Re-Use System for Notebooks – the Goals and Rationale of the RUN Project

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'ReUse Notebook–Collection, Refurbishment and Distribution System'

Co-funded by the Eco-innovation Initiative of the European Union Grant Agreement No.ECO/13/630329 | www.ReUse-Notebook.eu | eMail: Info@ReUse-Notebook.eu

Introduction: Project Facts

- Started 11/2014
- 3 years runtime
- Funded under EU‘s FP7, CIP-Eco-Innovation, Market Replication
- 8 partners from 3 countries: Germany, Austria, Poland
- Refurbishers, recycling centers, consultants, one association
- Implement a collection and remarketing system for notebooks from **private households and SMEs→ small batch sizes**

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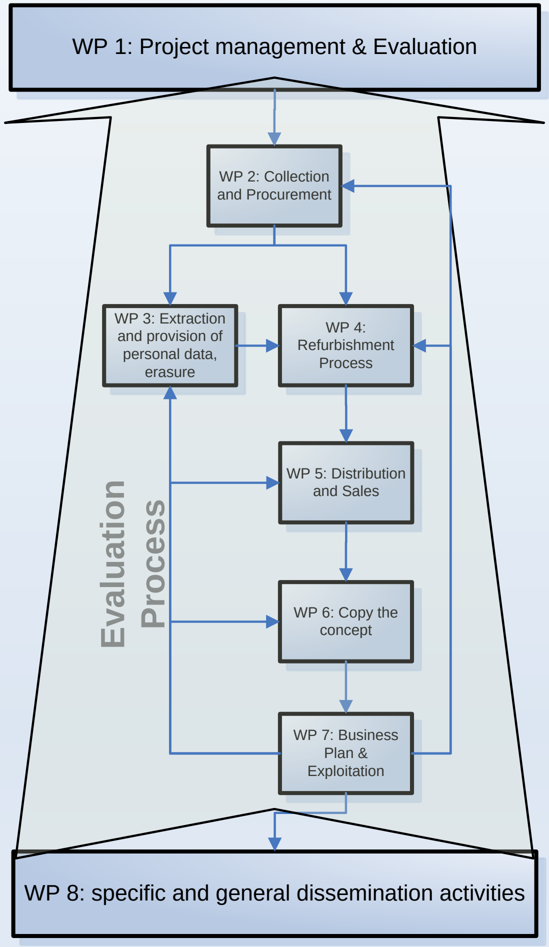
Introduction: Project Structure

8 work packages

All issues addressed for starting up a large scale collection and remarketing system:

- Collection concept
- Data security and extraction as service add-ons
- Refurbishment process
- Marketing concept and transfer to other European countries



Project structure

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Rationale

Starting Point:

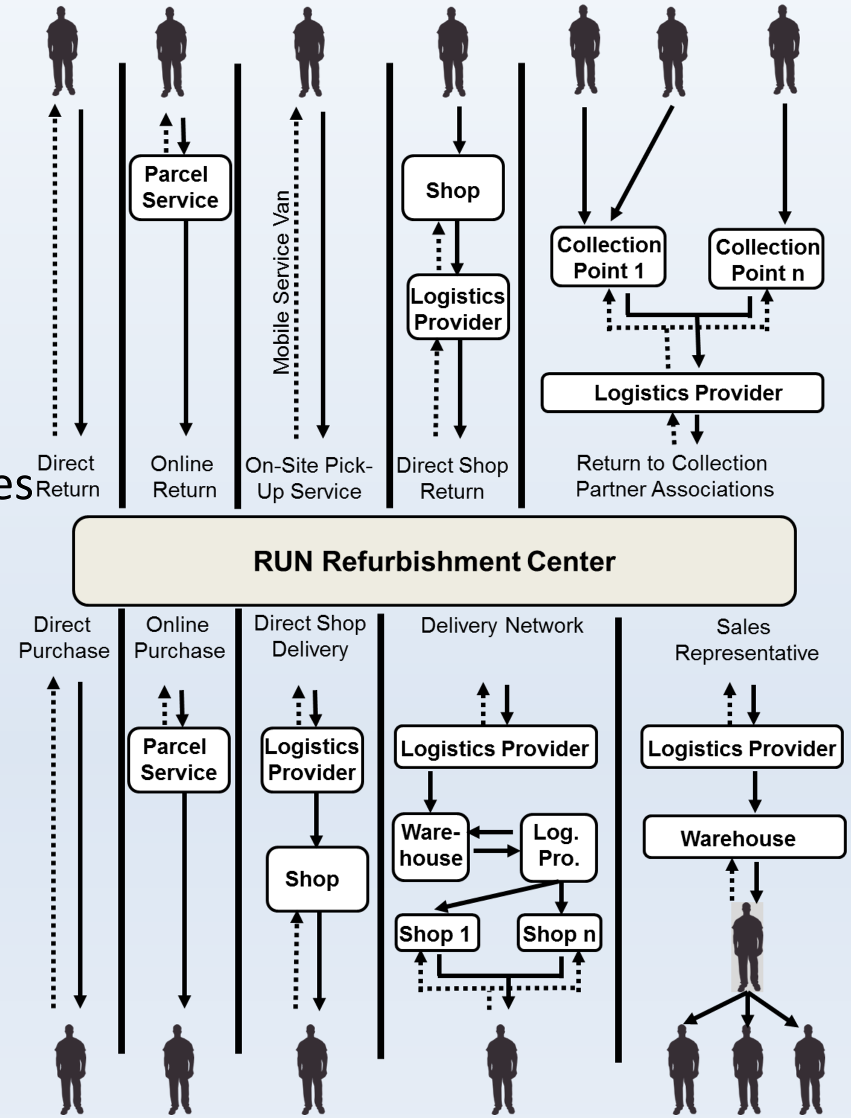
- Private households and SMEs neglected for professional refurbishing. Devices should basically be available for refurbishment.

