Poznań University of Life Sciences

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and Wood Industry Management

INDUSTRIAL SYMBIOSIS AND GREEN BUSINESS PARKS IN THE WOOD-BASED SECTOR IN POLAND

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WoodEMA – Dubrovnik 2015

Why ECO-Industrial Parks?

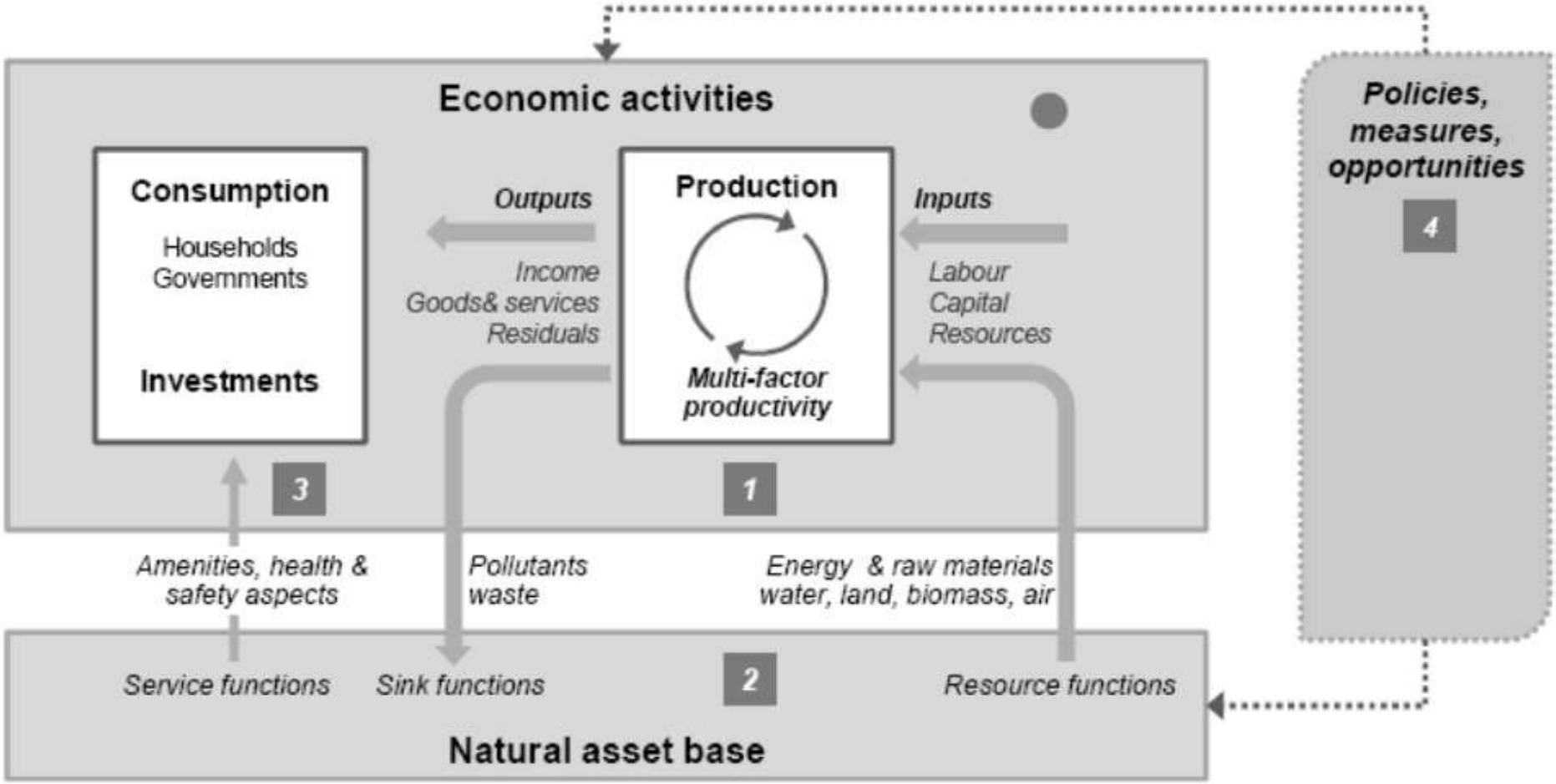
- **From „Sustained Yield Forestry" to „sustainable development":** The author of this concept – **Hans Carl von Carlowitz** (1713) – defined as such the concept of forest economy which consists in obtaining only the amount of industrial wood that can be recreated based on natural renewal (in: *Sylvicultura oeconomica*).
- **Direction – Integral Economics:** The traditional model of economy is questioned! Actually, nobody has released us from the responsibility for the condition of the resources and the quality of life of future generations (**Pope Francis**, in „*Laudato Si*", 2015).

Symbiosis versus the competition?

- **Industrial symbiosis in wood-based sector?** This is conducive in a natural way to the tendencies towards industrial symbiosis by creating proper conditions for the development of eco-industrial parks.
- **An eco-industrial park (EIP)** should not reflect only passive features (area, real property, infrastructure, etc.), but should be „***something more than just a fragment of an industrialised area***" (Doniec 2011).

