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Driver and Barrier Factors of Supply Chain  
Management (SCM) Implementation for Small and  
Medium-Sized Enterprises (SMEs)

Doctoral dissertation

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## **1. Research Questions of the Dissertation**

SCM has the potential to make a significant contribution to the firm's performance. In a global economy, it allows the organization to compete favorably both domestically and internationally. SCM can help enhance forecast accuracy, planning and scheduling, asset utilization, and customer service in the manufacturing process. Apart from that, it can reduce inventory levels, inventory costs, logistics costs, and the number of errors (Koech and Ronoh, 2015). The SCM concept that being published since the 1980s is developing rapidly. Yu and Cheng (2001) demonstrated how SCM can increase product and service quality while streamlining the manufacturing process and avoiding the bullwhip effect. In conclusion, using SCM in a business will increase the company's competitive edge (Porter, 1998; Blanchard, 2007; Govindan et al, 2013; Xian et al, 2018).

Large Enterprises (LEs) are quicker to adapt to implement SCM strategies in the globalization era, but Small and Medium-Sized Enterprises (SMEs) are now attempting to follow suit (Morais and Ferreira, 2019;

Petrou et al, 2020). In many supply chain operations, SMEs are part of the largest group of manufacturing enterprises that give product and service support to LEs (Baymoutt, 2015). In most nations, small and medium-sized businesses (SMEs) represent the backbone of the economy. Small businesses, for example, contributed €4,357 billion in added value and employed 97.7 million people in the EU-28 Member States (European Commission, 2019). Having a large number of SMEs in a country has several advantages, including supplying entrepreneurial skills, innovation, and employment. In comparison to larger enterprises (LEs), SMEs have simple systems and procedures, but they run their businesses more flexibly by making quick decisions, responding quickly to customers, and providing quick feedback (Singh et al, 2008).

SCM adoption by SMEs could present a great potential for not only the company to increase profits but also for the country's economy to grow. SCM can assist SMEs balance costs and time restrictions, improve customer relationships, and enable access to the newest technology, materials, processes, and other

means of innovation, according to Chin et al (2012). Some significant gaps were discovered in the SCM literature as well as the entrepreneurial literature. Several studies have looked into how SMEs implement SCM. SMEs face challenges in implementing SCM, according to Dubihlela and Omoruyi (2014), due to a lack of economies of scale, adequate technologies, and organizational structure. Exploiting SCM tactics, adopting new technologies, and restructuring operations can all help to increase business performance. However, several reasons can become impediments to SCM adoption, according to Baig et al (2020), who focused on developing countries. Internal barriers include a lack of commitment from top management, a lack of funds, difficulty aligning short- and long-term plans, and difficulty changing company practices and policies; external barriers include government regulation and a reluctance to share information by the company's partners. SCM implementation is also influenced by the size of the company. Cost reduction, customer satisfaction, inventory optimization, expansion, innovation, and

demand optimization are the drivers of SCM implementation in high-tech SMEs, according to Rezaei et al (2018).

Based on the gaps that have been analyzed above, we came up with research questions that are being analyzed in four different publications as follows:

1. Do SMEs implement SCM strategy in their organization structure?

This research question is specifically addressed in the attached journal paper with the title: “Cross-Country Comparison of Supply Chain Management (SCM) Adoption at Small and Medium-Sized Enterprises (SMEs)”.

2. What is the current state of research on driver and barrier factors of SCM implementation in SMEs?

This research question is specifically addressed in the conference paper with the title: “Driver and Barrier Factors of Supply Chain Management for Small and Medium-Sized Enterprises: An Overview”.

3. What is the importance ranking of the driver factors of SCM implementation in SMEs in those two countries (Hungary and Indonesia)?

This research question is specifically addressed in the journal paper with the title: “Cross-Country Analysis of Supply Chain Management Drivers for Small and Medium-Sized Enterprises”.

4. What is the importance ranking of the barrier factors of SCM implementation in SMEs in those two countries (Hungary and Indonesia)?

