SOPRONI EGYETEM

LÁMFALUSSY SÁNDOR KÖZGAZDASÁGTUDOMÁNYI KAR

A konferenciát támogatta / Supported by:
Magyar Nemzeti Bank (MNB)
/ Hungarian National Bank (MNB)

NEMZETKÖZI TUDOMÁNYOS KONFERENCIA

A MAGYAR TUDOMÁNY ÜNNEPE ALKALMÁBÓL

International Scientific Conference on the Occasion of the Hungarian Science Festival

Sopron, 2021. november 4.
4 November 2021, Sopron

PANDÉMIA – FENNTARTHATÓ GAZDÁLKODÁS – KÖRNYEZETTUDATOSSÁG / PANDEMIC – SUSTAINABLE MANAGEMENT – ENVIRONMENTAL AWARENESS

KONFERENCIAKÖTET / Conference Proceedings

Szerkesztette / Edited by: OBÁDOVICS Csilla, RESPERGER Richárd, SZÉLES Zsuzsanna

Nemzetközi tudományos konferencia a Magyar Tudomány Ünnepe alkalmából /
International Scientific Conference on the Occasion of the Hungarian Science Festival

Sopron, 2021. november 4. / 4 November 2021, Sopron

PANDÉMIA – FENNTARTHATÓ GAZDÁLKODÁS – KÖRNYEZETTUDATOSSÁG /
PANDEMIC – SUSTAINABLE MANAGEMENT – ENVIRONMENTAL AWARENESS

KONFERENCIAKÖTET /
Conference Proceedings

(LEKTORÁLT TANULMÁNYOK / PEER-REVIEWED STUDIES)

Szerkesztette / Edited by**:**
OBÁDOVICS Csilla, RESPERGER Richárd, SZÉLES Zsuzsanna

SOPRONI EGYETEM KIADÓ /

UNIVERSITY OF SOPRON PRESS

SOPRON, 2022

Nemzetközi tudományos konferencia a Magyar Tudomány Ünnepe alkalmából /
International Scientific Conference on the Occasion of the Hungarian Science Festival

Sopron, 2021. november 4. / 4 November 2021, Sopron

Mottó / *Motto:* **„Tudomány: iránytű az élhető jövőhöz”** / „Science: a Compass For a Livable Future”

Szervező / *Organizer:* **A Soproni Felsőoktatásért Alapítvány** / For the Higher Education at Sopron Foundation

A konferencia védnöke / Patron of the Conference:
Innovációs és Technológiai Minisztérium / Ministry for Innovation and Technology

Felelős kiadó / Executive Publisher**: Prof. Dr. FÁBIÁN Attila**
a Soproni Egyetem rektora / Rector of the University of Sopron

Szerkesztette / Edited by:
Prof. Dr. OBÁDOVICS Csilla, Dr. RESPERGER Richárd, Prof. Dr. SZÉLES Zsuzsanna

A kötet tanulmányait lektorálták / Peer-reviewed by:
Dr. BARTÓK István, BAZSÓNÉ dr. BERTALAN Laura, Dr. BEDNÁRIK Éva, Dr. habil. BODNÁR Gabriella, Dr. BRUDER Emese, Dr. HOSCHEK Mónika, Dr. habil. Eva JANČÍKOVÁ, Dr. JANDALA Csilla, Dr. habil. KOLOSZÁR László, Dr. KÓPHÁZI Andrea, Dr. KOVÁCS Tamás, Prof. Dr. KULCSÁR László, Prof. Dr. Markus MAU, Prof. Dr. Nicole MAU, Dr. MÉSZÁROS Katalin, Dr. NEDELKA Erzsébet, Dr. NÉMETH Nikoletta, Prof. Dr. OBÁDOVICS Csilla, PAPPNÉ dr. VANCSÓ Judit, Dr. habil. PAPP-VÁRY Árpád, Dr. PATAKI László, Dr. PIRGER Tamás, Dr. RESPERGER Richárd, Dr. habil. SZABÓ Zoltán, Prof. Dr. SZÉKELY Csaba, Prof. Dr. SZÉLES Zsuzsanna, Dr. SZÓKA Károly, Dr. TAKÁTS Alexandra

Tördelőszerkesztő / Layout Editor: TAKÁCS Eszter

Borítóterv / Cover Plan: ZSIDY Emese

ISBN 978-963-334-411-8 (pdf)

