Requirements Engineering for Sustainability

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#SustainabilityDesign
#KarlskronaManifesto

Timeline

- Tuesday 29.3
    - 10-12 Open lecture "Software engineering for sustainability – The Karlskrona manifesto", Room 4511
    - 12-16 Opening of the course, Room 7441
- Wednesday 30.3
    - 18-22 LUT Beach Sauna, student idea presentations & discussions
- Thursday 31.3
    - 10-12 Stakeholder model and goal modelling, Room 4511
    - 12-14 Course work, Room 4511
- Friday 1.4
    - 10-12 System vision, Sustainability analysis and use cases, Room LS204
    - 12-14Course work, Room LS 204
- Monday 4.4.
    - 10-14 Intermediate presentations, Room 7441
- Tuesday 5.4
    - 12-16 Course work, Room 7441
- Wednesday 6.4
    - 8-10 Briefing for presentations, Room 7441
    - 10-12 Course work, Room 7441
- Thursday 7.4
    - 10-14 Course work, Room 7441
- Friday 8.4
    - 12-16 Final presentations, Room 7441

Outline & Overview

1. Review of readings

2. Overview of Approach

3. Sustainable Business Model Canvas

4. Teaming up

Preparation – to have read

- "Karlskrona Manifesto"
- "Requirements: Key to sustainability"
- "Requirements engineering for sustainability"
- "Business model canvas" book
(first two chapters)
- Sustainable Business Model Canvas webpage

Karlskrona Manifesto

- 11 misperceptions
- 9 principles
- Call for discussion
- Call to action

Take a piece of paper:
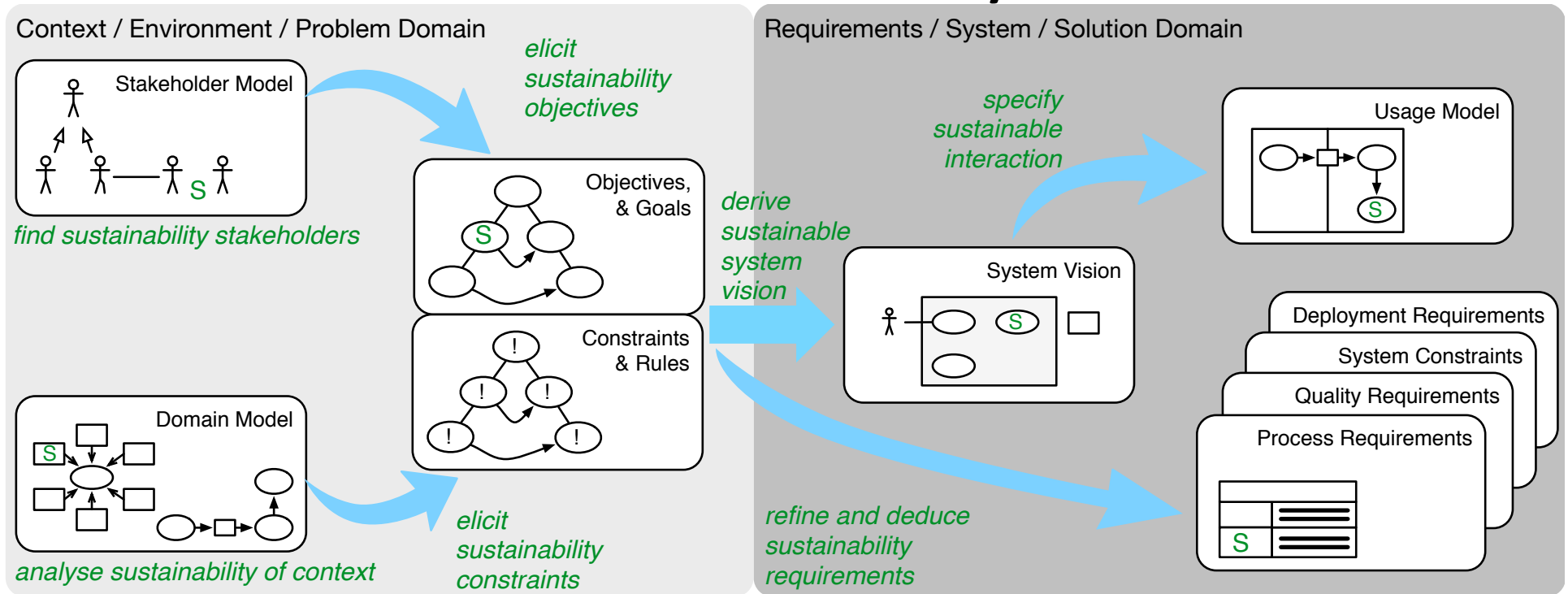
→What did you like?