This research question is specifically addressed in the journal paper with the title: “Barrier Factors of Supply Chain Management (SCM) Implementation in Small and Medium-Sized Enterprises: Evidence from Hungary and Indonesia”.

The major goal of this study is to fill in the information gap in the adoption of SCM by studying the driver and barrier factors that SMEs encounter. The question is whether and how the importance of the

driver and barrier variables in SCM implementation varies depending on the SCM environment.

This dissertation analyzes a survey collected in two countries representing two different supply chain structures. Hungary can utilize land transportation because it is part of a homogeneous land region, hence it has a simple SCM system. On the other hand, Indonesia, being an archipelago country, faces numerous distribution challenges. Because the volume of traffic in Indonesia is substantially higher, many organizations have begun to outsource their SCM to a third party, due to their reduced prices and capacity to reach remote places throughout the archipelago (Oxford Business Group, 2012). Specifically, in both countries the SME sector is dominated by micro-enterprises. On average, Hungarian SMEs have one fewer employee than their EU counterparts (3.3 vs. 4.3 in the EU) (Szira, 2014). Similarly, 98 percent of SMEs in Indonesia are micro-enterprises (BPS, 2018). Understanding these facts may lead to valuable insight on the adoption of SCM strategy in SMEs and also how



the driver and barrier factors are ranked in two nations with differing supply chain structures.



## 2. Methodology

We split the research into four different papers. Each one of the papers has its own methodology. However, the primary method that we use is quantitative data collection. Next, we describe in some details the methodology used in each one of the papers.

### a. Cross-Country Comparison of Supply Chain Management (SCM) Adoption at Small and Medium-Sized Enterprises (SMEs)

In this paper, we used a cross-sectional survey from the Hungarian and Indonesian companies, mainly SMEs, but we also used a sample from Large Enterprises (LEs) as a control variable.

After the questionnaire translation procedure, the questionnaire was pre-tested to guarantee its validity. The email survey was sent to several companies in 2018 and 2019, to 304 Hungarian enterprises and 150 Indonesian enterprises. It resulted in a 90% return of valid questionnaires from Hungarian enterprises including 253 SMEs

and 21 LEs. In Indonesia, it resulted in a 73% return with 94 SMEs and 16 LEs. The LEs were used for control in this research. The feedback from upper management and strategic decision-makers helped to understand the present state of SCM strategy adoption.

The authors used statistical analysis to describe tendencies based on the quantitative sample. Since the data covers two subsets of samples (Hungarian and Indonesian enterprises), t-test statistics help to detect similarities and differences in sample characteristics to support conclusions.

b. Driver and Barrier Factors of Supply Chain Management for Small and Medium-Sized Enterprises: An Overview

This paper has the objective to explore the drivers and barriers in the Supply Chain Management (SCM) implementation in the practice of SMEs. A systematic literature review was conducted. In the process of retrieving and

selecting the articles the following phases were used: sourcing, screening, analyzing the articles, and describing the sample characteristics.



Figure 1. Structured Literature Review Process  
(Source: Own Development)

We ended up with 54 articles that were evaluated in detail as a result of the above process. The papers are divided into two major categories. The first category, the drivers of SCM deployment, has 31 publications, accounting for 57% of the total number of articles assessed. In the other category, the impediments to SCM implementation, 23 articles were found, accounting for 43 percent of the total number of publications analyzed.

- c. Cross-Country Analysis of Supply Chain Management Drivers for Small and Medium-Sized Enterprises
- d. Barrier Factors of Supply Chain Management (SCM) Implementation in Small and Medium-Sized Enterprises: Evidence from Hungary and Indonesia

Similar to the first paper, these two papers used cross-sectional surveys from the Hungarian and Indonesian companies. The sample in Hungary is based on the government directory of the Hungarian Chambers of Commerce and Industry (<https://mkik.hu/en>), which has a list of around 1700 SMEs. In Indonesia, the sample was selected from the Akseleran company database (<https://www.akseleran.co.id/>), connected to SMEs providing loans to around 300 SMEs. An email was sent with an explanatory letter on the purpose of the research and a link to the online questionnaire to the respondents in both countries. Based on this, we filtered the invalid email

addresses. Emails were sent out in two phases with follow-up text messages, resulting in 105 responses from Hungarian SMEs and 124 from Indonesian SMEs.

