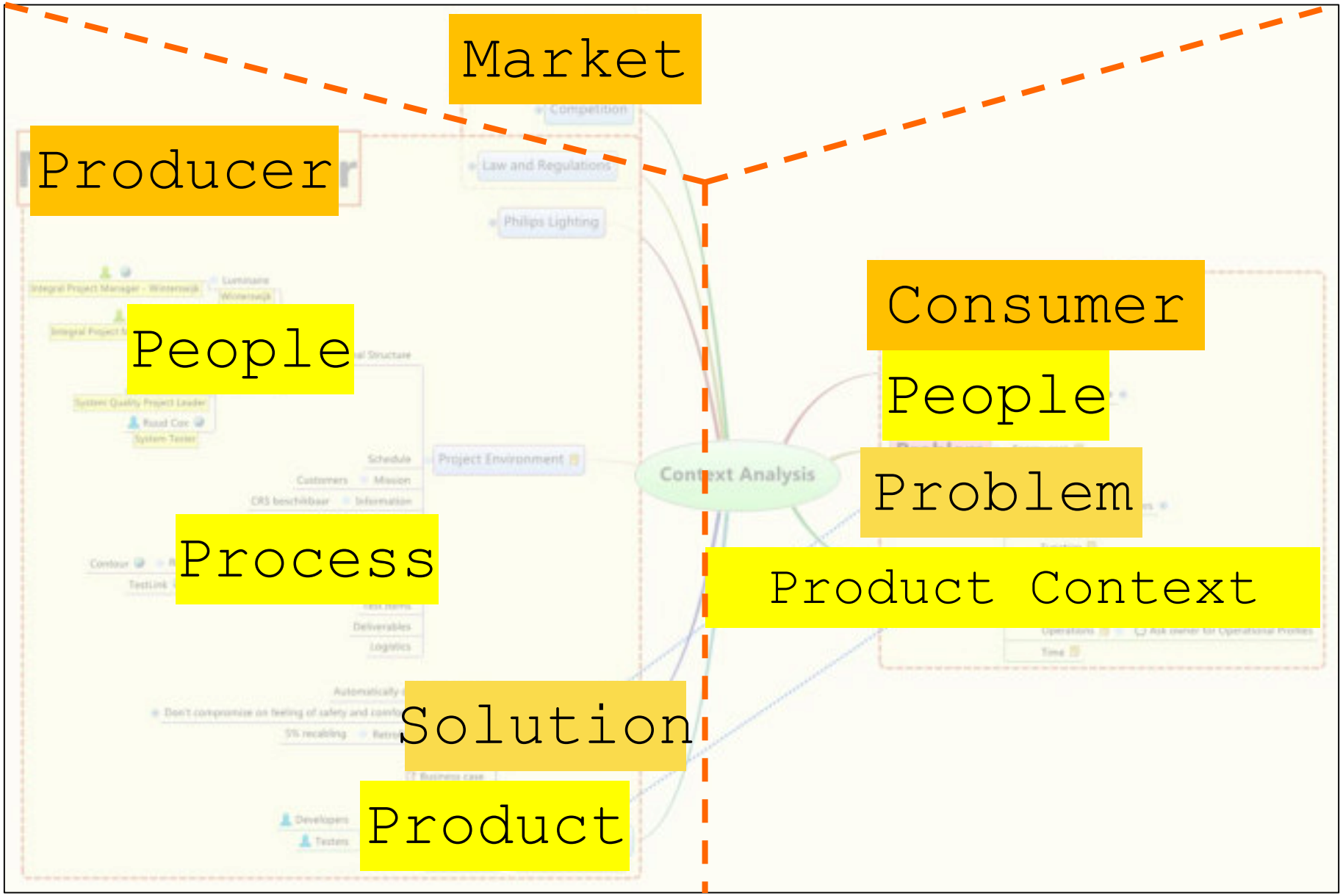

Perspectives

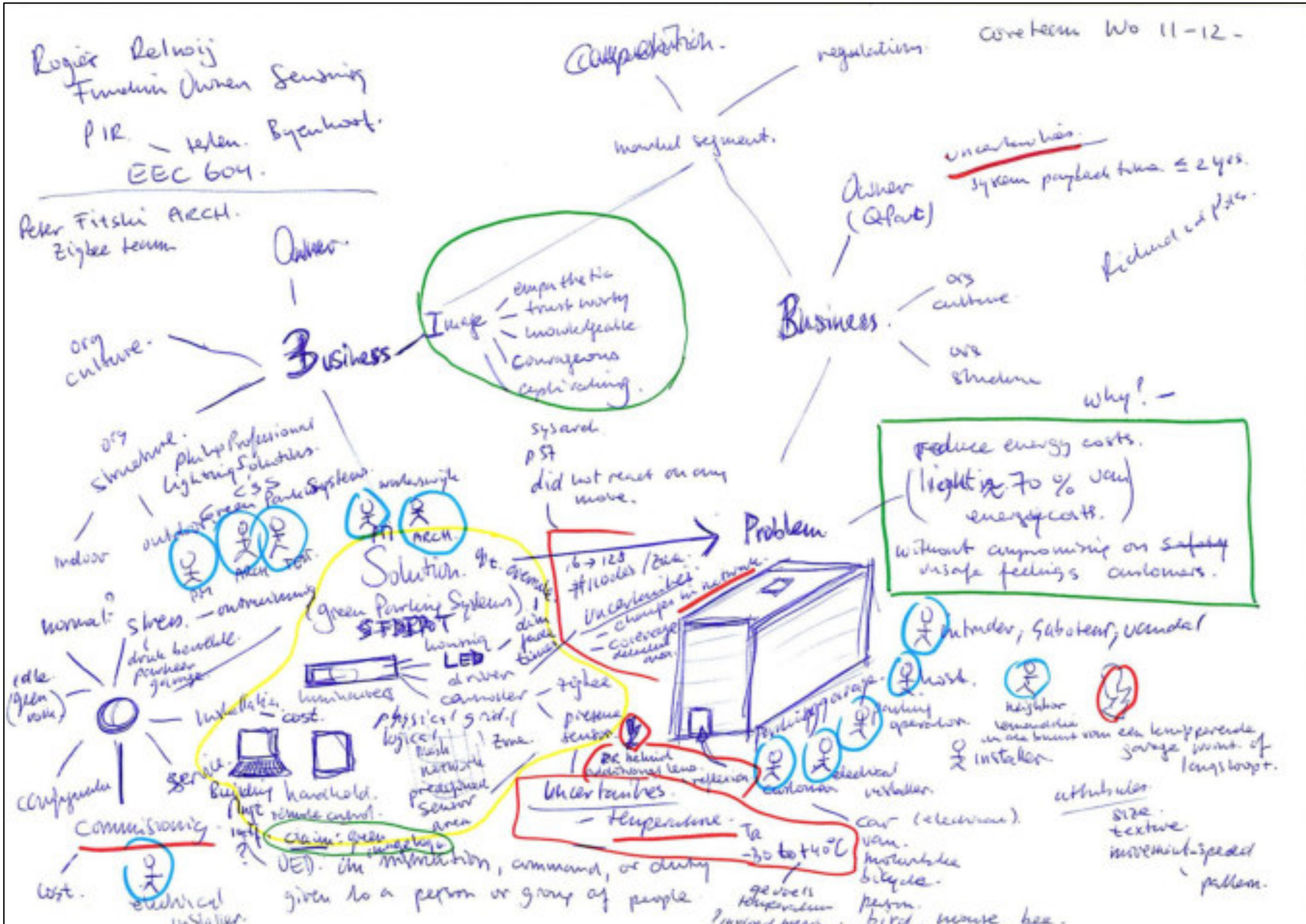
- **Problem, Solution**
  - What is the problem that we are trying to solve?
  - What is our solution to the problem?
  - What other solutions were proposed or evaluated?

