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NEW RESEARCH OPPORTUNITIES IN ECO-INNOVATION FROM TWO YEARS OF COLLABORATIVE RESEARCH PROJECTS

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INTRODUCTION (1/2)

ECO-DESIGN & ECO-INNOVATION CONCEPTS

Eco-design: a well-established concept

- *“Integration of environmental aspects into product design and development, with the aim of reducing adverse environmental impacts throughout a product's life cycle.”* [ISO 14006:2011]

Eco-innovation: a polysemic term

- *“a new product, process or service, development (NPD) process that provides significant environmental performances”* [Fussler & James 1996]
- Ill-understood concept with many theoretical uncertainties [Andersen 2008]
- Inventory of 16 definitions related to eco-innovation and sustainable innovation [Carrillo-Hermosilla et al. 2010]

Divergent viewpoints about eco-innovation

- Intensity of the eco-innovation: radical / incremental [Baroulaki, 2007]
- Integration of the social aspect in the scope of the eco-innovation [Cucuzella, 2008; Charter et Tischner, 2001]

INTRODUCTION (2/2)

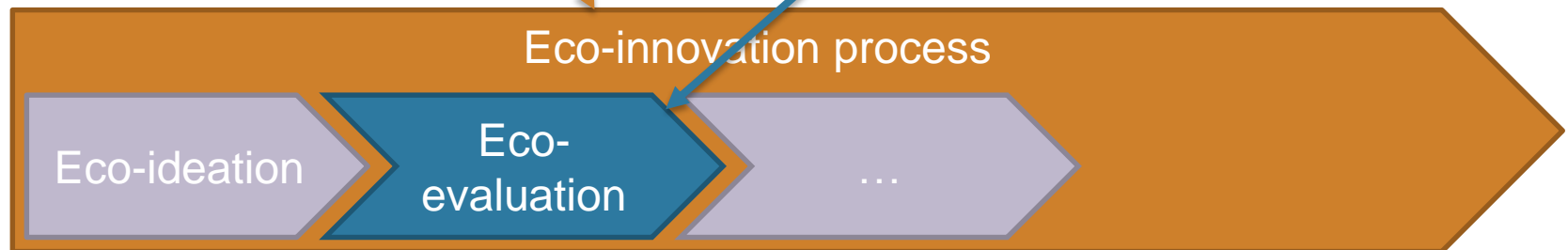
CONTEXT & OBJECTIVE

Two EcoSD Collaborative Research Projects performed in eco-innovation from 2012



2012-2013 : Eco-design vs. Eco-innovation: what is the perception of companies?

2013-2014 : Environmental evaluation of ideas in the upstream phases of an eco-innovation process



Objective of the study: to make the synthesis of two years of projects and to identify new research directions in eco-innovation

RESEARCH PROJECT #1

CONTEXT & OBJECTIVES

- Difficulty to clarify the **similarities and differences** between eco-design and eco-innovation.
- Difficulty to draw a **clear boundary** between these two concepts.
- Surveys on **industrial implementation** of eco-innovation are scarce [Santolaria et al. 2011; Bocken et al. 2014]

What is the perception of eco-innovation by French enterprises already involved in eco-design ?

How is eco-innovation perceived and defined in reference to eco-design by French industrial practitioners?

Has the company/organization already experienced eco-innovation projects?

What are the expected outcomes of eco-innovation?

RESEARCH PROJECT #1

METHOD: INDUSTRIAL SURVEY

- 12 French organizations having at least a recent experience in eco-design
- Semi-directed in-depth interviews with 18 persons