Table 1. Sample Demographics

SME's Type	Hungary (n <sub>1</sub> = 105)		Indonesia (n <sub>2</sub> = 124)	
	N	%	N	%
Micro	51	49%	71	57%
Small	35	33%	39	31%
Medium	19	18%	14	12%

Source: Own Development

The proprietors of the enterprises made up the majority of significant informants from both countries. In Indonesia, 55% of respondents were SME owners, while in Hungary, 54% were. In addition, directorships were held by 26% of Indonesian respondents and 14% of Hungarian respondents. Commissioners, managers, and professional staff associated with SMEs made up the rest of the group.

For statistical analysis, we used one-way ANOVA. The p-values can be used to test the null hypothesis as the variances of the groups. It can be statistically stated that there is a significant difference if the  $p\text{-value} < 0.05$ , which is universally used in biostatistics, social science, and other parts of the implementation (Gelman, 2013). In addition, we also checked the result by calculating the means, standard deviation, and Cronbach's  $\alpha$  values for the main factors showing that the reliability and internal consistency are appropriate (higher than 0.7 suggested by Bonett and Wright, 2014).

Specifically for the paper, "Barrier Factors of Supply Chain Management (SCM) Implementation in Small and Medium-Sized Enterprises: Evidence from Hungary and Indonesia", we assessed convergent validity (CV), calculating Factor Loading (FL), Composite Reliability (CR), and Average Variance Extracted (AVE) for the statistical analysis.

### **3. Results of the Dissertation**

We prepared first the paper on Cross-Country Comparison of Supply Chain Management (SCM) Adoption at Small and Medium-Sized Enterprises (SMEs). In this paper, we evaluated the different implementations of SCM for different geographical structures and SCM capabilities with the sample of two countries, Hungary and Indonesia. It revealed several facts. Firstly, the sample is supporting the author's expectation that LEs are more advanced in implementing SCM strategy compared to SMEs having deficiency in supply chain workforce or sophisticated IT infrastructure. If just SMEs are evaluated, Indonesian SMEs are the ones who use the SCM strategy at a higher rate. This finding suggests the basic hypothesis that the country's more complex environment and advanced SCM infrastructure have a significant favorable impact on the deployment of SCM strategies.

A huge majority of SMEs in both nations feel that the supply chain is more of an extended inter-enterprise value chain involving suppliers, their own company,

and customers than a corporate (internal) value chain when it comes to working with supply chain partners. In SCM, collaborating with another party forces them to form a cohesive entity. It establishes a reliance on SCM, making it reliant on both information and physical flows. According to the survey data, customer dominance is the highest by the perception of Hungary's SMEs followed by equal dominance. Indonesia's SMEs have a completely reverse dominance perception, from the highest of their own dominance to the lowest of customer dominance. It resulted also that in Indonesia, LEs have more dominance in SCM partnerships compared to SMEs.

There are significant parallels between the two countries' deployment of various SCM methods. Vendor Managed Inventory (VMI), which is being used to collaborate more with suppliers, and Just in Time (JIT), which is being used to collaborate with customers, have comparable perceptions. However, there is a considerable difference in non-utilized methods, such as 'Sharing Financial Operation' for Hungary's SMEs and 'Real-Time Sales Data',



‘Enterprise Data Interchange (EDI)’, and ‘Sharing Financial Operation’ for Indonesia’s SMEs. This research also examines which factors are considered important for the cooperation between partners in SCM. The answers show a tendency that the SMEs from Hungary consider those factors such as ‘a long-term view’, ‘commitment to partnership’ more important and apply them more frequently compared to Indonesia’s SMEs.