- **Producer, Market, Consumer**
  - How and where is the product made? Who are the suppliers?
  - What is the market for this product? Who are the competitors? Are there standards, laws and regulations?
  - Who is our customer? Who buys the product?

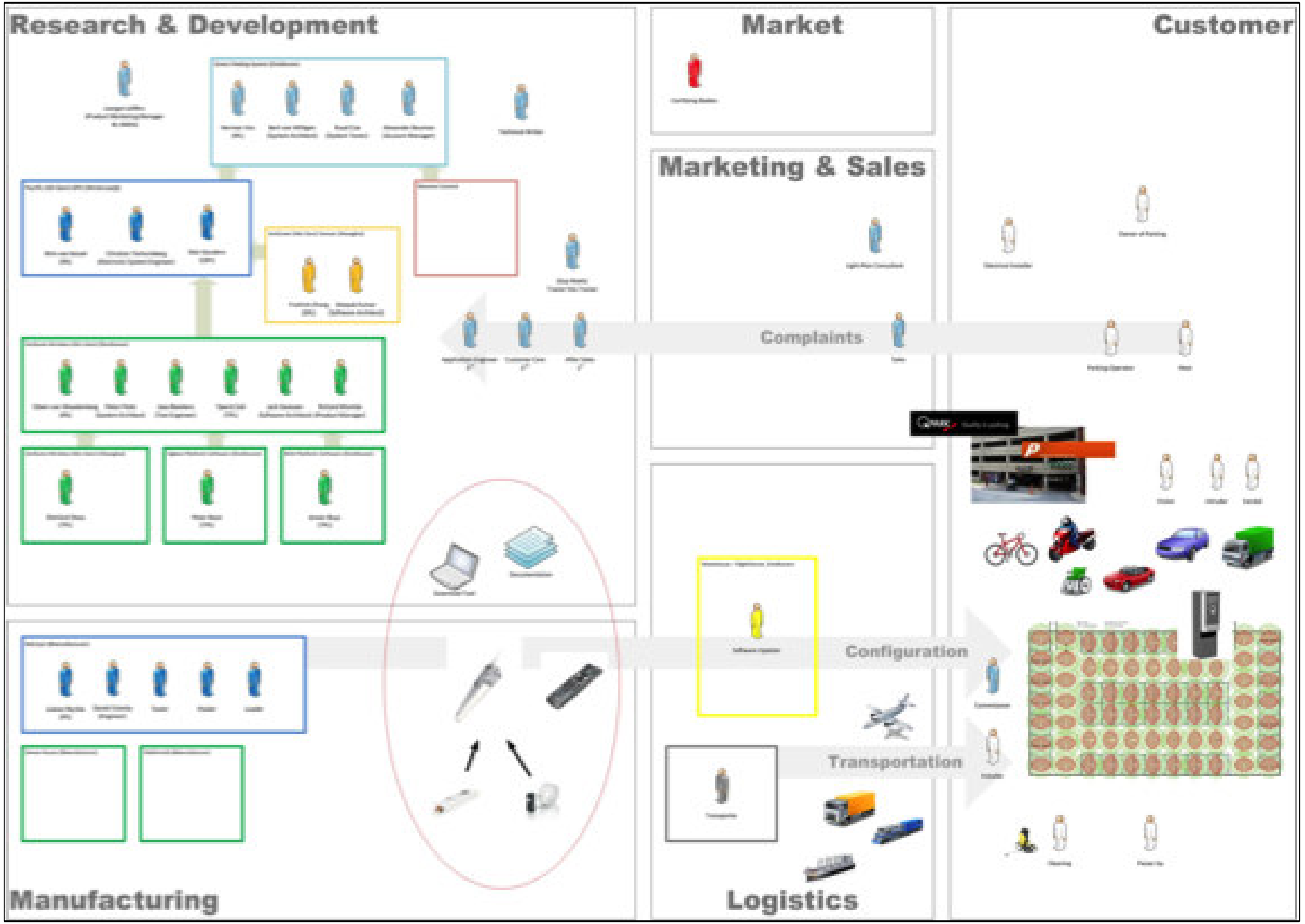
- **Product, People, Process**
  - What are the elements of the product?
  - How are the people organized? Project? Departments?
  - What does the product development process look like?


Mark...
Competition
Law and Regulations
Philips Lighting
Manufacturer
Integral Project Manager - Winterswijk
Luminaire
Winterswijk
Integral Project Manager - Wireless
System Architect
System Quality Project Leader
Ruud Cox
System Tester
Controls
Organisational Structure
Schedule
Customers
Mission
CRS beschikbaar
Information
Developer Relations
Test Team
Contour
Requirements Engineering
TestLink
Test Management
Equipment & Tools
Test Items
Deliverables
Logistics
Project Environment
Automatically dimmed lights
Don't compromise on feeling of safety and comfort
5% recabling
Retrofit
Constraints
Alternatives
Business case
Solution
Developers
Testers
Stakeholders and Users
Structure
Lighting System
Solution to the Problem
Context Analysis
Customer
Owners
Image
Organisational Culture
Organisational Structure
Problem
Energy cost
Parking
Product or Service with Problem
Stakeholders and Users
Structure
Function
Data
Interfaces
Platform
Operations
Ask owner for Operational Profiles
Time


Market
Producer
People
Process
Solution
Product
Consumer
People
Problem
Product Context



Rogier Delnoij
PIR
EEC 604
Peter Fitski ARCH
Zigbee team
core team Wo 11-12
Competition
regulations
market segment
Owner
Business
org culture
org structure
Image
empathetic
trustworthy
knowledgeable
courageous
captivating
Owner (Qpark)
uncertainties
system payback time ≤ 2 yrs
Business
org culture
org structure
why!
reduce energy costs
(lighting 70 % van energycosts)
without compromising on safety
unsafe feelings customers
Problem
did not react on any move
Solution
(Green Parking Systems)
START
LED
driver
controller
zigbee
presence sensor
luminaires
cost
installation
physical grid / logical
zone
mesh network
predefined sensor area
Uncertainties
temperature
-30 to +40°C
intruder, saboteur, vandal
host
neighbor
installer
parking operator
customer
electrical installer
car (electrical)
van
motorbike
bicycle
person
bird, mouse, bee
attributes
size
texture
movement-speed
pattern
normal
stress
idle (green mode)
configure
service
commissioning
cost
electrical installer
UED: an information, command, or duty given to a person or group of people

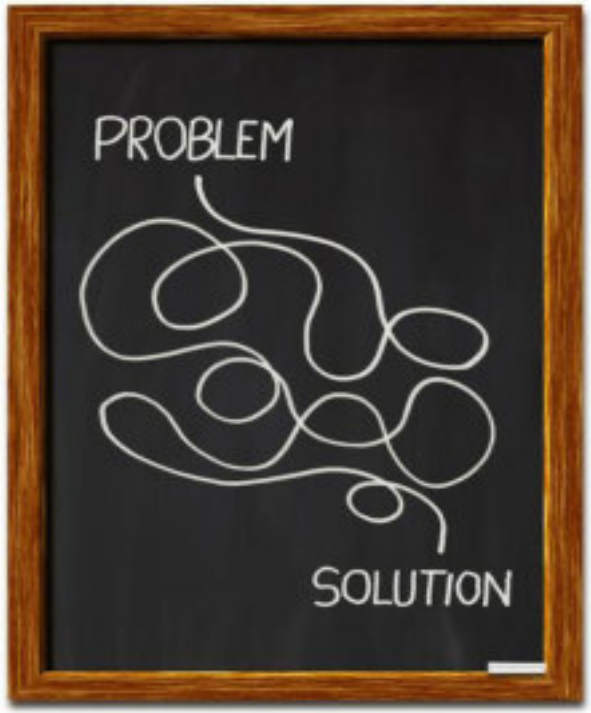

Research & Development
Market
Customer
Marketing & Sales
Complaints
Configuration
Transportation
Manufacturing
Logistics