Definitions, differences, maturity

Innovation process and organization

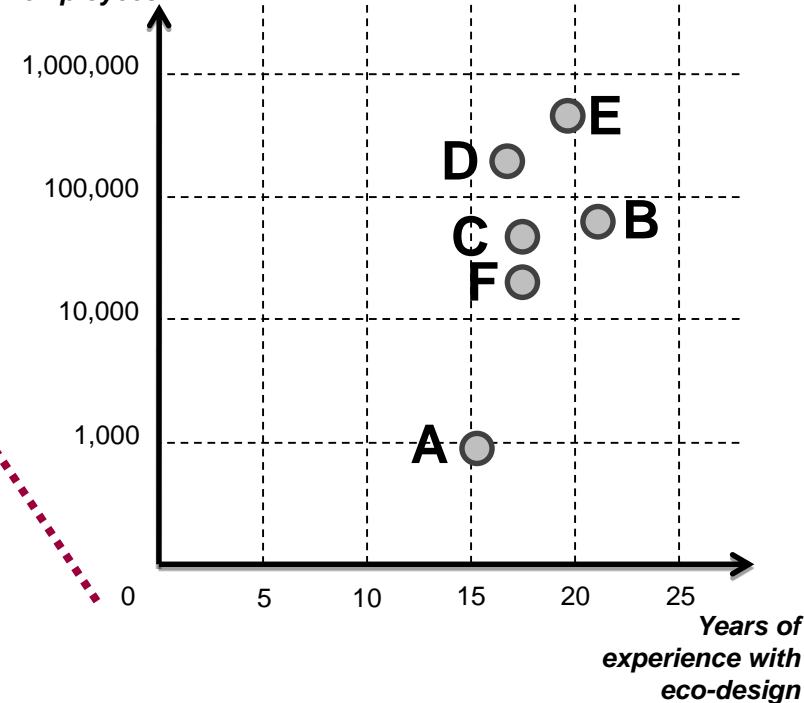
Sustainable considerations in projects

Methods and tools

Experience feedbacks

Name	Industrial sector	Type	Business
A	Urban mobility	Industry	BtoB
B	Building	Industry	BtoB
C	Energy	Industrial association	BtoB/BtoC
D	Energy	Industry	BtoB
E	Metal industry	Industry	BtoB
F	Automotive	Industry	BtoC
G	Automotive	Industry	BtoB
H	Environmental management	Consultancy	NA
I	Environmental management	Consultancy	NA
J	Environmental management	Consultancy	NA
K	Postal sector	Industry	BtoB
L	Furnishing	Technological center	BtoB/BtoC

Number of employees



RESEARCH PROJECT #1

RESULTS



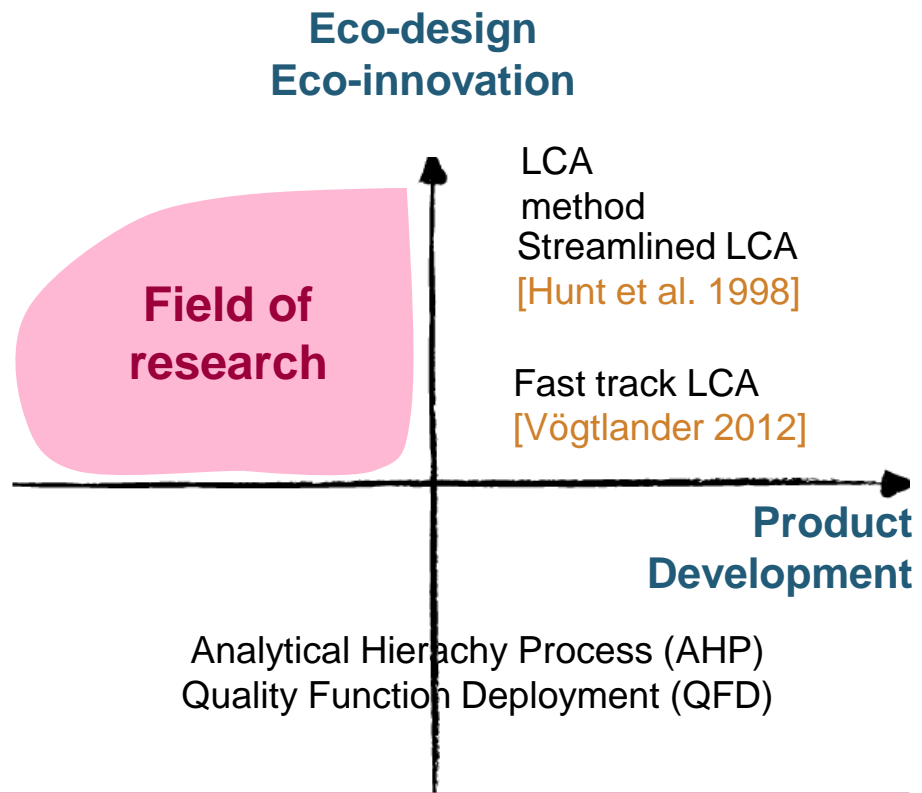
- **Ambiguity still remains** between eco-design and eco-innovation
- Eco-innovation is **not clearly supported** by an eco-innovation process
- Eco-innovation can result from the introduction of **economic and environmental** constraints in the design process
- Although numerous eco-innovation tools and approaches were developed by academics, **none of them were cited**