Next, we continue to explore the driver and barrier factors of SCM implementation in SMEs. The reason behind this research is that if SMEs can implement the SCM strategy well, it will be beneficial for a more effective and efficient way of working. We prepared the paper of Driver and Barrier Factors of Supply Chain Management for Small and Medium-Sized Enterprises: An Overview. In this paper, we successfully identified five key drivers (market pressure, social pressure, organizational culture, organizational characteristic, and corporate strategy) with 22 variables as a subgroup. Besides, we identified five key barriers (organization, financial, knowledge, technology, and outsourcing)

with also 22 variables as a subgroup that can support experts to implement SCM. The detail is as follow:

**Table 1.** Critical Drivers of SCM Implementation

<b>DRIVER FACTORS</b>	
Market Pressure	Improve competitive advantage
	Competitor's pressure
	Shareholder/Investor Pressure
	Institutional pressure
	SCM partners' pressure
	Reputation/image of corporate
	Globalization
Societal Pressure	Improve customer satisfaction
	Value-based networks
	Consumer organization
Organizational Culture	The direct benefit of the use of its system to the process business
	Innovativeness
Organizational Characteristic	Information dissemination
	Position in supply chain
	Industrial sector
	Size
	Geographical location
Corporate Strategy	Degree of internationalization
	Top management commitment
	Cost related pressure

	Operational/economic performance
	Monitoring, evaluation, and development of implementation

**Table 2.** Critical Barriers of SCM Implementation

<b>BARRIER FACTORS</b>	
Organization	Absence of training classes/ consultancy/ supervise progress
	Inadequate supplier commitment/ reluctant to share information
	Inadequate of Inter-departmental coordination in communication
	Inadequate of involvement of top management in adopting Lack of management capacity
	Big effort to change organizational strategy
	Unclear organization objective
	Inadequate performance measure
Financial	Financial constraints
	High investments and less ROI (Return on Investments)
	Superior execution and preservation cost
Knowledge	Inadequate of SCM system exposure to experts
	Lack of awareness and participation on SCM

	Lack of motivation and employee involvement
Technology	Lack of new technology, materials, and processes
	Recent exercise inadequate of the flexibility to change into new system
	Lack of human resources
	Fear of failure
Outsourcing	Lack of standard SCM system to collaborate with suppliers
	Lack of Customer Satisfaction Index
	Lack of Trust among SCM partners
	Unwilling to share risk and rewards between SCM partners

Source: Own Research Result

Those driver and barrier factors become the subject of the next two papers. The first one only focuses on the driver factors (Cross-Country Analysis of Supply Chain Management Drivers for Small and Medium-Sized Enterprises) while the second paper focuses on the barrier factors (Barrier Factors of Supply Chain Management (SCM) Implementation in Small and Medium-Sized Enterprises: Evidence from Hungary and Indonesia).

The above two papers deal with different aspects of the main research question. Specifically, for the driver factors paper, according to the research, both countries view the same top 10 driver factors, but in a different order.

**Table 3.** Top 10 Driver Factors of SCM Implementation

<b>Factor</b>	<b>Sub- Factor</b>	<b>HUN Rank</b>	<b>IDN Rank</b>
Market Pressure	Improve customer satisfaction (ICS)	1	1
Organizational Culture	Information dissemination (ID)	2	2
Corporate Strategy	Top management commitment (TMC)	3	7
Corporate Strategy	Operational/economic performance (OEP)	4	4
Market Pressure	Improve competitive advantage (ICA)	5	9
Corporate Strategy	Cost related pressure (CRP)	6	5
Social Pressure	Direct benefit to business process (DBBP)	7	6
Organizational Culture	Innovativeness (I)	8	3
Corporate Strategy	Monitoring, evaluation, and	9	8

	development of implementation (MEDI)		
Market Pressure	Reputation/image of corporate (ROC)	10	10

Source: Own Research Result

Interestingly, Hungary and Indonesia have the same top two drivers, which are ICS and ID, and those drivers have a significant correlation to one another. It means that to implement SCM, the company is required to strengthen those two factors.

The result from the barrier factors paper revealed that the ranking of the barrier factors in the two countries are statistically different that may be caused by the different SCM structures.