Example of Project

Another way of creating insight in what is going on…

Testers investigate and evaluate solutions and problems and the relation between solution and problem

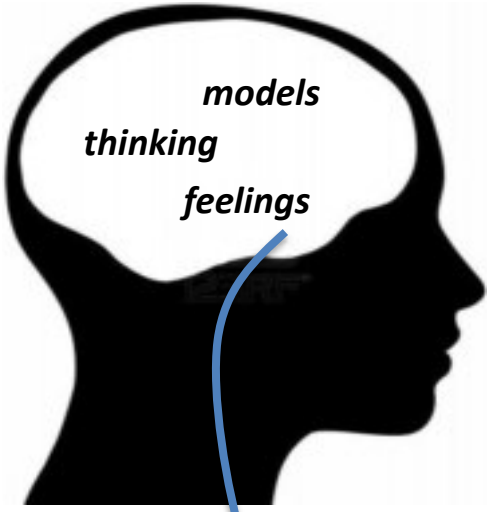
Developers design a solution to a problem



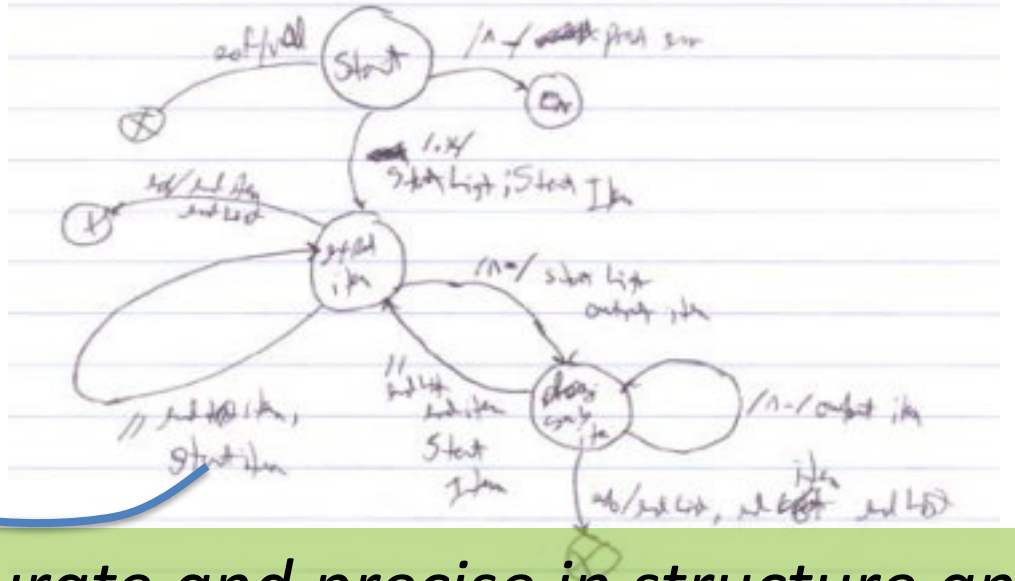
…by building mental models from different perspectives

Testers solve testing problems

Drawing the Problem

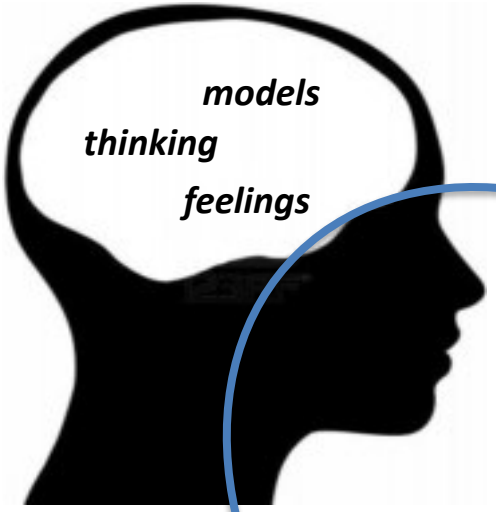


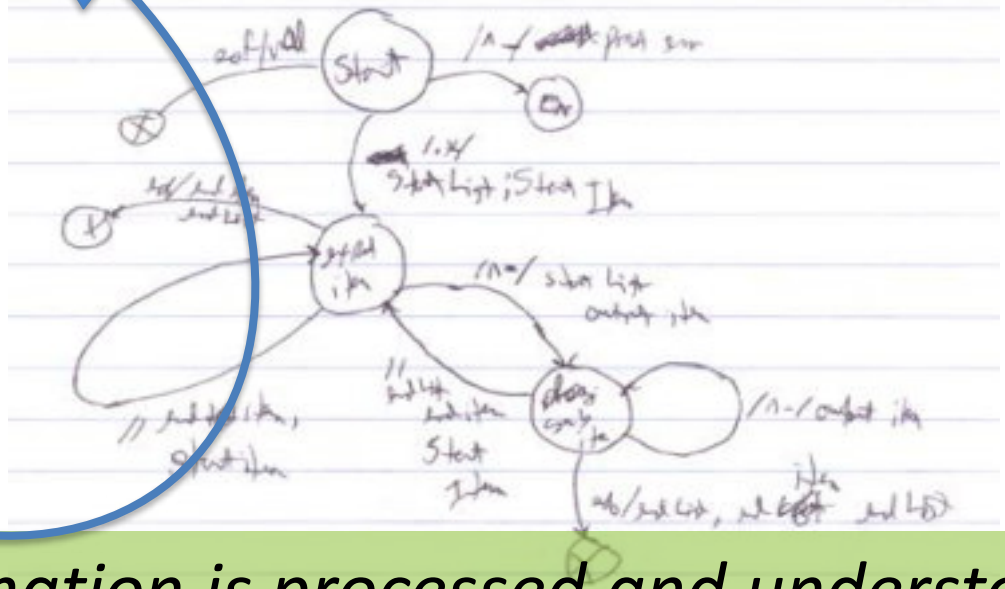
External Memory



Good sketches are accurate and precise in structure and message, but rough in an expressive way

Drawing to Learn





Visual Learning

In visual learning, information is processed and understood through images and visualizing techniques

Ah, problem!

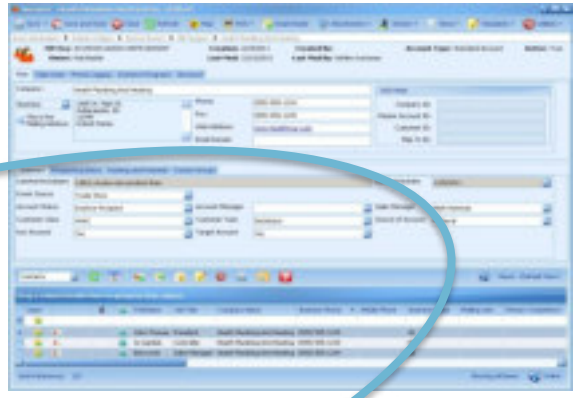
Ah, new test idea!

4. Evaluate

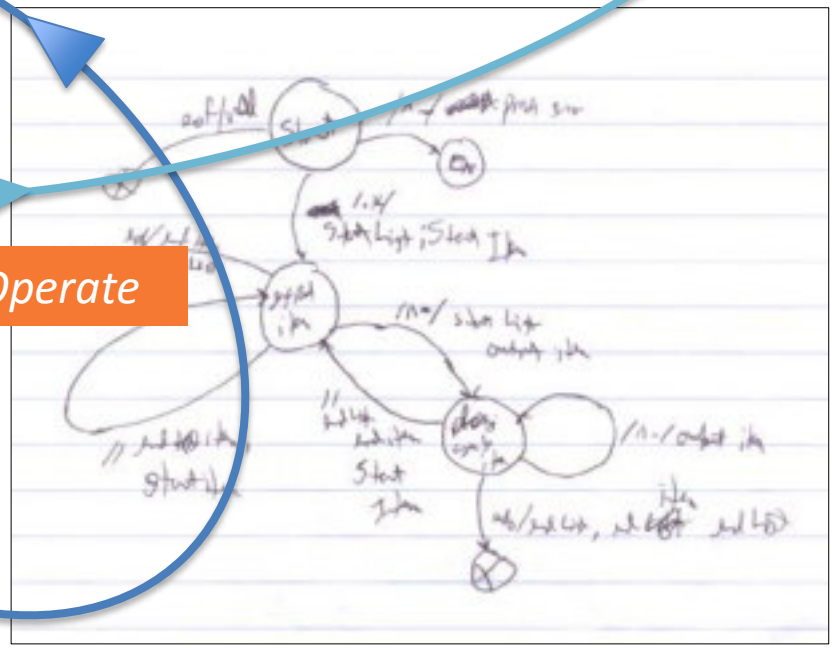
models

thinking

feelings



3. Observe



2. Operate

1. Configure

What questions do you need to ask?