Knowledge transfer from academia to industry is crucial and requires a special attention

- **Limits** of the survey:
 - Size of the sample
 - Troubles generated by the use of the term 'Eco-innovation' in the questionnaire.

RESEARCH PROJECT #2

CONTEXT & OBJECTIVES



How to turn elementary ideas into concepts with a high environmental potential in a design team?

What is the influence of the method on the selected ideas and emerging concepts?

RESEARCH PROJECT #2

METHOD

- **2 case studies**

- New usages of crumpled paper (UTT) → 14 ideas
- The next generation of parking meter (Parkeon) → 15 ideas
- 12 eco-design experts + 2 Master students
 - 3 Groups (academic, industrial, consultant, student)
 - 2 evaluation methods + 1 control method
 - 2 * 2 hours sessions = **6 experiments** → **Each method applied on each case studies**



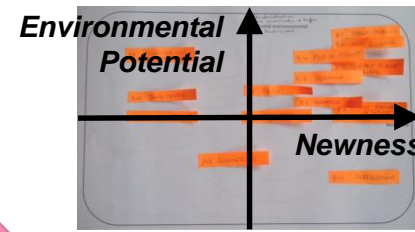
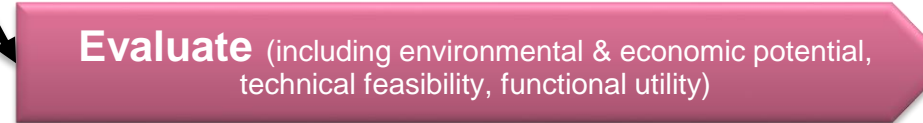
Method 1: Combineval (inspired from [Fussler & James, 1996])



Method 2: Geneval



Control method

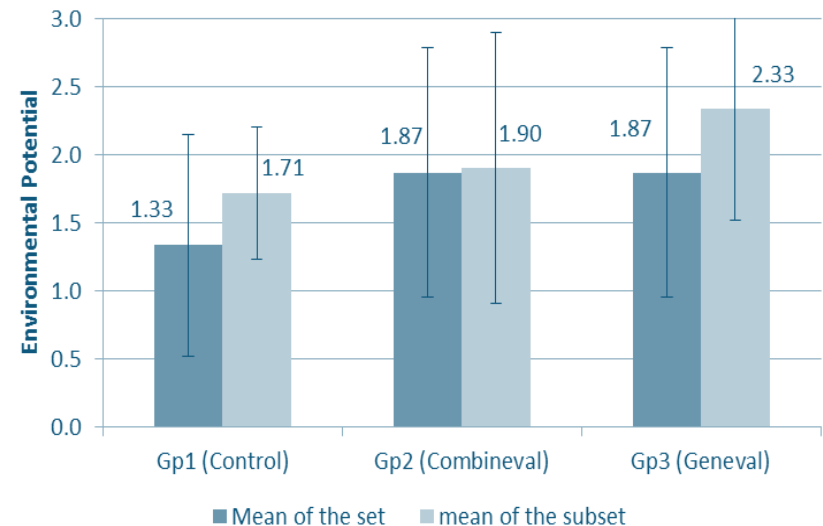


RESEARCH PROJECT #3

RESULTS



- Evaluation and environmental scores are **highly dependent on the method employed**
- Geneval and the control approaches are relevant to **capture ideas with a promising environmental potential**



- Geneval and Combineval more relevant for **ideas with low maturity level**
- Control method **high team adhesion** but limited to the assessment of ideas

The format of ideas is reported as a major issue

GENERAL DISCUSSION



What are the **new research directions in eco-innovation** emerging from these research projects?