DOI: 10.35511/978-963-334-411-8

SZERVEZŐK

Szervezők: A Soproni Felsőoktatásért Alapítvány
Soproni Egyetem Lámfalussy Sándor Közgazdaságtudományi Kar

A konferencia elnöke: Prof. Dr. SZÉLES Zsuzsanna PhD egyetemi tanár, dékán

Tudományos- és Szervező Bizottság:

elnök: Prof. Dr. OBÁDOVICS Csilla PhD egyetemi tanár, Doktori Iskola-vezető
tagok: Prof. Dr. FÁBIÁN Attila PhD egyetemi tanár, rektor
Prof. Dr. SZÉKELY Csaba DSc professor emeritus
Prof. Dr. KULCSÁR László CSc professor emeritus
Dr. habil. POGÁTSA Zoltán PhD egyetemi docens
Dr. habil. TÓTH Balázs István PhD egyetemi docens, igazgató
Dr. KERESZTES Gábor PhD egyetemi docens, dékánhelyettes
Dr. NEDELKA Erzsébet PhD egyetemi docens, dékánhelyettes
Dr. HOSCHEK Mónika PhD egyetemi docens, intézetigazgató
Dr. KOLOSZÁR László PhD egyetemi docens, intézetigazgató
Pappné dr. VANCSÓ Judit PhD egyetemi docens, intézetigazgató
Dr. KOVÁCS Tamás PhD egyetemi docens
Dr. RESPERGER Richárd PhD adjunktus, a konferencia titkára

ORGANIZERS

Organizers: For the Higher Education at Sopron Foundation
University of Sopron Alexandre Lamfalussy Faculty of Economics

President of the Conference: Prof. Dr. Zsuzsanna SZÉLES PhD Professor, Dean

Scientific and Organizing Committee:

chair: Prof. Dr. Csilla OBÁDOVICS PhD Professor, Head of the Doctoral School
members: Prof. Dr. Attila FÁBIÁN PhD Professor, Rector
Prof. Dr. Csaba SZÉKELY DSc Professor Emeritus
Prof. Dr. László KULCSÁR CSc Professor Emeritus
Dr. habil. Zoltán POGÁTSA PhD Associate Professor
Dr. habil. Balázs István TÓTH PhD Associate Professor, Director
Dr. Gábor KERESZTES PhD Associate Professor, Vice Dean
Dr. Erzsébet NEDELKA PhD Associate Professor, Vice Dean
Dr. Mónika HOSCHEK PhD Associate Professor, Director of Institute
Dr. László KOLOSZÁR PhD Associate Professor, Director of Institute
Dr. Judit PAPP-VANCSÓ PhD Associate Professor, Director of Institute
Dr. Tamás KOVÁCS PhD Associate Professor
Dr. Richárd RESPERGER PhD Assistant Professor, Secretary of the Conf.

TARTALOMJEGYZÉK / CONTENTS

Plenáris előadások
Plenary Lectures

1. szekció: Versenyképesség és fenntartható gazdálkodás
Session 1: Competitiveness and Sustainable Management

2. szekció: Turizmus, marketing
Session 2: Tourism, Marketing

3. szekció: Fenntarthatóság, környezettudatosság
Session 3: Sustainability, Environmental Awareness

4. szekció: Vállalati döntések a koronavírus-járvány idején
Session 4: Corporate Decisions During the Coronavirus Pandemic

5. szekció: Versenyképesség és fenntartható gazdálkodás
Session 5: Competitiveness and Sustainable Management

6. szekció: Fenntarthatóság, környezettudatosság – marketing
Session 6: Sustainability, Environmental Awareness – Marketing

7. szekció: Fenntartható pénzügyek
Session 7: Sustainable Finances

8. szekció: Versenyképesség – munkaerőpiac
Session 8: Competitiveness – Labour Market

9. szekció: Poszter-előadások
Session 9: Poster Presentations

DOI: 10.35511/978-963-334-411-8_s1_Litzenburger_et_al

Supply Chain Resilience: Lessons Learned during the COVID-19 Outbreak and its Implications for the Future

Johannes LITZENBURGER
PhD Student
University of Sopron Alexandre Lamfalussy Faculty of Economics István Széchenyi Economics and Management Doctoral School, Hungary