You could start by using guideword heuristics!

What is a heuristic?

- A fallible method of solving a problem.

  Simple rules and shortcuts, comprehensive procedures, or even sophisticated software tools.

- Fallibility implies that wisdom and responsibility are critical.

Source: Reinventing Testers by James and Jon Bach

Exercise:
An Italian restaurant

Create a product ecology in steps:

1. What problem are we solving?
2. Try these heuristics:
   - Producer, Market, Consumer
   - Product, People, Process
3. What questions do you have after doing this?

Heuristics

- **Problem, Solution**
  - What is the problem that we are trying to solve?
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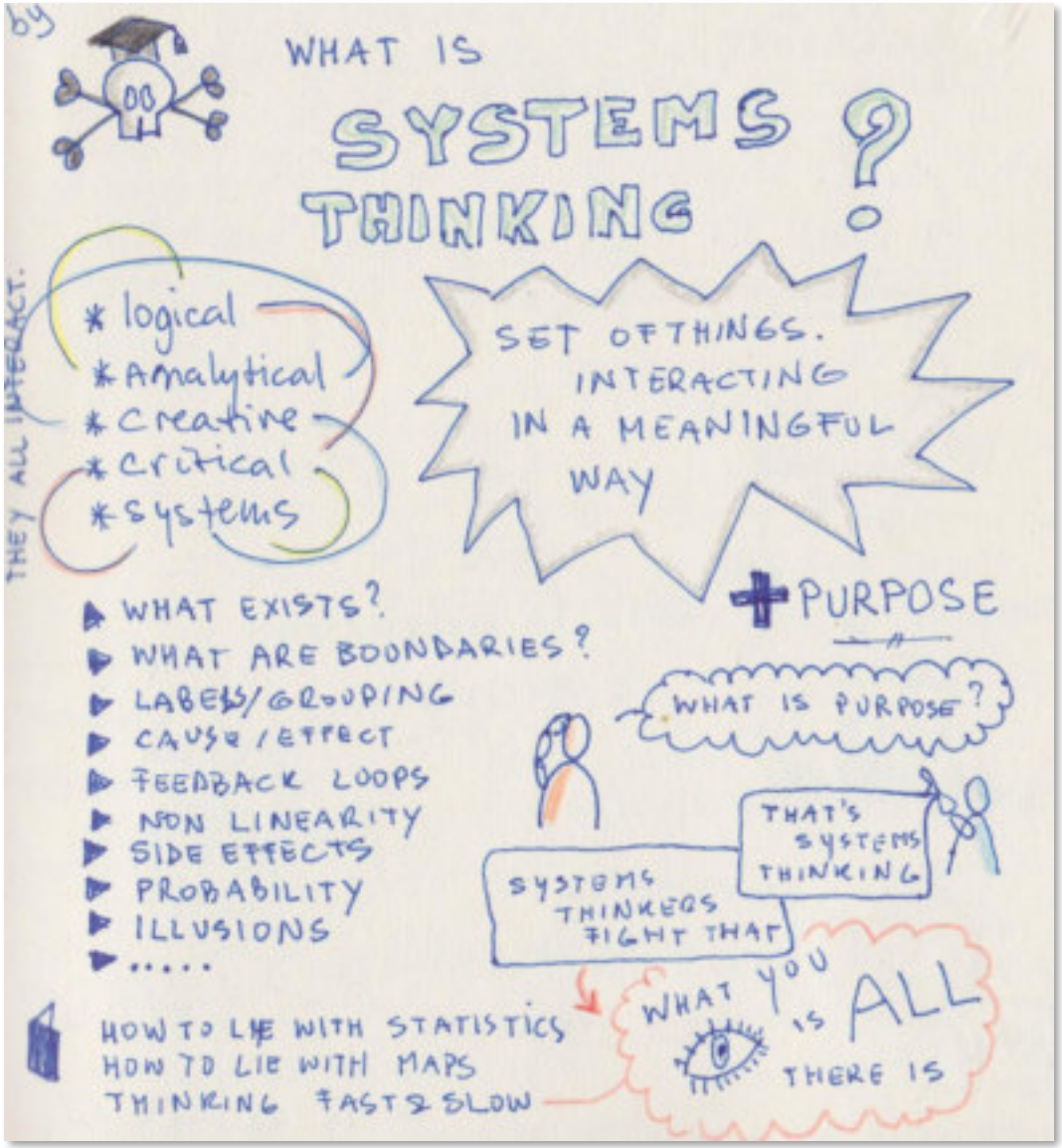
Debrief

Systems thinking



Source: http://ruudcox.wordpress.com/2013/04/24/dewt3-sketchnotes/

WYSIATI

Source: http://www.inc.com/daniel-kahneman/idea-lab-what-you-see-not-all-there-is.html

Exercise: WYSIATI!

So the trap is “What you see is all there is”.

What is missing from your product ecology?

Tacit and Explicit Knowledge

EXPLICIT means it is represented completely in the form of a string of bits: words, pictures, even actions can be explicit. (software is explicit)

TACIT means it is not manifested in a form that can be equated to a string of bits: it is unspoken, unwritten, unpictured.

- **Relational Tacit Knowledge** is tacit by convenience.
- **Somatic Tacit Knowledge** is tacit in your body.
- **Collective Tacit Knowledge** is tacit in your community.

(Harry Collins*, Tacit and Explicit Knowledge*)

Questions…
Posing & answering them

Huh?

- You may not understand. (errors in interpreting and modeling a situation, communication errors)

Really?

- What you understand may not be true. (missing information, observations not made, tests not run)

And?

