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SHIFT TO ELECTRIC CAR PRODUCTION:
NATIONAL STRATEGIES IN CENTRAL AND EASTERN EUROPE

HUN REN Institute of World Economics | PRAGUE UNIVERSITY OF ECONOMICS AND BUSINESS | SGH Warsaw School of Economics | INSTITUTE OF ECONOMIC SCIENCES | PAN-EUROPEAN UNIVERSITY

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How do collaboration, sustainability and resilience impact the new product development: Investigation among Czech and Hungarian automotive producers in time of transition towards electromobility

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Content of the presentation

LITERATURE REVIEW

METHODOLOGY

RESULTS

FUTURE RESEARCH

DISCUSSION

Holgado et al. (2024)

The Literature Review

- **Supply chain resilience** – the adaptive capacity of the supply chain to prepare for unexpected events, respond to disruptions, and recover from them by maintaining continuity of operations at the desired level of connectedness and control over structure and function (*Ponovarov & Holcomb, 2019*)

- **Sustainability -** Sustainability encourages the implementation of such policies that sustain or expand the environmental resource base so that present and future generations' needs can be satisfied (*UN, 1987)*. Sustainability concerns environmental, social, and economic pillars. The major issues in the manufacturing industry and NPD focus on ecological pilar (*Kalish et al., 2018).* On the same line, research calls for more attention to be dedicated to the social pillar (*Eggert & Hartmann, 2023)*.

- **Innovations**
  - New product development (NPD)
  - Business process innovation (innovation of production process, organizational innovation, and technological innovation)

Resilience & Sustainability

- *Ji et al., 2020*

  Resilience is a "necessary precondition for sustainability „

- *Eggert & Hartmann (2023)*

Positive relationship between sustainable SCM and resilient SC; higher sustainability intensity proved to be more ready for unexpected events

- *Said et al. (2024)*

Reserach recognizes the interplay of operational, logistical, and environmental considerations, but the focus is on more efficient green supply chain

RQ1: How are supply chain resilience and sustainability dymensions integrated in innovations?

RQ2: How can resilience in SCM in innovations support sustainability and vice versa?

Resource dependence theory - Defee et al., 2010; Zacharia & Mentzer, 2007; Hillman et al., 2009.

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Methodology

Qualitative research (*Matsuo, 2014; Scavarda, 2015; van Hoek, 2020; Scholten & Schilder, 2015; Herold, 2021)*

Multiple case study research, thematic analysis, indepth interviews

Sample of 11 large NACE 29 companies from Czechia and Hungary

TIER 1 and TIER 2 companies, OEMs

April 2024 – January 2025

7 Czech, 4 Hungarian companies

Results

RQ1: How are supply chain resilience and sustainability dymensions integrated in innovations?

Knowledge sharing with suppliers (Ji et al., 2020)

Resilience & Sustainability & Agility -> viable supply chain model (Ivanov, 2020)

Ecosilient index (Azevedo et al., 2013)

- Environmental collaboration with suppliers
- Environmental monitoring upon suppliers
- ISO 14001
- Reduced energy consumption
- Reuse or recycling materials
- Environmental collaboration with the customers
- Reverse logistics
- Sourcing strategies
- Flexible SC
- SC visibility
- Strategic stock
- Collaborative planning)

RQ2: How can resilience in SCM in innovations support sustainability and vice versa?

- Compared to the literature, the cooperation potential with the suppliers is not used besides what concerns cooperation with OEMs and TIER 1 suppliers.
- The universities are concerned as a source of educated manpower, but the cooperation is limited.

OEM (CZ): We collaborate with suppliers, universities (e.g. what we cannot 3D print) and accredited laboratories; universities are a potential source of employees, we offer internships for students
TIER 1 (CZ): Cooperation with external institutions, e.g. universities, has decreased. There is no time or money for that.
TIER 1 (HU): Basically, we only formulate our expectations towards our suppliers, cooperation is only with our customers.

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Conclusions & discussion

Sourcing strategies

- Including sustainability in the sourcing strategies is on the beginning and will be further developing depending also on the OEMs policy
- The CO_2 emissions are the main subject of requirements
- Certification can be a competitive factor of suppliers
- Increased costs vs. price competitiveness
- Quidelines vs. objectivity

TIER 1 (HU): The sustainability criteria and criteria defined by the OEM are applied during operations and suppliers are held accountable for this. These mainly concern the reduction of the carbon footprint (CO2). But it also has socio-social pillars.
TIER 1 (CZ): It's harder (to find suppliers) than it was 10 years ago. A lot of suppliers dropped out, they were not able to meet the criteria of the Green Deal - they did not have certificates, they were not able to reach for support.