Prof. Dr. Nicole MAU PhD
Professor
University of Sopron Alexandre Lamfalussy Faculty of Economics, Hungary

Prof. Dr. Markus MAU PhD
Professor
University of Sopron Alexandre Lamfalussy Faculty of Economics, Hungary

Abstract
The COVID-19 pandemics show cased across all industries how vulnerable supply chains can be. In many companies this is leading to a shift of paradigms away from low-cost to a more reliable and robust supply chain which comprises higher inventories and logistics cost. This underlines the necessity of supply chain resilience which already became more and more important over the last years. This paper shall investigate different forms of disruption during the pandemics and strategies how to manage them in terms of supply chain resilience. Especially strategies which led to a competitive advantage over a company's competition are of interest. Finally, it will be discussed what implications for the future arise out of the discussed cases.

Keywords: Supply Chain Resilience, COVID, Supply Chain Management, SCM
JEL Code: A11

1. Introduction

The COVID-19 pandemics show cased across all industries how vulnerable supply chains can be. In many companies this is leading to a shift of paradigms away from low-cost to a more reliable and robust supply chain (SC) which comprises higher inventories and logistics cost.

In the pre COVID-19 era companies were focusing on efficiency gains by utilizing concepts like:

- Just in time.
- Low inventories.
- Complex supply chain structures spanning the globe.
- Single source situations (may be unknown at early stages of SC).
- High dependency on certain regions.
- Non-local sourcing.

In summary prioritizing efficiency in terms of lower cost and inventories over redundancy was successful creating shareholder value as long as no disruptive event occurred. Optimization over many years made the supply chain very thin with almost no margin to maneuver in case of disruption.

This means companies with efficient but in many cases not resilient supply chains were hit by COVID-19 and the following disruption.

2. Disruption during the Pandemics

Disruption during the pandemics was not a single event. Furthermore COVID-19 was only the trigger and accelerator for many disruptive events and created kind of a perfect storm. In the following, some of the main sources of disruption are listed and their implication for a post pandemic world:

- Chip shortage.
- Harbor congestions.
- Suez blockage.
- Brexit & driver shortage.
- Energy shortage in China.
- Factory shutdowns in China.

This Post-Pandemic world comes with shifted demand patterns across product portfolios. A massive shift of consumers towards online retail. Totally new customer groups appeared in many cases out of changed priorities due to new life circumstances (home office) of the people. At the same time a strong political push towards sustainability has happened, which comes with the zero-emission target and this earlier than expected for the economy.

Impact on supply chains is manifold:

- Product portfolios and offerings have exploded in size and diversity.
- Production and supply networks have become increasingly complex.
- External pressures, including regulations and trade barriers, have intensified.
- Customer segments have become more volatile, with rising service requirements.
- Multiple stakeholders are demanding action to promote sustainability.

The described disruptions and their impact on supply chains indicate that the post-pandemic world will requires supply chain resilience (SCR).

At the beginning of COVID-19 a study (BVL, 2020) across 336 companies out of industry, retail, logistics have been asked if "supply chain risk management" systems strengthen resilience more than other ERP systems or logistics software solutions. In the response companies did not see more added value of those special system compared to other IT systems. However, only 32% of the companies had those systems partially or fully implemented in use.

In contrast, it was observed that companies which are more digitalized have responded better to the COVID-19 crisis over their competition. It seems that this advantage was not recognized at that moment in time by the companies. However, asked for what they could have done different to be prepared for a pandemic many responded with "more digitalization" and implementation of "risk management".

In a study (BVL, 2021) across 286 logistic service providers from October 2021 after ~1.5 years of COVID-19 already 52% of the companies utilize risk and resilience tools in their IT landscape.

This means there has been a massive push towards supply chain risk and resilience tools and their digital application across the companies during the pandemics.

3. Supply Chain Resilience Strategies

During the pandemics companies have been forced to change their strategies to deal with this new era of uncertainty. The classical approach with focus on efficiency and cost was in many cases blind for risk. In a stable environment this strategy can be successful. If disruption comes into play as discussed in the previous chapter risk management becomes a key factor. Many companies learned this the hard way faced with broken supply chains and business disruption. This led to shift in paradigm to balance risk, cost and performance as shown below.