**Table 4.** Top 5 Barrier Factors of SCM Implementation

FACTOR	SUB FACTOR	HUN RANK	IDN RANK
Organization	Inadequate performance measure (Org8)	10	1
	Inadequate management capacity (Org5)	11	2
	Lack of Inter-departmental co-	14	3

	operation in communication (Org3)		
	Unclear organization objective (Org7)	9	4
Knowledge	Lack of motivation and employee involvement (K3)	3	5
Technology	Lack of human resources (T3)	1	7
Financial	Financial constraint (F1)	2	13
Knowledge	Lack of supply chain management knowledge exposure to employee (K1)	4	17
Organization	Poor supplier commitment/unwilling to exchange information (Org2)	5	6

Source: Own Research Result

The top-ranked hurdles for Indonesian companies are organizational problems, whereas the top barrier factors for Hungarian companies include a lack of financial resources, workers, the expertise of SCM, and poor commitment from other SCM partners.

We deal with the top five barrier factors in each country. Based on the conclusions of this study, top

managers of SMEs in Hungary and Indonesia can priorities their actions to improve the execution of SCM strategy. These findings could serve as a benchmark for SMEs in other countries with varied supply-chain difficulties. Indonesia has numerous modes of transportation, including land, sea, and air, which classify the complexity. The more similar a country's supply chain structure is to the Hungarian plan rather than the Indonesian model, and vice versa.



#### 4. Author's Publications on the Topic

We logically arranged the material to make it easier for the reader to understand. The main part of the dissertation resumes in four paper publications. Herewith are the details of the four publications:

- a. Setyaningsih. S. and Kelle, P. (2021) 'Cross-Country Comparison of Supply Chain Management (SCM) Adoption at Small and Medium-Sized Enterprises (SMEs)', *Journal of International Studies*, 14(3), pp. 26-42, doi:10.14254/2071-8330.20211/14-3/2.
- b. Setyaningsih, S., Kelle, P. and Maretan, A.S. (2020) 'Driver and Barrier Factors of Supply Chain Management for Small and Medium-Sized Enterprises: An Overview', In: *58<sup>th</sup> International Scientific Conference Economic and Social Development*. [online] Budapest: Hungary, pp: 238-249.
- c. Setyaningsih. S., Czakó K. F., Vasic T. and Kelle, P. (2021) 'Cross-Country Analysis of Supply Chain Management Drivers for Small and Medium-Sized Enterprises', *Polish Journal and*

*Management Studies*, 23(1), pp. 352-369,  
doi:10.17512/pjms.2021.23.1.22.

- d. Setyaningsih. S. and Kelle, P. (2021) ‘Barrier Factors of Supply Chain Management (SCM) Implementation in Small and Medium-Sized Enterprises: Evidence from Hungary and Indonesia’, *Economics and Sociology* (<https://www.economics-sociology.eu/>) – under review.

Next, we describe the connections and logic of the research steps followed in the four publications. We began the research by revealing the degree of adaption of SCM strategy and methods in Hungary and Indonesia, two countries with vastly distinct geographical and supply chain disparities. The findings of the study were published in the first issue of the *Journal of International Study* in September 2021. We compared also the results of LEs and SMEs in this paper.

In the next phase of the research, we focused on SMEs. As mentioned at the beginning of the summary,

SMEs are not giving appropriate attention to the implementation of SCM strategy. Based on a literature search, we created a list of driver and barrier factors in the SCM implementation. The result of the research has been presented at the 58<sup>th</sup> International Scientific Conference Economic and Social Development last September 2020 in Budapest, Hungary online.

Essentially, the most recent journal publications contain the major research results of the dissertation. We examined the driver and barrier factors for SMEs in both Hungary and Indonesia. In the two papers, we separated the results. The first research, published in the Polish Journal of Management Studies in June 2021, looked at the impact of SCM implementation driver variables in SMEs. The other work that is still being reviewed by the Economics and Sociology journal, is about the barriers to SCM implementation in SMEs. The authors believe that all four papers will contribute academically to the literature on SCM with a focus on SMEs and that they will also serve as the foundation for future research on the impact of

geographical structure and supply chain structure on the importance of drivers and barriers in SCM.

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