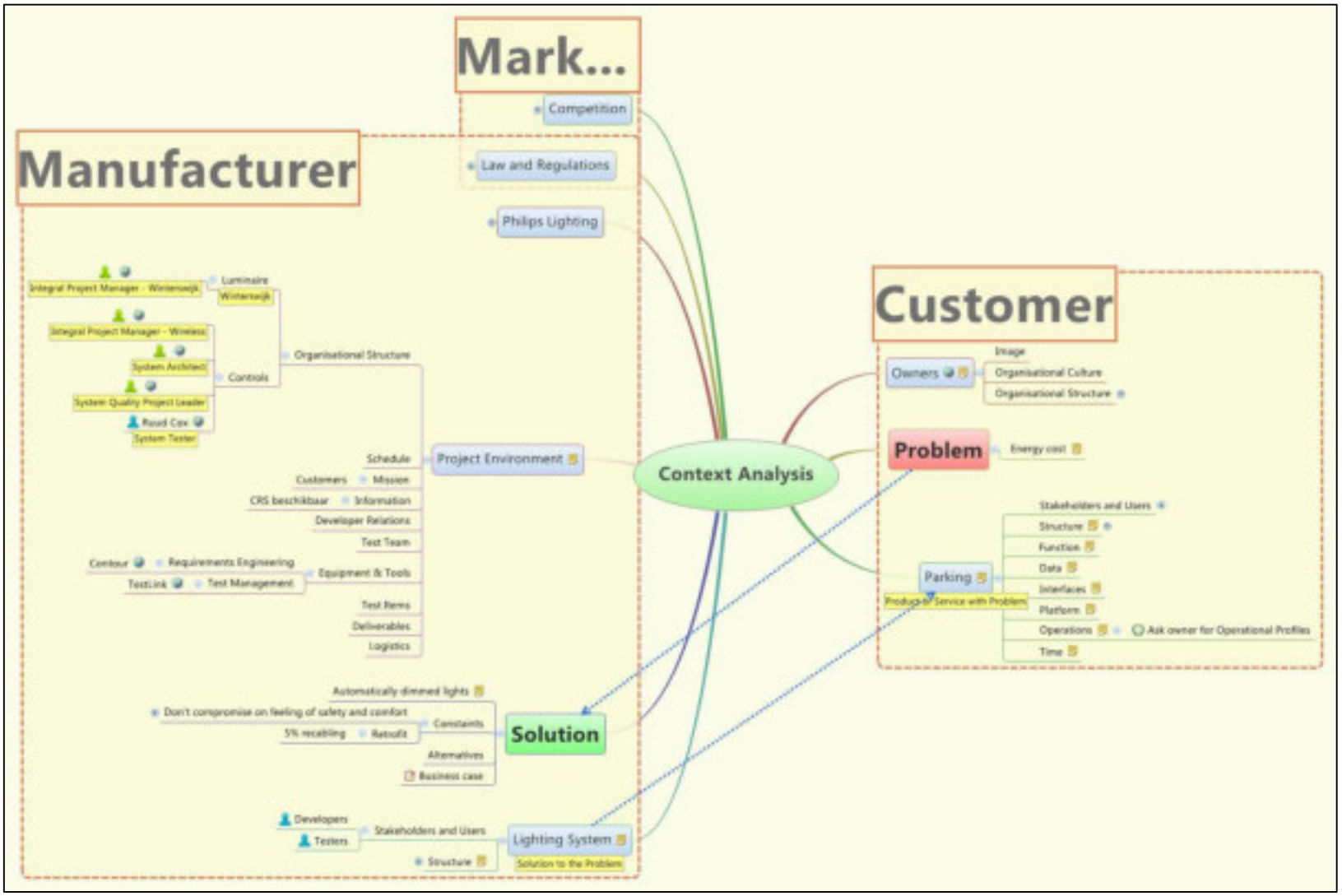
- You may not know the whole story. (perhaps what you see is not all there is)

So?

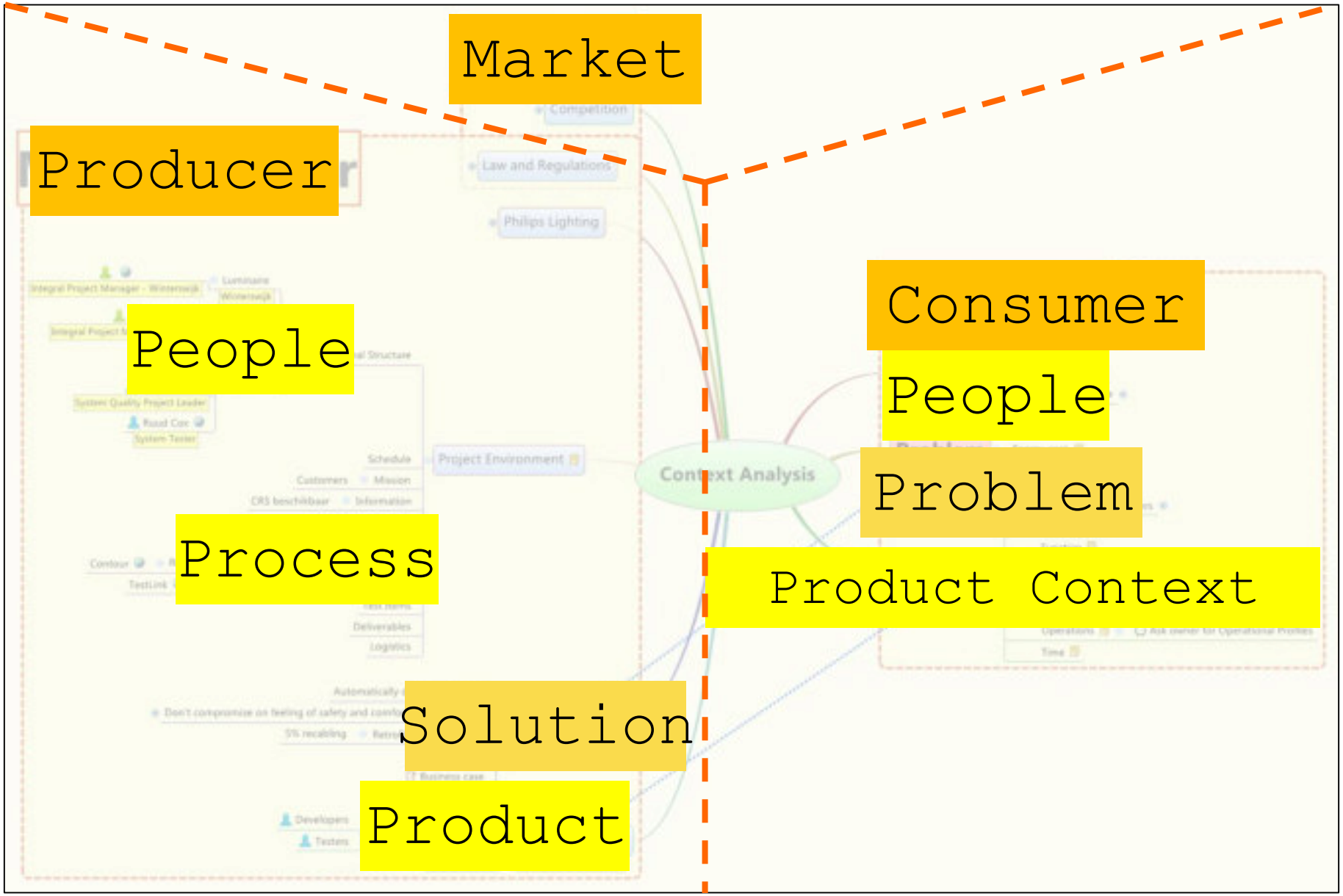
- The truth may not matter, or may matter much more than you think. (poor understanding of risk)

Exercise: DNA analyser

Before we start, let’s recap...