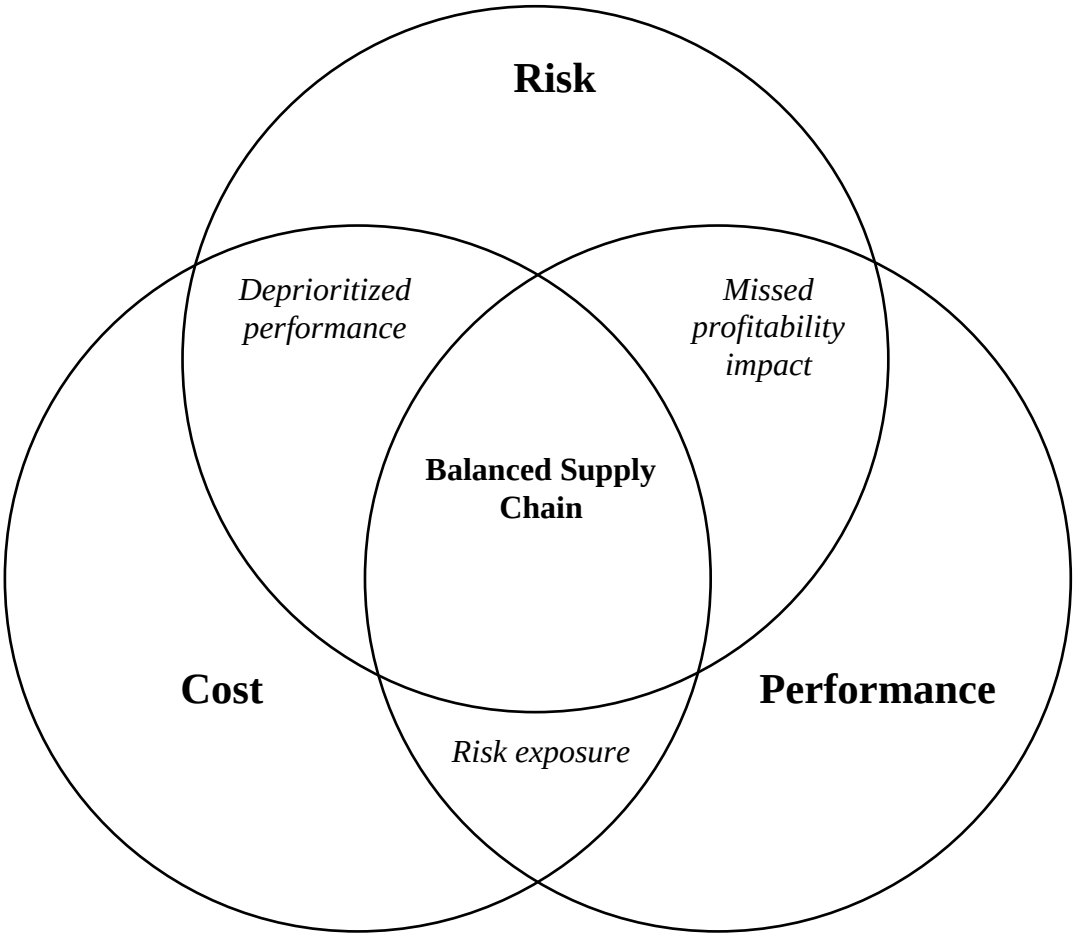

Figure 1: Strategic balance between cost, risk and performance
Source: Fred et al. (2021)

In a world of disruption with new patterns described in the previous chapter strategies for more resilience are required (Kiebler et al., 2020; Schuster et al., 2021).

First companies shall become more shock resistant. This comprises to re-thing global supply, manufacturing, and distribution networks. To establish and re-evaluate buffers in the supply chain and finally proactive Supplier Management.

Second its key to be agile to respond in case of disruptive events. This can be achieved by transparency and the ability to manage the whole supply chain across multiple tiers. Therefore, its key to have real-time data to act on. This shall be accompanied by end-to-end risk management strategies und pro-active planning incl. the simulation of what-if scenarios.

To achieve more resilience, industry companies rate following top 3 strategies as most important (BVL, 2020):

1. Improved informational and planning processes in collaboration with their supply chain partners
2. Intensify digital transformation
3. Dual or multi sourcing

This is fully in line with the resilience requirements. Interesting is that the companies directly point out to the "how". They believe this needs to be enabled by digital tools which they want to implement with priority.

