Innovation for Sustainability

Dr Steve Kennedy
Rotterdam School of Management, Erasmus University

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Agenda

1. Introduction to Innovation

2. Sustainability Oriented Innovation

3. Sustainable Business Model Innovation
“Innovation distinguishes between a leader and a follower.”
We are always saying to ourself...we have to innovate. We’ve got to come up with that breakthrough.
Innovation Defined

“systematic technological and social change process which consists of the invention of an idea for change and its application in practice”
(Carrillo-Hermosilla et al, 2009: 4)

“Innovation is the successful exploitation of new ideas”
(Innovation Unit, UK Dept of Trade and Innovation, 2004)
idea
Invention vs Innovation

Invention
– Creation of something new with practical application
– Some but not all are patented (e.g., the zip)
– Not all inventions are commercialised (not entered economic system)

Innovation (as Commercialisation)
– The introduction and commercialisation of novelties (part of the economic system)
– Includes product, process and organisational changes
What is Innovation?

Innovation is driven by the ability to see connections, to spot opportunities and to take advantage of them.

- Completely new opportunities (mobile phones)
- Ability to spot where and how new markets can be created and grown (Ford Model T mass market for transportation)
- New ways of serving established and mature markets (Easyjet)

Tidd & Bessant, 2009
Managing Innovation

1. Generating new ideas
   - Inspiration
   - Transferring from another context
   - Listening to user needs
   - Frontier research
   - Combining existing ideas into something new

Scan and search (internal and external) environment to pick up and process signals about potential innovation.

Tidd & Bessant, 2009
Managing Innovation

2. Selecting the good ones
   – Which ideas to develop
   – How much to invest
   – Managing risk

Strategically select from set of potential triggers which the organisation will commit resources to

Tidd & Bessant, 2009
Managing Innovation

3. Implementing them
   – Balancing resources and time
   – Team composition and diversity
   – Prototype, stakeholder (inclus user) involvement

Grow idea, through development to launch.
Need to solve issues such as: finding and integrating skills, removing bugs, steering against resource and time constraints
Moving from Idea to Innovation

Do we have a clear innovation strategy?

Search – how can we find opportunities for innovation?

Select – what are we going to do – and why?

Implement – how are we going to make it happen?

Capture – how are we going to get the benefits from it?

Do we have an innovative organization?

FIGURE 1.7: Simplified model of the innovation process

Tidd & Bessant, 2009
Joseph Schumpeter (1883-1950)

Process of ‘creative destruction’ - constant search to create something new which simultaneously destroys the old rules and establishes new ones – all driven by the search of profits
Waves of Innovation

Source: The Natural Edge Project, 2004
http://www.naturaledgeproject.net/Keynote.aspx
http://www.naturaledgeproject.net/NAONChapter1.4.aspx
Discussion: Innovating for Sustainable Value

What is ‘innovation for sustainability’?

How is it different from conventional market-driven innovation?

In what ways can businesses innovate for sustainable cities?
Triple Bottom Line?
Triple Bottom Line?

versus

envt  social

total
Sustainable?

How do you know the future ‘best in class’?

How do you know if your innovation is meeting socio-ecological needs?

Is being ‘less bad’ sustainable?
**Eco+**

Product solutions that create more value with less environmental impact than competing alternatives commercially available, fulfilling the same function.

**People+**

Product solutions that create a measurable better impact on the lives of people than competing alternatives commercially available, fulfilling the same function.
Process Differences? Conventional Innovation vs SOI

What are your innovation objectives?
- Max returns Vs Max social impact?

How does this affect how you ideate?
- New ways of thinking?
- Start with current competencies/customer desire Vs social problem?
- Avoid imitation and protect your intellectual property Vs Open access and innovation for replication and maximum diffusion?

What will be your development and outcome controls?
- Stage-gate controls for environmental and/or social performance
- Eco+/ People+?
Definition

Sustainability oriented innovations defined as realised ideas that improve environmental and/or social performance while simultaneously considering commercial viability.