→What did you dislike?

→What were you missing?

Requirements: Key to sustainability

- Why the manifesto makes sense to have
- A tale of how things can be done differently
- A discussion of benefits and challenges
- Questions?
- Likes / dislikes?

Requirements Engineering for Sustainability

Context / Environment / Problem Domain

Stakeholder Model

elicit sustainability objectives

find sustainability stakeholders

Domain Model

analyse sustainability of context

Objectives, & Goals

Constraints & Rules

elicit sustainability constraints

Requirements / System / Solution Domain

derive sustainable system vision

specify sustainable interaction

System Vision

Usage Model

refine and deduce sustainability requirements

Deployment Requirements

System Constraints

Quality Requirements

Process Requirements

Example checklist for analyzing environmental sustainability for a software system.

Guiding Questions for Green RE:
1. Does the system have an explicit sustainability purpose?
2. Which impact does the system have on the environment?
3. Is there a stakeholder for environmental sustainability?
4. What are the sustainability goals and constraints for the system?
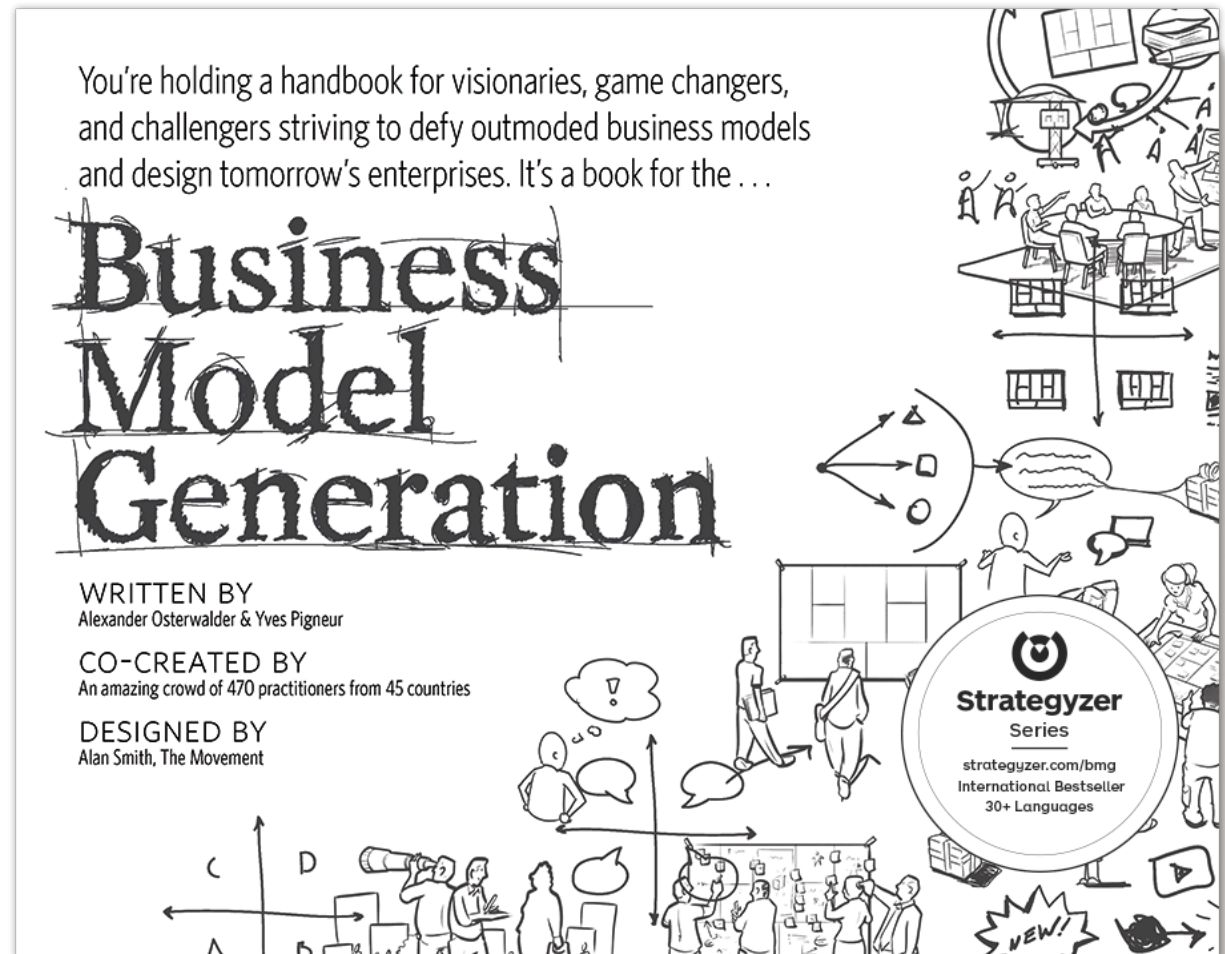
Requirements Engineering for Sustainability