In the following an example shall outline how these digital tools could look like and which benefit was achieved in this case. Microsoft utilizes blockchain and cloud services to achieve a digitalized supply chain (Rhodes III, 2021).

At the beginning a situation in the supply chain was characterized by labor intense processes, error prone payment management processes, data inconsistency and time lagging across the SC, lack of inventory data for forecasting and reporting, supplier contracts have not been

linked to transaction nor they have been available digitally. At the end the supply chain network was a block box leading to missing parts and price discrepancies.

To overcome the situation blockchain technology combined with Microsoft's cloud capabilities was enabling the transformation process. The missing what, when and how was transferred into digital assets on blockchain to provide visibility and a single source of truth mirroring the real world.

This finally unlocked values such as supply chain transparency, component integrity and operation efficiency. Major benefits were lead time reduction, data security, better inventory planning, supply chain flexibility, error reduction and many more.

According to Microsoft they have been able to achieve USD 50 million savings with only 9 suppliers using the system. Another outcome has been reduced cycle times combined with end-to-end item level traceability and expanded margins.

In the future even CO2 footprint and conflict minerals can be traced or avoided.

One core feature is the scalability, this means we might will see an evolving industry standard created and proven by Microsoft which will be adopted by other firms over time using the underlying technology. This is only one example out of many utilizing cloud-based platforms ready to use across multiple companies.

4. Competitive Advantages enabled by Supply Chain Resilience

Empiric evidence demonstrates that SCR creates a competitive advantage over the competition for companies who apply SCR strategies and methods. In addition it seems that digitalization is an enabler of this outperformance as found in the study of (BVL, 2020) and the value creation shown in the case of Microsoft (Rhodes III, 2021).

Recently a study (Schuster et al., 2021) comprising 1800 US companies analyzed their performance in terms of resilience from 1995 to 2020. As key indicator the total shareholder return was compared against the industry average for each company.

It was found that resilient companies outperform their competition in normal times by 16%. During a crisis the effect more than doubled in terms of total shareholder return to a total of 30%.

This data clearly makes a case for the usage of SCR and translates its benefits directly into hard dollars.

5. Implications for the Future of SCR

The key implication for the future of SCR is that it is digital and arriving in practice. COVID-19 was a trigger and accelerator for disruption and hence for this trend towards utilizing SCR strategies. In addition, SCR demonstrated empirically its value for companies by outperforming competition if applied.

This means the "nice to have" and "no value add" opinion from the past has already changed in the minds of decision makers. Previously this was one of the main obstacles why SCR was not broadly applied in practice.

SCR is still at the beginning, but awareness of an issue and the potential solution comes always prior to transformation and change. Evidence of this development is found in a recent survey (BVL, 2021), many companies recognized the value of SCR. In addition, it's understood that cloud-based IT systems are the enabler for collaboration. Today already 50% of the companies work with cloud systems and those who are lagging are willing to invest. In the whole field of SCR, the companies see themselves in the driver seat for the rollout.

It can be anticipated that application of SCR strategies will rise in the near future.

References

BVL (2020): Digitale Erfolgsfaktoren für resiliente Wertschöpfungsketten. *Logistik Für Unternehmen*, *34*(11–12), 21–21. DOI: https://doi.org/10.37544/0930-7834-2020-11-12-21

BVL (2021): *Besser Zusammenarbeiten in der Logistik.*

Fred, E. – Michae, J. – Trang, K. (2021): *COVID call to action: supply chain resiliency beyond the pandemic. Kearney*. https://www.kearney.com/covid-19/article/?/a/covid-call-to-action-supply-chain-resiliency-beyond-the-pandemic

Kiebler, L. – Ebel, D. – Klink, P. – Sardesai, S. (2020): Risk Management of Disruptive Events in Supply Chains. *White Paper of Fraunhofer IML, Dortmund, Germany.* DOI: https://doi.org/10.24406/iml-n-599828

Rhodes III, Y. (2021): *Strengthen resilience in multinational production supply chains with block chain: case study & project overview*.

Schuster, B. R. – Nath, G. – Rodriguez, P. – Aylor, B. – Sidopoulos, B. – Weise, D. – Datta, B. (2021): *Real-World Supply Chain Resilience*. https://mkt-bcg-com-public-pdfs.s3.amazonaws.com/prod/building-resilience-strategies-to-improve-supply-chain-resilience.pdf