Context analysis: 1st iteration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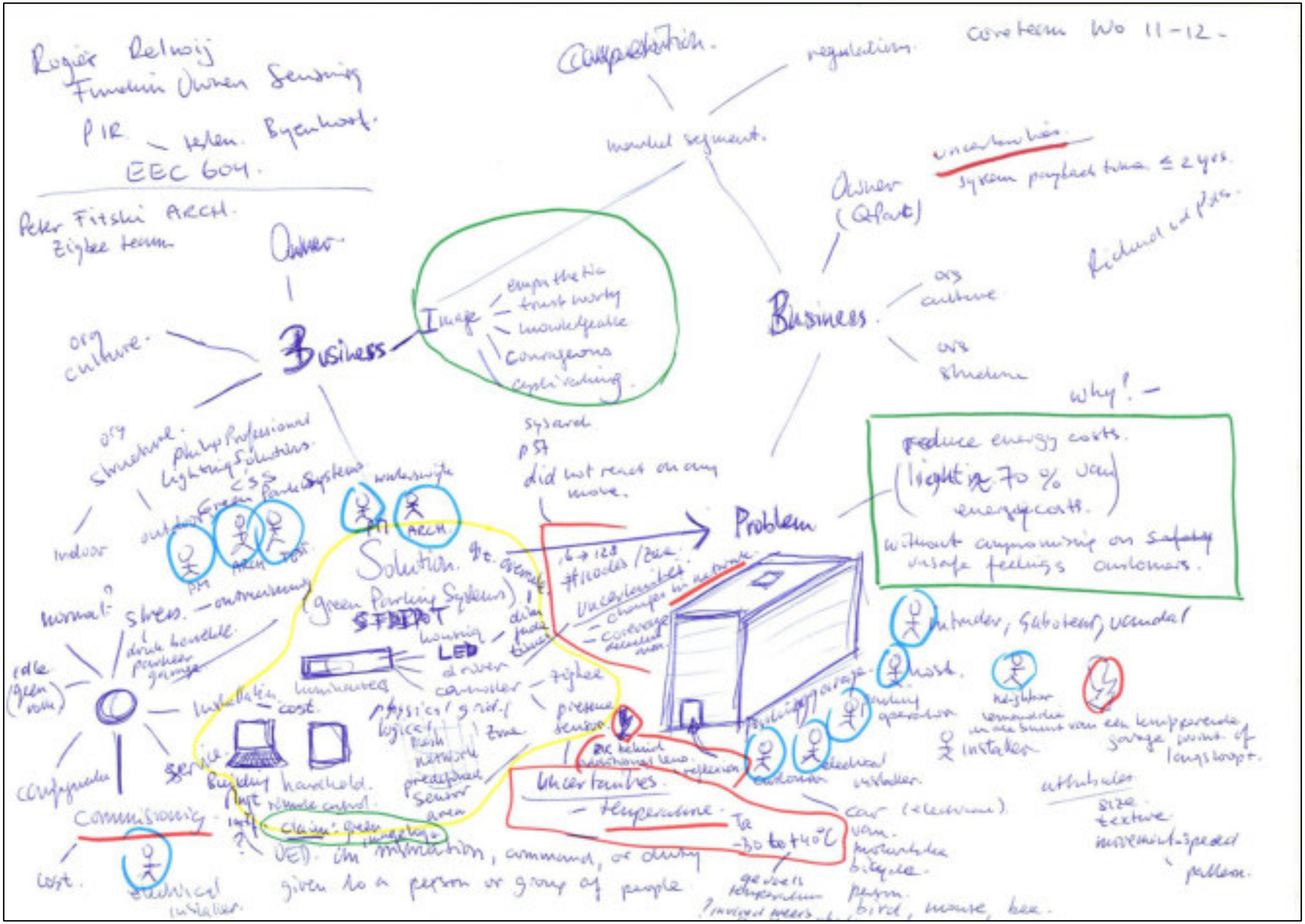
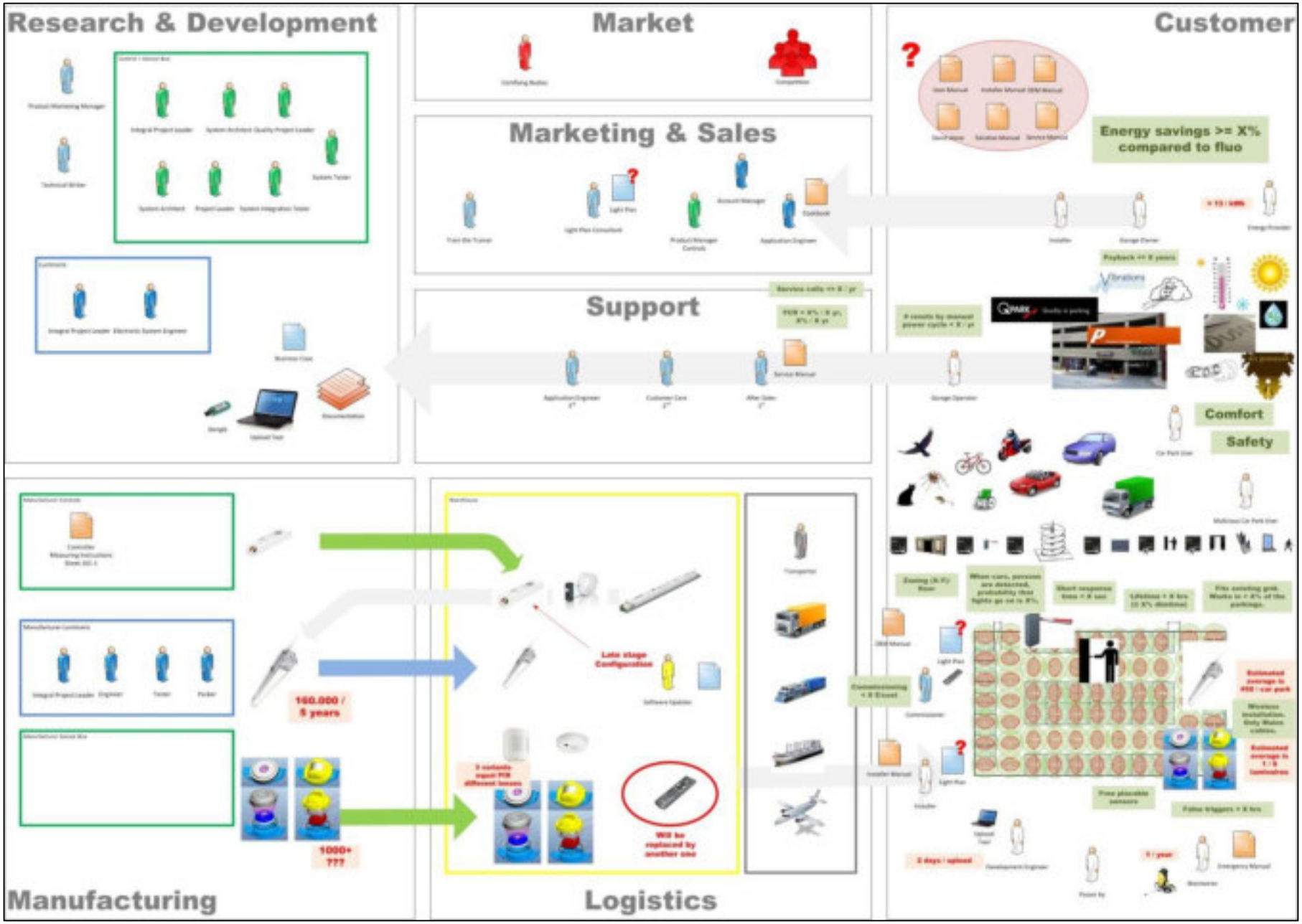
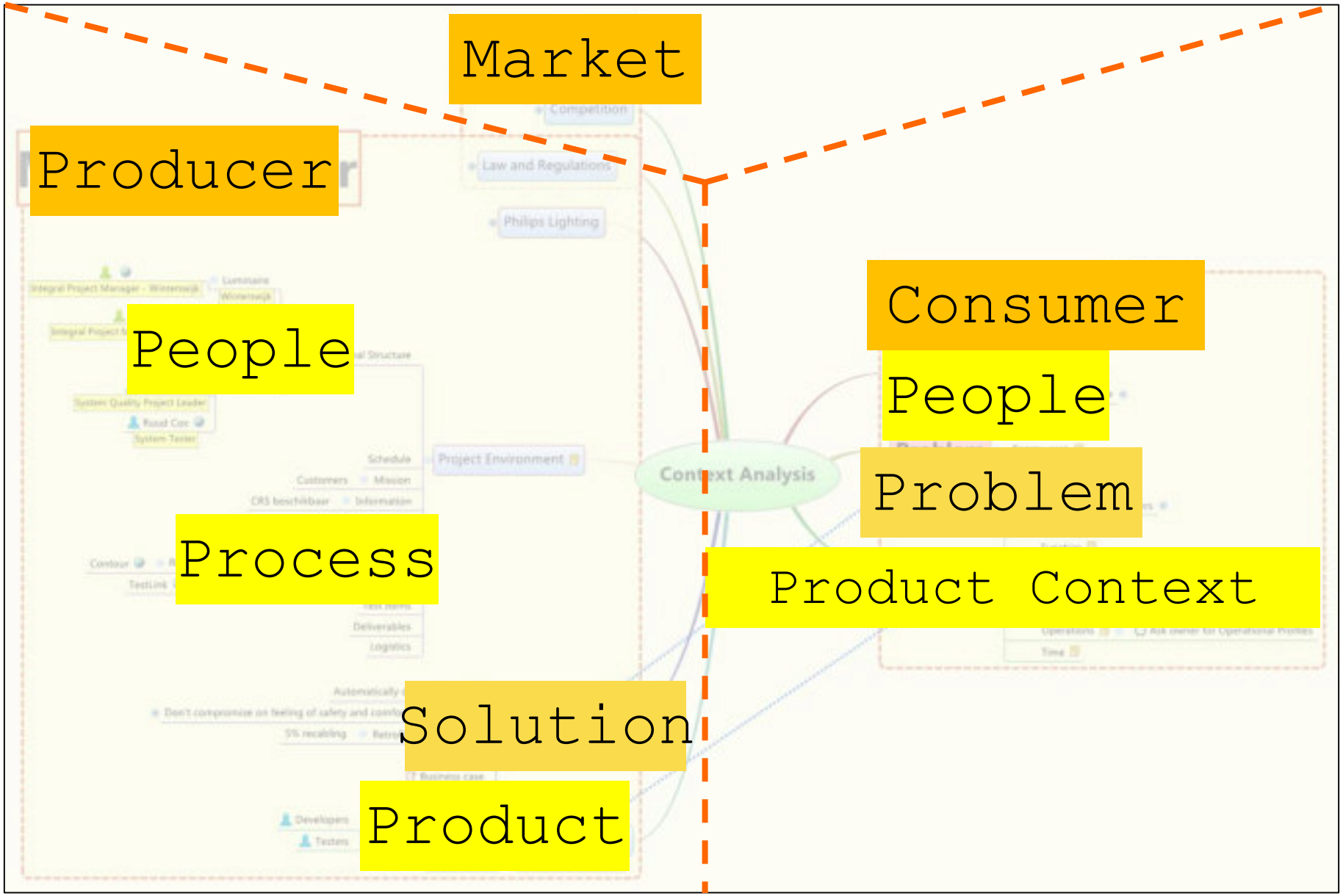