- Implies directionality of a process deliberately seeking outcomes to improve current environmental and/or social performance (Hansen et al., 2009; Paech, 2007)

- Avoids confusion surrounding the related idea of ‘sustaining’ innovation activity.

- Does not require innovations to improve the economic state nor does it require an improvement in both the environmental and social dimensions.
# Organisational Stage Model

<table>
<thead>
<tr>
<th>Stage</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
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<tbody>
<tr>
<td><strong>Stage Name</strong></td>
<td>Viewing Compliance as Opportunity</td>
<td>Making Value Chains Sustainable</td>
<td>Designing Sustainable Products and Services</td>
<td>Developing New Business Models</td>
<td>Creating Next-Practice Platforms</td>
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<tr>
<td><strong>Innovation Opportunity</strong></td>
<td>Use compliance to induce experimentation with sustainable tech/materials/processes</td>
<td>Develop sus sources of components/material. Increase use of clean energy sources. Innovative uses of returned products</td>
<td>Apply techniques such as biomimcry. Develop compact and eco-friendly packaging.</td>
<td>Develop new delivery tech. Create monetization models that relate to services not products. Devise models that combine digital &amp; physical.</td>
<td>Build business platforms that enable customers/suppliers to manage energy/water in radical way. Design tech to use energy as bi-product.</td>
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Nidumolu *et al* (2009)
Sustainable Innovation in Cities

Making Value Chains Sustainable

**HOW IT WORKS**

**REWEAR**
Clothing that can be worn again is marketed worldwide as second-hand goods.

**ENERGY**
When rewear, reuse and recycle are not options, textiles are used to produce energy.

**REUSE**
Textiles that are no longer suitable to wear are converted into other products, such as cleaning cloths.

**RECYCLE**
Textiles that can't be reused get a new chance as textile fibres, or are used to manufacture products such as damping and insulating materials for the auto industry.
Sustainable Innovation in Cities

Designing ‘Sustainable’ Products
Sustainable Innovation in Cities

Creating Next Practice Platforms
Categorisation Model

- Systems Building
- Organizational Transformation
- Operational Optimization

- Stand alone
- Integrated

- Systemic
- Insular

- Socio technical
- Technical

NBS (2012)
Operational Optimisation

**Definition:** Compliance with regulations or optimized performance through increased efficiency.

- Incremental
- ‘Techno-fix’ - focusing on new technologies as ways to **reduce impacts while maintaining business as usual.**
- Intent is primarily to reduce costs or maximize profits

**Examples:**
- Energy efficient lighting
- Reduced Packaging
- Hybrid Electric Fleet Vehicles
Example of Operational Optimisation

- Life Cycle Assessment showed 86% of CO2 from tyre use phase
- Researched how rolling resistance could be reduced (less exhaust and fuel use)
- Replace carbon black with silica

Source: 
Organisational Transformation

**Definition:** The creation of disruptive new products and services by viewing sustainability as a market opportunity.

- Organization can benefit financially from “doing good.”
- See opportunities to **serve new markets** with novel, **sustainable products**, or they are new entrants with **business models** predicated on creating value by lifting people out of poverty or producing renewable energy.
- **Radical shift in mindset from doing things better to doing new things.**

**Examples:**
- **Disruptive New Products that Benefit People.** Example: CT scanners that are portable, durable and have minimum functionality
- **Replacing Products with Services.** Examples: Leasing and maintaining carpets over a prescribed life-time rather than selling them.
Example of Organisational Transformation

‘Tata Swatch’ (Hindi for ‘clean’)
• The world’s cheapest household purification system (50% cheaper)
• Quest to reach largest number of people
• No harmful chemicals (including chlorine)
• Uses natural, locally sourced materials + nanotech
• Complies with U.S EPA standards

Tiwari and Herstatt, 2012
**Systems Building**

**Definition:** The intimate, interdependent collaborations between many disparate organizations that create positive impacts on people and the planet.