Challenges:

- Small batch sizes
- Re-usability of devices? What kind of devices are returned?
- Logistics challenge: reach throughput

Rationale:

- Avoid competition in niche
- Innovative service add-ons
- Materials recycling is economic viable – re-use is profitable
- Easy take-back



Assessed reverse logistics and distribution channels

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Ecological Impacts of Notebooks

- Main environmental impacts during production phase (Ciroth & Franze, 2011)
- Many scarce or valuable resources – very low functional recycling rates (Graedel et al., 2011; USGS 2013)
- Waste generation (whole lifetime): average office notebook: **11.240 kg** of non-hazardous waste and **1.482 kg** hazardous waste (IVF, 2007)
- New product generations have only slightly lower energy consumption in use (re-use devices only two product generations older) (Prakash et al., 2013)
- World market 2013: 180.9 million devices (IDC, 2013) - Germany 2014: 5,436,000 devices to private consumers (gfu et al., 2015)

Type of Device	CO_2e emissions
14,1” Fujitsu EcoLeaf (Jibiki, 2010)	96 kg
12,1” HP (Hischier et al., 2007)	155 kg
14” Dell Latitude E6400 (Stutz & Moriarty, 2010)	250 kg
11” MacBook Air (Apple, 2015)	352.6 kg
15” MacBook Pro (Apple, 2015)	704 kg

Overview of CO_2 (equivalent) emissions from manufacturing of selected notebooks

Material	Weight in mg	Used mainly in component
cobalt	65,000	lithium-ion battery
neodymium	2,100	spindle motor, speakers, voice coil actuator
tantalum	1,700	capacitors
silver	440	(main) circuit boards
praseodymium	270	voice coil actuator, speakers
gold	100	main circuit board
dysprosium	60	voice coil actuator
indium	40	display
palladium	40	(main) circuit board
platinum	4	hard disks
yttrium	1.8/ 1.6	background lighting

Average usage of critical metals per notebook (LANUV , 2012, Table 23]

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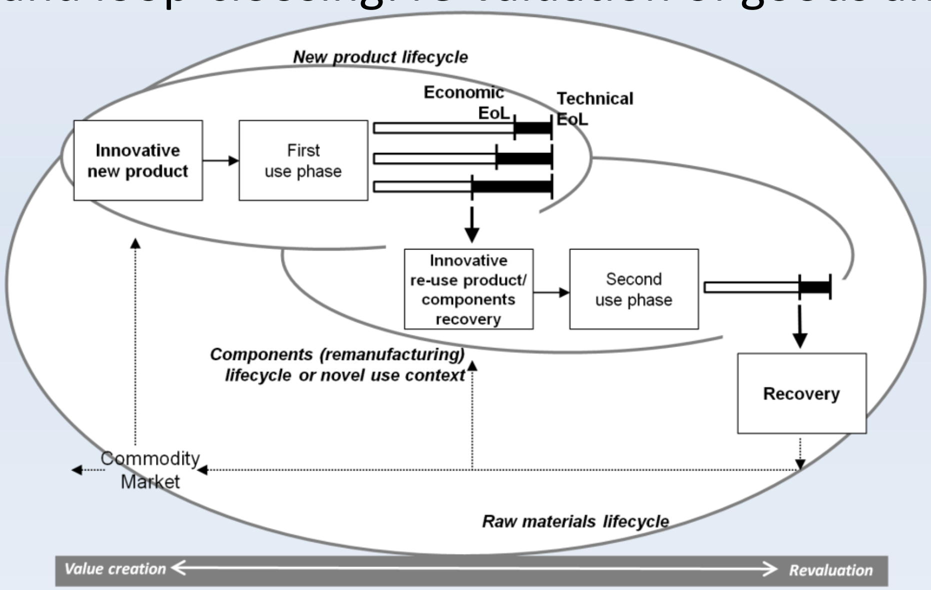
Eco-Innovation

"all measures of relevant actors […] which develop new ideas, behaviour, products and processes, apply or introduce them [but also] contribute to a reduction of environmental burdens or to ecologically specified sustainability targets." (Rennings, 2000)

- Centered on environmental impact
- Not only technically-centred → Innovation also is rooted in radically new or improved business models or patterns of interaction between consumers, firms and other actors (Chesbrough & Rosenbollm, 2002; Wirtz, 2010)
- Circular economy and loop-cloosing: re-valuation of goods and materials (Slowak & Regenfelder, 2015)



Conceptualisation of the sustainable pattern of innovation (Slowak & Regenfelder, 2015, Fig. 1)

Eco-Innovativeness of RUN

ECO: Positive Ecological Impact by Prolonging Lifetime of Notebooks

- Several ten thousands of devices will be collected and refurbished during project's run-time
- Ecological savings from substitution of new production (lowest boundary for substitution found in literature is 0.2 (Ciroth & Franze, 2011)) – incorporated natural resources stay in industrial cycle
- Not every device will fulfil requirements for refurbishing → manual disassembly before materials recycling →increase the yield and quality of the recycling process compared to shredding whole appliances (Schöps et al., 2010)

INNOVATION : New Business Model

- Unlock a new source for used appliances
- New cost-efficient logistics concept which is able to handle very small batch sizes down to one piece

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Thank you!

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