1 Develop stimulation mechanisms and appropriate format of ideas



2 Make environmental assessment of ideas simpler and more efficient

3 Reduce the gap between academia and industry

RESEARCH DIRECTION #1

ECO-IDEATION

Develop stimulation mechanisms and appropriate format of ideas

- A lot of eco-ideation tools exist, but **none of them are used in industry**
- They are judged too complicated or not adapted
- Instead of developing new methods and tools, existing ones should be improved with
 - **Stimulation mechanisms** [Tyl and Vallet 2015]
 - On-going work: a toolbox of 9 Eco-ideation Stimulation Mechanisms (ESM)
 - Based on technical, economical and social dimensions of eco-innovation.
 - **Adapted format of ideas**
 - To preserve/transfer information during the eco-innovation process
 - To help evaluation of ideas with a comparable level of detail for all ideas
- What should be the **right eco-ideation tool in a given context?**

RESEARCH DIRECTION #2

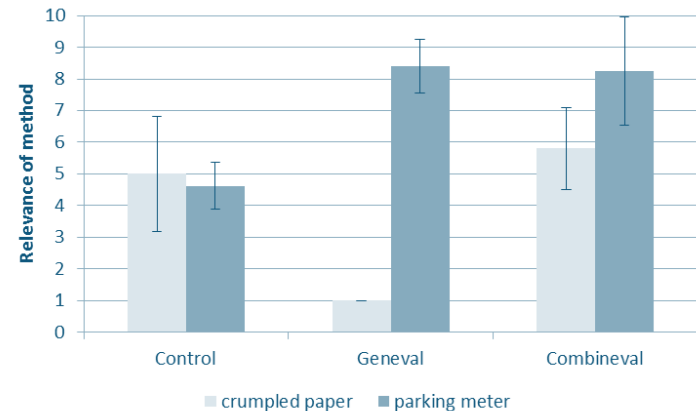
ECO-EVALUATION



Make environmental assessment of ideas simpler and more efficient

- Going further in the **assessment of environmental evaluation methods** and tools

- What are the most efficient ones?



- What should be the **right eco-evaluation method or tool in a given context?**

- Adapted **format of ideas**: which input/output for the eco-evaluation stage?
- Co-creation of **environmental/sustainability criteria** in project teams?
- How to **adapt the method/tool** to the context/product?

RESEARCH DIRECTION #3

ECO-INNOVATION PROCESS

Reduce the gap between academia and industry

Academia



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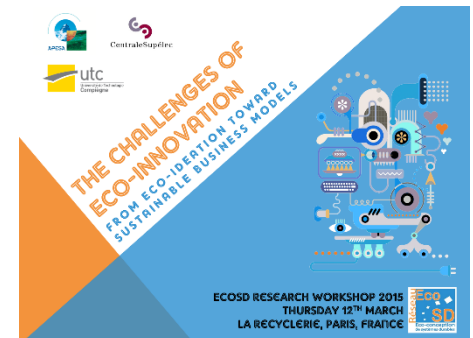
Industry

- With **more efficient and improved methods and tools**, transfer to academia should be facilitated
- This is **necessary but not sufficient**
- How is it possible to go further?
 - By **integrating business model** aspects
 - By **working closer with industry**
 - By **improving the integration** of eco-innovation methods and tools in existing eco-design or innovation processes
 - By **highlighting advantages** of eco-innovation
 - ...

CONCLUSIONS AND PERSPECTIVES

How to implement these research directions?

- Develop **collaborative research projects** in eco-innovation
 - At the French level (EcoSD, ANR ALIENNOR, ADEME...)
 - At the international level (European projects...)
 - **Collaborate closer with industry**
 - Co-development of methods, tools, processes, good practices...
 - Identification of case studies and testing grounds in multiple sectors
 - **Share knowledge and experience** with academia and industry
 - Through scientific publications
 - Through dedicated events
 - EcoSD workshop « *The challenges of eco-innovation: from eco-ideation toward sustainable business models* », March 2015, Paris, France
- **Proceedings to be published in a few months**





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Thanks for your attention

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