Competition
regulations
core team Wo 11-12
market segment
uncertainties
system payback time ≤ 2 yrs
Owner (Q1 part)
PIR
EEC 604
Peter Fitski ARCH
Zigbee team
Owner
org culture
Business
Image
empathetic
trust worthy
knowledgeable
courageous
Business
org culture
org structure
why?
reduce energy costs
(lighting 70 % van energycosts)
without compromising on safety
unsafe feelings customers
org structure
Philips Professional Lighting Solutions
CSS
Green Parking Systems
indoor
outdoor
PM
ARCH
Solution
(green Parking Systems)
housing
LED
driver
controller
zigbee
luminaires
physical grid
logical
zone
mesh network
predefined sensor area
pressure sensor
did not react on any move.
Problem
#nodes / zone
uncertainties
coverage
intruder, saboteur, vandal
host
neighbour
installer
parking garage operator
customer
electrical installer
normal
stress
idle (green mode)
installation cost
service
configuration
commissioning
cost
electrical installer
laptop
building
Uncertainties
temperature
-30 to +40°C
car (electric)
van
bicycle
person
bird, mouse, bee
attributes
size
texture
movement-speed
pattern
given to a person or group of people


Research & Development
Market
Customer
Marketing & Sales
Energy savings >= X% compared to fluo
Support
Comfort
Safety
Late stage Configuration
160.000 / 5 years
1000+ ???
Will be replaced by another one
Manufacturing
Logistics

Exercise:
DNA analyser

1. Create a product ecology


Market
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Consumer
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Problem
Product Context

Teaching Moment

My ecology is a mess!

Too much information!

Where do I put this?

Recognize three important activities:

1. Collect information
2. Analyse & process by modeling
3. Cluster & restructure model

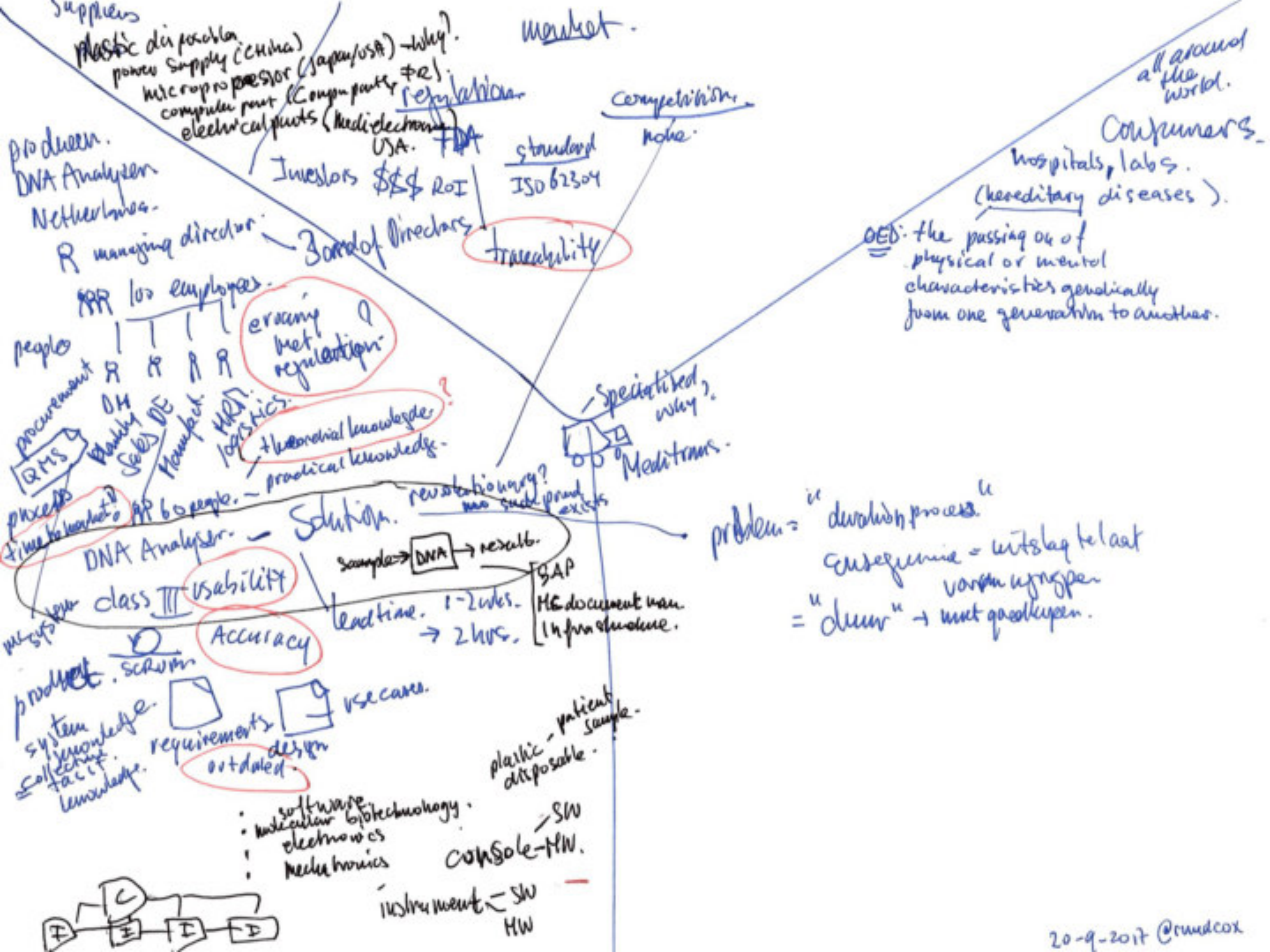
➔ Side effect: new discovery & serendipity

Exercise:
DNA analyser

1. Create a product ecology
2. If you want to gain deeper knowledge, you could focus using other heuristics like:
   Supply Chain → Focus on supply and demand network
   Value Chain → Focus on internal organization activities
   Product Life Cycle → Focus on story of a products life
3. Create some scenarios at walk through the context from different perspectives
   For example: a director of a hospital wants to order 5 DNA analysers. What happens after he has read the brochure?