Conclusions & discussion

- **Reduced energy consumption and environmental impact**

TIER 1 (CZ): *We have installed effective (certified) dust particle filters. In general, people's acceptance is important. There is a strong resistance of people inside the organization to the introduction of new materials*
TIER 1 (HU): *Energy consumption is a priority here.*
TIER 3 (HU): *Low carbon footprint is a consideration during investments. This is primarily a question of efficiency, if we use less energy, our costs also decrease.*
TIER 1 (HU): *The supply of certain raw materials and components is disrupted. Another problem is the increase in purchase prices, which is caused by the increase in energy prices and efforts to reduce CO2 emissions.*
TIER 1 (CZ): *Sustainable activities must first of all be financially beneficial – if they are not, there is no reason to implement them. There are many activities when it comes to lowering energy consumption, improving productivity = better utilization of energy + manpower per produced part etc.*

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Conclusions & discussion

- Jointly built information network
- Environmental collaboration
- Flexibility in sourcing

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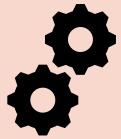
Future research



Agility & flexibility vs. longterm collaboration

Resilience building

Further research on efficiency seeking

Developing **dynamic capabilities**

Sources

- Azevedo, S.G., Govidan, K., Carvalho, H., Cruz-Machado, V. (2013) Ecosilient Index to assess the greenness and resilience of the
- upstream automotive supply chain. *Journal of Cleaner Production*, 56, 131-146.
- Defee, C. C., & Fugate, B. S. (2010). Changing perspective of capabilities in the dynamic supply chain era. *The International Journal of Logistics Management*, 21(2): 180-206. doi:10.1108/09574091011071915
- Eggert, J. & Hartmann, J. (2023) Sustainable supply chain management – a key to resilience in the global pandemic. Supply Chain Management: An International Journal, 28(3), 486-507.
- Herold, D.M., Nowicka, K., Pluta-Zaremba, A., Kummer, S. (2021): COVID-19 and the pursuit of supply chain resilience: reactions and "lessons learned" from logistics service providers (LSPs), *Supply Chain Management: An International Journal*, 26, 2, 702–714.
- Hillman, A. J., Withers, M. C., & Collins, B. J. (2009). Resource Dependence Theory: A Review. *Journal of Management*, 35(6): 1404-1427
- Holgado et al. (2024) Brilliance in resilience: operations and supply chain management's role in achieving a sustainable future. International Journal of Operations & Production Management, 44(5), 877 – 899.
- Ivanov, D. (2020) Viable supply chainmodel: integrating agility, resilience and sustainability perspectives—lessons from and thinking beyond the COVID-19 pandemic. Annals of Operations Rsearch, 319, 1411-1431.
- Ji, L., Yuan, Ch., Feng, T., & Wang, Ch. (202) Achieving the environmental profits of green supplier integration: The roles of supply chain resilience and knowledge combination, DOI: 10.1002/sd.2050
- Kalish, D., Burek, S., Costello, A., Schwartz, L., & Taylor, J. (2018) Integrating Sustainability into New Product Development. Research-Technology Management, 61(2), 37-46.
- Matsuo, H. (2014): Implications of the Tohoku earthquake for Toyota´s coordination mechanism: Supply chain disruption of automotive semiconductors, *Int.J. Production Economics*, 161, 217-227.
- Ponomarov, S.Y., & Holcomb, M.C. (2009): Understanding the Concept of Supply Chain Resilience, *The International Journal of Logistics Management,* 20,1, 124-143.
- Scavarda. L.F., Ceryno, P.S., Pires, S., & Klingebiel, K. (2015): Supply chain resilience analysis: A Brazilian automotive case, *Revista de Administraçao de Empresas*, 55, 3, 304-313.
- Scholten, K., & Schilder, S. (2015): The role of collaboration in supply chain resilience, *Supply Chain Management: An International Journal*, 20, 4, 471-484.
- Zacharia. Z.G., & Mentzer, J.T. (2007). The role of logistics in new product development. *Journal of Business Logistics*, 28(1): 83-110.

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Thank for your attention

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