- Systems Builders extend their thinking beyond the boundaries of the organization to include *partners in previously unrelated areas or industries.*
- Radical shift in mindset – this time from doing new things and serving new markets to *thinking beyond the firm.*

**Example**
- **Industrial Symbiosis.** Disparate organizations cooperate to create a “circular economy” in which one firm’s waste is another’s resources. Example: A construction company uses other companies’ glass waste.
“The Kalundborg Symbiosis is an industrial ecosystem, where the \textbf{by-product} residual product of one enterprise is used as a resource by another enterprise, in a \textbf{closed cycle}.”

http://www.symbiosis.dk/en
Examples...

Organic waste from Novozymes is made into agricultural fertilizer.

from DONG is made into gypsum at Gyproc. 

\[ \text{SO}_2 + \text{CaCO}_3 = \text{CaSO}_4 \]
Conceptualising Sustainability Oriented Innovation

1. **OPERATIONAL OPTIMIZATION**
   - “Eco-Efficiency”
   - Compliance, efficiency
     * “Doing the same things better”
   - Reduces harm
   - Incremental improvements to business as usual

2. **ORGANIZATIONAL TRANSFORMATION**
   - “New Market Opportunities”
   - Novel products, services or business models
     * “Doing good by doing new things”
   - Creates shared value
   - Fundamental shift in firm purpose

3. **SYSTEMS BUILDING**
   - “Societal Change”
   - Novel products, services or business models that are impossible to achieve alone
     * “Doing good by doing new things with others”
   - Creates net positive impact
   - Extends beyond the firm to drive institutional change

SUSTAINABLE BUSINESS
How Do You Do It?

“While there is a considerable amount of knowledge on what drives sustainable innovation at the firm level, we know less about how sustainable innovations can be realized“ (Boons et al, 2013)

Debates of whether or not it pays to be ‘green’ are being replaced with new discussions of how to most effectively conduct SOI
Exercise: Sustainability Oriented Innovation

1. Select a company operating in your urban area

2. Identify one possible *operational optimisation*, *organisational transformation* and *systems building* opportunity for the firm

3. What are the business cases for these 3 opportunities?

4. What would the business need to know in order to make it happen?

5. What challenges will the business face in the innovation process?
Challenges

‘Double market failure’ (double externality)

– *Technological change externality* – firm developing the technology generates benefits to others while incurring all the costs (production expensive but reproduction not)

– *Environmental externality* – when negative environmental externalities have not been internalized, the investment rate in environmental solutions are likely to be lower than the social optimum level. (reductions not valued by the market)

Techno-institutional ‘lock-in’

– Tendency to use old solutions due to habit, user familiarity, lack of trust and experience with new solutions.

– Investment decisions linked to earlier investments
Challenges

High uncertainty and risk (Hall & Wagner, 2012).

- **Added complexity** of reconciling potentially opposed sustainability dimensions and stakeholder demands (Chen, 2001; Dangelico et al., 2013; Hall & Vredenburg, 2003).

- **Higher ambiguity** due to either scientific uncertainty (Hall & Vredenburg, 2003; De Meyer et al., 2002) or incomplete information (Wu & Pagell, 2011).

- **Ensuring commercial viability** (Berchicci & Bodewes, 2005; Dangelico & Pujari, 2010),
  - May produce products with **inferior performance** (in mainstream dimensions) (Geels et al., 2008).
  - **Green marketing myopia** (Ottman et al., 2006)
  - **Higher scrutiny** from stakeholders (Hall, 2002)
Success Factors?

(a) Market, law and legislation knowledge;
   – Customer expectation fulfilment
   – Knowledge of sustainable buying drivers
   – Competitor monitoring

(b) Interfunctional collaboration;
   – Stakeholder integration (envt experts)
   – Culture of collaboration

(c) Innovation-oriented learning;
   – Development of sustainability competencies

(d) R&D Investments.
   – Clean tech research
   – Methods for sustainable product innovation
Sustainable Business Model Innovation
A Business Model is...