Debrief

- How did that go?
- What did you do?
- Is it helpful?
- Did you identify other heuristics you used?


suppliers
plastic disposables
power supply (China)
microprocessor (Japan/USA) - why?
computer part (Component part, $e)
electrical parts (Medi-electronics)
market.
all around the world.
regulations
USA. FDA
competition.
none.
Consumers.
hospitals, labs.
(hereditary diseases).
standard
ISO 62304
producer.
DNA Analyzer
Netherlands.
Investors $$$ ROI
R managing director → Board of Directors
traceability
OED: the passing on of physical or mental characteristics genetically from one generation to another.
100 employees.
people
R R R R
erring ? met regulation
procurement
QM
Quality
Sales
Sales DE
Marketing
HRM
logistics
theoretical knowledge ?
practical knowledge.
QMS
process
time to market?
60 people.
Specialized, why?
Meditrans.
revolutionary?
no such prod. exists
Solution.
DNA Analyser.
sample → DNA → result.
class III
usability
Accuracy
lead time. 1-2 wks. → 2 hrs.
SAP
HC document man.
Infrastructure.
problem = "devotion process"
consequence = uitslag te laat
voorom ingrijpen
= "duur" + niet geadkopen.
product. scrum
system knowledge. collective. tacit. knowledge.
requirements
use cases.
outdated. design
plastic disposable.
patient sample.
software
molecular biotechnology.
electronics
mechatronics
console - SW - HW.
instrument - SW - HW
C
I I I I
20-9-2017 @ruudcox

Project Environment

Ways to understand our context

MIDTESTD

- Mission
  - *The set of things we must do in order to satisfy our clients.*
- Information
  - *Information about the product or project that is needed for testing.*
- Developer relations
  - *How you get along with the programmers.*
- Test team
  - *Anyone who will perform or support testing.*
- Equipment & tools
  - *Hardware, software, or documents required to administer testing.*
- Schedule
  - *The sequence, duration, and synchronization of project events.*
- Test Items
  - *The product to be tested.*
- Deliverables
  - *The observable products of the test project.*

Context-free questions

- Is it okay if I ask you questions?

- Who is my client?
- Are you my only client?
- Who is the customer of the product?
- Who are the other stakeholders?

- What is my mission?
- What else might be part of my mission?
- What problems are you aware of that would threaten the value of this product or service?

- Do you want a quick, practical, or deep answer to the mission or question you have in mind?

- How much time do I have?
- How long before the next release or deployment?
- How long before the end of this testing or development cycle?
- When do you want reports or answers?

- How do you want me to provide them? How often?
- When were you thinking of shipping or deploying this product or service?

- What else do you want me to deliver?
- How do you want me to deliver it?

- This thing I'm testing… could I have it myself, please?
- Is there another one like it?
- Are there more than that?
- Is that all there are?
- How is this one expected to be the same or different from the other ones?

Michael Bolton - http://www.developsense.com/blog/2010/11/context-free-questions-for-testing/

Dealing with context change

- Enables rapid response (adapt) on changes

- Create overview and gain deep knowledge to:
  - Enables fast learning & promote understanding
  - Train new people
  - Discover new insights
    - New questions
    - Improvements
  - Supports explaining
  - Illuminate core dynamics
  - See complexity behind simplicity
  - Analyse impact of changes
    - Technical
    - Business
    - Social
  - Analyse risks & value
  - Inform testing

Exercise: Context changes

1. Given the Product Ecology you made earlier.
2. What could happen that totally changes your test approach?

Any questions?

Exercise:
Your own context

1. Groups of 2 (or 3)
2. Interview each other and explain your own context. While talking, create a first draft of a Product Ecology.

Any questions?

Wrap-up

10 Tips for testers to provide insight

1. Don’t wait to be asked
2. Be aware of your own thoughts, observations and theories
3. Keep asking questions and push to discover the next piece of the puzzle
4. Take a step back
5. Use models and heuristics for inspiration
6. Focus on impact and consequences
7. Tailor to your audience
8. Be prepared to share your findings
9. Offer balanced options for action
10. Remember your purpose

Cassandra Leung - http://www.cassandrahl.com/blog/10-tips-for-testers-to-provide-insight/

Skills

- Analysis
  - Information gathering
  - Apply heuristics
  - Factoring/decomposing
- Modeling
- Exploration & discovery
  - Finding boundaries
  - Focus/defocus
  - Learning
- Communication
  - Asking questions
  - Explain
  - Argumentation

Skills

- System thinking
  - Making Distinctions
  - Organizing Systems
  - Recognizing Relationships
  - Taking Perspectives

Video: Dr. Derek Cabrera - How Thinking Works - http://youtu.be/dUqRTWCdXt4

Heuristics we used today

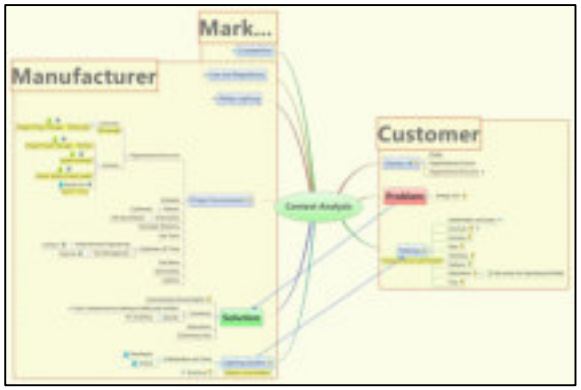
- Problem, Solution
- Producer, Market, Consumer
- Product, People, Process

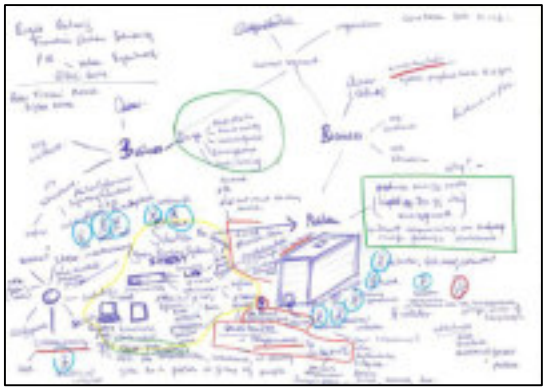
- Supply/Value Chain
- Product Life-cycle
- User Scenarios

Focus / Defocus

Stop!
Think!
Slow down!

Representation





A new situation might require a change of representation: (Re)structure, dual-task effect

QUESTIONS, YOU HAVE, HMM?

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References

- Some of these slides are taken from: Rapid Software Testing – James Bach & Michael Bolton http://www.satisfice.com/info_rst.shtml
- Product Ecology – Ruud Cox http://ruudcox.wordpress.com/2013/10/25/an-example-of-a-product-ecology-for-testers/
- Heuristic Test Strategy Model –James Bach http://www.satisfice.com/tools/htsm.pdf
- DEWT3 http://dewt.wordpress.com/2013/04/24/dewt3-experience-reports/
- Understanding context - Andrew Hinton (Book)
- An Introduction to Product Discovery - Teresa Torres http://www.producttalk.org/2016/08/opportunity-solution-tree/
- What You See Is Not All There Is http://www.inc.com/daniel-kahneman/idea-lab-what-you-see-not-all-there-is.html
- Context-free questions - Michael Bolton http://www.developsense.com/blog/2010/11/context-free-questions-for-testing/
- Dr. Derek Cabrera - How Thinking Works - http://youtu.be/dUqRTWCdXt4
- Cassandra Leung - 10 Tips for testers to provide insight http://www.cassandrahl.com/blog/10-tips-for-testers-to-provide-insight/
- Also check out many links to “great resources” here: http://www.huibschoots.nl/links