- Guideline
- Artifacts
- Reference models
- Questions?
- Likes / dislikes?
→ This will be the scope for our course.

Reference: Business Model Canvas

http://www.businessmodelgeneration.com/
canvas/bmc

Serves to

communicate

a new

business idea

You're holding a handbook for visionaries, game changers, and challengers striving to defy outmoded business models and design tomorrow's enterprises. It's a book for the . . .

Business
Model
Generation

WRITTEN BY
Alexander Osterwalder & Yves Pigneur

CO-CREATED BY
An amazing crowd of 470 practitioners from 45 countries

DESIGNED BY
Alan Smith, The Movement

Strategyzer
Series

strategyzer.com/bmg
International Bestseller
30+ Languages

Business model canvas

- Template
- 9 key areas
- Questions?
- Likes / dislikes?

Business Model Canvas – Template

Key Partners 7

Who are our Key Partners?

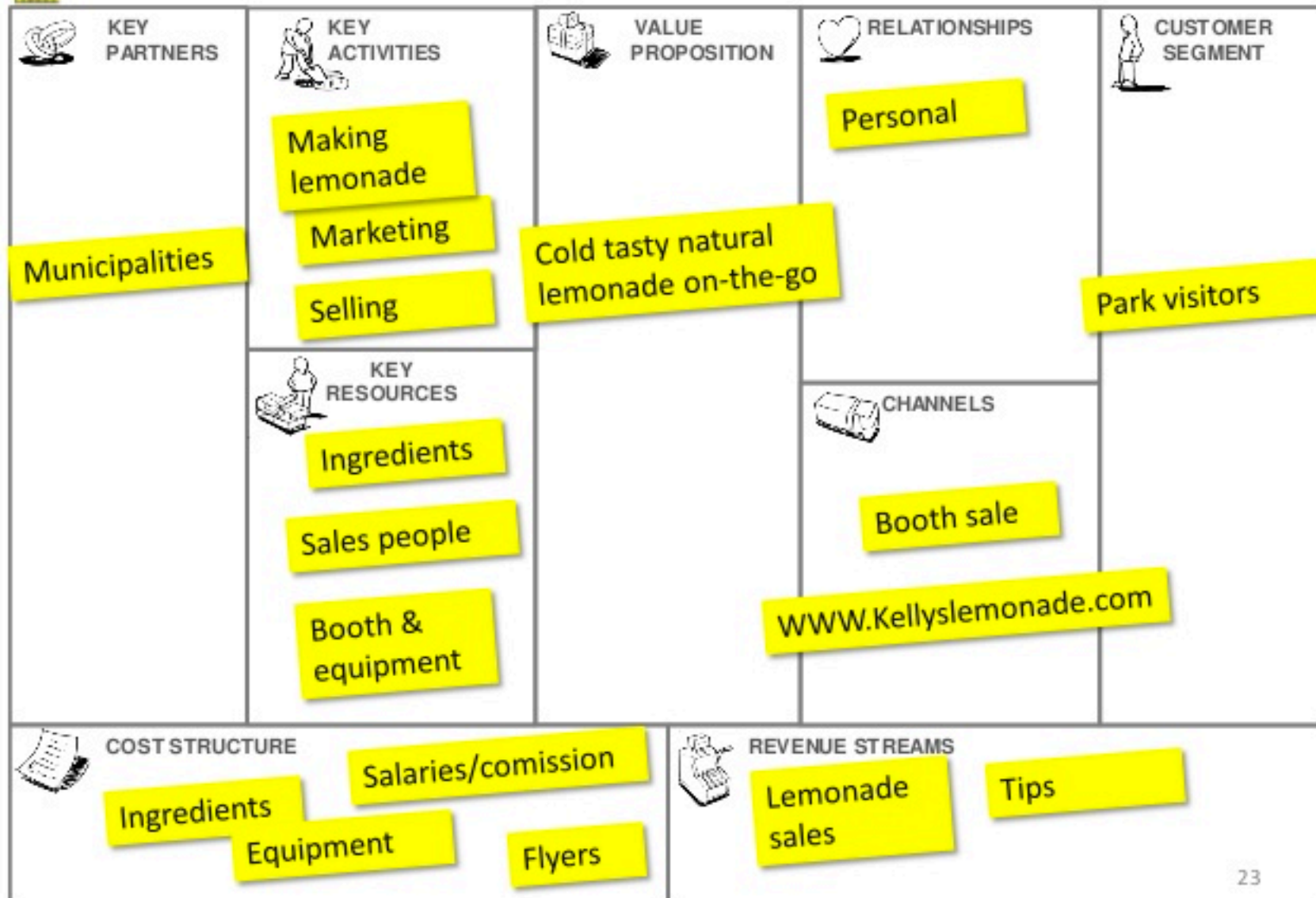**Key Activities** 5

What Key Activities do our Value Propositions require?

Key Resources 6

What Key Resources (suppliers, etc.) do our Value Propositions require?

Value Propositions 1

Which one of our customer's *problems* are we helping to solve? or Which customer *needs* are we satisfying?

What is the specific product/service?

What are the *features* that match customer needs?

Customer Relationships 4

How will we Get, Keep and Grow customers?

Channels 3

Through which Channels do our Customer Segments want to be reached?

Customer Segments 2

For who are we solving a problem or fulfilling a need?

Who are the customers?

Does the value proposition match their needs?

Is this a single-sided or multi-sided market?

Cost Structure 9

What are the most important costs in our business model?

Revenue Streams 8

What is the revenue model? What are the pricing tactics? For what value are our customers willing to pay?