Green Business Parks

- **Forest recources – a natural source of wood:**
  Forest resources, which constitute a natural source of wood, are an inextricable element of the natural environment. Their greatest assets include constant sustainability of resources and the ecological character of the economic chain at every stage of wood usage (from logging to recycling).
- **Industrial symbiosis?**
  The changes taking place in this field are confirmed by a tendency towards formation of new industrial communities, in Polish conditions referred to as "**green parks of entrepreneurship**". The tendency, based on the concept of "eco-industrial symbiosis", seems particularly important for the forest- and wood-based industry and potential changes in the structure of the sector.



- Figure 1. **Framework for green growth indicators**

INDUSTRIAL SYMBIOSIS IN GREEN ECONOMY

SELECTED INDICATOR GROUPS

I.	The environmental and resource productivity of the economy	* Carbon and energy productivity; * Resource productivity: materials, nutrients, water; * Multi-factor productivity;
II.	The natural asset base	* Renewable stocks: FOREST (WOOD), water, fish resources; * Non-renewable stocks: mineral resources; * Biodiversity and ecosystems;
III.	The environmental dimension of quality of life	* Environmental health and risks; * Environmental services and amenities;
IV.	Economic opportunities and policy responses	* Technology and innovation; * Environmental goods and services; * International financial flows; * Prices and transfers; * Skills and training; * Regulations and management approaches;
SOCIO-ECONOMIC CONTEXT		* Economic growth and structure; * Productivity and trade; * Labour markets, education and income; * Socio-demographic patterns.

Green Business Parks in Poland

- **The starting point?** The analysis of conditions for the establishment and functioning of eco-industrial parks in the wood-based industry was based on an original survey study and an analysis of the current legal status.
- **Considerations?** As a result (of desriptive analysis), significant groups of **natural**, **institutional**, **economic** and **social** factors were identified.

Greenfield or Brownfield+ECO?

- **Which way?** Based on completed research studies, Polish past experiences refer mainly to the broadening of the structure of a traditional industrial park by adding environmental aspects. This process may take place by means of:
- - introducing the "eco" added value to an existing industrial park: **brownfield-type park**;
- - designing EIP from scratch: **greenfield-type park**.

Dilemmas…

- In both cases, certain dilemmas arise which are associated with the necessity to gather an appropriate group of partners (including in particular production enterprises), whose profile of activities will enable to **create symbiotic links**.
- Identification of an industrial chain: **raw material – process – product**, including the creation of side products in this chain, has become the basis for the formation of **symbiotic links** between enterprises. It turns out that the use of an "**unwanted stream**" constitutes an important element of competitive potential.

Research – Step 1

- The analysis of conditions for the establishment and functioning of eco-industrial parks in the wood-based industry was based on an original survey study and an analysis of the current legal status.

Research – Step 2

- The most commonly mentioned determinant of competitiveness in literature is price. After transferring this observation into this study, the **criterion of economic effectiveness of eco-industrial parks** was accepted as an endogenous variable.
- A research question was formulated: to what extent potential economic effectiveness, possible to be achieved by EIP, is shaped by price factors, and to what extent by non-price factors of competitiveness. In order to verify that a hypothesis was made that the establishment, development and effectiveness of EIP in the wood-based industry in Poland is mainly affected by the **price-related** competitiveness factors.

Research method

- Based on a theoretical analysis, selection of variables (measurable and non-measurable) for qualitative research was made. Regardless of primary features, all selected factors were given the character of qualitative variables.
- The research was carried out with the use of descriptive statistics methods, applying successively a correlation analysis and method of step wise regression, as well as a descriptive analysis by conducting a discussion of results and conclusions.

Results (1)

- **The interpretation of the model** (of the method of step wise regression): It turns out that when applying a model based on price criteria, as much as 85% of Ŷ variability (potential effectiveness of EIP) remains **unexplained.**
- The research **did not confirm** the initially assumed hypothesis that competitiveness of eco-industrial parks in the industries based on wood was determined mainly by price factors of competitiveness.

Results (2)

- By aggregating the observations made in the study, the competitive situation which is conducive to the establishment and development of eco-industrial parks is determined by institutional conditions, non-price factors and, most of all, **market stability**.

Conclusions (1)

- It seems that identification of **non-price factors** of competitiveness turns out to be particularly important in the Polish wood-based industry, shaped by the monopolistic wood produce market.
- Based on the studies conducted, the most important barriers for the establishment and functioning of EIPs include **lack or instability of legal regulations**, **no incentives** for the establishment of EIPs and widely-understood **limitations in the scope of waste management**. No regulations concerning EIPs in the act on forests is yet another problem for the forest- and wood-based industry.

Conclusions (2)

- At the same time, however, based on the experiences of the **Promotional Forest Complexes** (25 in Poland, with surface area of 1,267,803 ha), it seems possible to work out analogous structures relying on symbiotic links between production enterprises of the wood-.ased industry

Thank you *for your attention!*
Hvala *vam na pozornosti!*

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Please send more questions to the main author:

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Best greetings to ALL from Jan Chudobiecki ☺

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