“the logic of the firm, the way it operates and how it creates value for its stakeholders” (Baden-Fuller et al, 2010)

“the rationale of how an organisation creates, distributes and captures value” (Osterwalder and Pigneur, 2010)
The business model canvas

Osterwalder and Pigneur, (2010)
Growing Area of Interest

“Scholars and practitioners are [therefore] increasingly exploring whether modified and completely new business models can help maintain, or even increase, economic prosperity, by either radically reducing negative or creating positive external effects for the natural environment and society”

Schaltegger et al (2015: 2)
Why Consider Business Models and Sustainability?

- Highlights the *value creation logic of an organization and its effects*
- Potentially allows (and calls) for *new governance forms* such as cooperatives, public private partnerships, or social businesses, thus helping transcend narrow for-profit and profit-maximizing models.
- *Overcome the technology bias* of traditional “green” approaches; as a way of sustainability-oriented innovation at the level of use-systems or functions

Schaltegger et al (2015: 3)
Business Model for Sustainability

A business model for sustainability helps describing, analyzing, managing, and communicating

(i) a company’s sustainable value proposition to its customers, and all other stakeholders,

(ii) how it creates and delivers this value,

(iii) and how it captures economic value while maintaining or regenerating natural, social, and economic capital beyond its organizational boundaries.

Schaltegger et al (2015: 4)
Exercise: Sustainable Business Models

What constitutes a Business Model for Sustainable Cities?

You may wish to consider:

The value proposition - The exchange of value between the firm and its urban stakeholders. e.g. What are the actual needs of the customers? What is valued by the customer?

The configuration of value creation - The way in which the firm links to suppliers and urban stakeholders. e.g. How is the product-service produced? How is the product-service delivered to the customer?

The revenue model - How are the costs and benefits divided between urban stakeholders? e.g. creating shared value across the value chain
What Constitutes a Sustainable Business Model?

• The *value proposition* must provide both ecological or social and economic value through offering products and services,

• The *business infrastructure* must be rooted in principles of sustainable supply chain management,

• The *customer interface* must enable close relationships with customers and other stakeholders to be able to take responsibility for production *and* consumption systems (instead of simply “selling stuff”), and

• The *financial model* should distribute economic costs and benefits equitably among actors involved.

Boons and Lüdeke-Freund (2013)
Business Model Innovations for Sustainability

“Innovations that create significant positive and/or significantly reduced negative impacts for the environment and/or society, through changes in the way the organisation and its value-network create, deliver value and capture value (i.e. create economic value) or change their value propositions”

Bocken et al (2014)
Business Model Innovations for Sustainability

- **Defensive strategies** (adjustment) are incremental business model adjustments to protect current business models focusing on risk and cost reduction often driven by the need for compliance;

- **Acommodative strategies** (improvement, integration) are modifications of internal processes and include some consideration of environmental or social objectives (e.g. environmental protection),

- **Proactive strategies** (full integration) concern the redesign of the core business logic of the firm for sustainable development.

Schaltegger et al. (2012) - as explained by Bocken et al (2014: 44)
Sustainable Business Model Archetypes

Bocken et al, (2014)
1. Maintenance contract
2. Course on product use
3. Car leasing
4. Car renting
5. City Bikes
6. Taxi service
7. Pay per copy printers
8. Public transport network

Figure 1. Main and subcategories of PSS
Example: Deliver Functionality rather than Ownership

FROM OWNING JEANS TO USING JEANS

We dream of a world without waste. That's why we design jeans with recycling in mind. Our jeans are a cross-over between American Vintage, Dutch Design and Scandinavian Minimalism. Lease or buy the jeans. Take them wherever you go, just return them at the end of use. This is how we create our own circle of denim products. Reusing valuable materials, cutting down on resources.

http://www.mudjeans.eu
HOW IT WORKS

1. **€25**
   - Pay member fee (1st month, one time)

2. **receive your jeans**

3. **€7.50**
   - Monthly fee (for 12 months)

AFTER 12 MONTHS, WE SEND YOU AN EMAIL WITH 3 CHOICES:

1. **keep them**
   - Still like them?
   - They’re yours now. Take them with you wherever you go

2. **switch them**
   - Ready for a new pair?
   - Pay ‘switching’ fee (1st month, one time)
   - Send us your old jeans and receive the new ones
   - **€10**

3. **send back**
   - Done wearing?
   - Return the jeans and get a €10 voucher to use at any point of time
   - **€7.50**
   - Monthly fee (for 12 months)
Example: Create Value from Waste

http://studenten.steunleiden.nl/projecten/upwear
Tools for sustainable business model innovation

Which *management instruments* enable the management of or transition to business models for sustainability?

Tools that support innovation

– (e.g., design thinking, The Natural Step framework, biomimicry)

Tools for strategy implementation

– (e.g., Business Model Canvas)

Tools for managing and measuring performance and societal impacts

– (e.g., Sustainability Balanced Scorecard)
The Sustainable Business Model Canvas

Complementary usage to traditional Business Model Canvas

The sustainable business model canvas is an ideal tool to complement the traditional business model canvas in order to fine tune the sustainable product and business model development process.

### Sustainable Partners
- Who are possible partners in becoming more sustainable?
- How can we make the whole supply chain sustainable and circular?
- Can we substitute some resources for sustainable ones?
- Can we shape anticipated environmental regulations by partnering and cooperating with relevant regulatory bodies?

### Sustainable Value Creation
- How do we have to adjust our key activities to ensure sustainability?
- Can we create value via resource and product recovery?

### Sustainable Resources & Tech.
- What kinds of resources, materials and technologies do we need for our sustainable transformation?

### Sustainable Products/Services
- Can we solve customers’ problems more sustainably?
- How do we satisfy customers’ needs more sustainably?
- How do we transform sustainability to value in the customer’s eyes?
- Is ownership necessary for customer value? Is the product as a service model applicable?
- How do we extend the product life cycle?

### Sustainable Customer Relation
- Which customer relationships satisfy customer expectations AND are sustainable?
- How can we make current relationships more sustainable?

### Sustainability-responsive customers
- How can we engage in acting in a sustainable way?
- Which target customers value sustainability and may help to promote our sustainable solution?

### Sust. Channels
- How can we make our distribution channel more sustainable and circular?
- How do we best communicate the sustainable aspect of our product/service?

### Higher Costs due to Sustainability Strategy
- Which resources/activities are the least sustainable?
- Do sustainable alternatives exist? Is switching economically reasonable?

### Increased Turnover due to Sustainability Strategy
- Are customers willing to pay a premium for sustainability?
- Can we create a unique advantage due to sustainable proposition elements?
- What is it that customers value about our product/service? Is there a way to provide this value more sustainably?
- Do fee structures exist that incentivize sustainable user behaviour?

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The mm1 S-BMC is derived from the work of Servatius, 2014
KEEP CALM AND MAKE A SUMMARY

http://www.keepcalm-o-matic.co.uk
Key Lecture Takeaways

1. Innovation is the **successful exploitation of new ideas**.

2. Through **Sustainability Oriented Innovation** firms may contribute to more sustainable cities.

3. Sustainability Oriented Innovation is **differentiated in its types**, ranging from optimising current activities to building new systems of interdependent collaborations in line with sustainable city needs.

4. Innovation of new **Sustainable Business Models** moves firms beyond the techno-fix approach and consider how they are creating value for its urban stakeholders.
Homework: Elevator Pitch

• Pick a business operating in your city
• Consider the current business model (value prop/ value delivery/ value capture). What extent is it in-line with ‘sustainable’ cities?
• Make a 2 minute video message to the CEO on how the business model may be innovated to become more sustainable. What archetype may be appropriate for the business and why?
• Post your video on the shared folder space
Thank you for your attention

Dr Steve Kennedy

skennedy@rsm.nl
References - SOI

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• Innovation Unit, UK Dept of Trade and Innovation, 2004


References - SOI

References – Sustainable Business Models