Kelly's Lemonade Stand: Refreshing Lemonade

KEY PARTNERS	KEY ACTIVITIES	VALUE PROPOSITION	RELATIONSHIPS	CUSTOMER SEGMENT
Municipalities	Making lemonade Marketing Selling	Cold tasty natural lemonade on-the-go	Personal	Park visitors
	KEY RESOURCES Ingredients Sales people Booth & equipment		**CHANNELS** Booth sale WWW.Kellyslemonade.com	

COST STRUCTURE	REVENUE STREAMS
Salaries/comission Ingredients Equipment Flyers	Lemonade sales Tips

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Business Model Canvas: Apple

Key Partners
- Manufacturers
- App store developers
- Cellular service providers
- Publishers
- Music, television, and movie industries

Key Activities
- Design
- Software development
- Manufacturing
- Quality control

Key Resources
- Intellectual
- Human
- Physical

Value Propositions
- Design
- Performance
- Brand/Status
- Convenience/Usability

Customer Relationship
- Self-service
- Personal assistance

Channels
- Apple.com
- Apple retail stores
- Other retailers

Customer Segments
- Mass market
- Multi-sided platforms

Cost Structure
- Cost-driven
- Economies of scale

Revenue Streams
- Sale of products
- Media sales/licensing
- Rental and subscription fees

DigitalBusinessModelGuru.com

WWW. EXPERIENCEINTEGRAL.ORG BUSINESS MODEL FEB 2011 BY AMBROZIAC.BLOGSPOT.COM
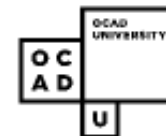
Sustainable Business Model Canvas

- Now called **Flourishing Business Model (FBM)**
- Same basic template as BMC
- Plus systems thinking and leverage points: 5 questions to "do good"
- https://prezi.com/k5x2civcaw7y/3-minute-introduction-to-strongly-sustainable-business-model-canvas/
- Questions?
- Likes / dislikes?

Flourishing Business Canvas v2.0

Environment

Society

Economy

BIOPHYSICAL STOCKS

ECOSYSTEM SERVICES

PROCESS

RESOURCES

PARTNERSHIPS

ACTIVITIES

GOVERNANCE

VALUE

VALUE CO-CREATIONS

VALUE CO-DESTRUCTIONS

PEOPLE

RELATIONSHIPS

STAKEHOLDERS

CHANNELS

ECOSYSTEM ACTORS

NEEDS

COSTS

GOALS

BENEFITS

OUTCOMES

Want to use this canvas in your project or business?
Want to support the project? Email inquiry@FlourishingBusiness.org for permissions

Flourishing Business Canvas

Flourishing Business Model

- Example Timberland: http://www.slideshare.net/AntonyUpward/strongly-sustainable-business-model-ontology-example-timberland-summary-v40
- Full thesis: http://yorkspace.library.yorku.ca/xmlui/handle/10315/20777

Tools / helpful resources

- Systems perspective short video series https://youtu.be/HQz9I-sAcZA

- Sustainability performance measurement https://youtu.be/8Rs2ASvWnAw

- The business logic of sustainability https://www.ted.com/talks/ ray_anderson_on_the_business_logic_of_sustainabilit y?language=en

- The route to a sustainable future https://www.ted.com/talks/ alex_steffen_sees_a_sustainable_future?language=en

Ideas to develop for this course

- Find a problem – not a solution you want to develop
- Find a scenario where this problem is obvious
- Find different ways that could solve this
- Evaluate the different consequences of this solution alternatives
- Find a favorite way of solving it → FBM
- Show how this favorite way will improve the situation

Deliverables for this course

- Flourishing business model
- Supported by
  - Stakeholder model
  - Goal model
  - System vision
  - Use case(s)
  - Sustainability analysis
- Mock-ups / prototypes

Team Building

- Teams of 3 people
- Mixed skill sets
  - Idea generator
  - Manager / communicator
  - Analyst
  - Designer
  - Programmer

Todos

1. Meet in your teams and develop an idea for a system for sustainability you want to work on

2. Develop a draft sustainable business model canvas

Get in touch.

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