The Impact of Sustainable Operations Management Practices on Supply Chain Efficiency and Profitability

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Abstract: - With a focus on the mediating function of supply chain management practices (SCMP hereinafter), this study examines the relationship between supply chain performance and profitability and Sustainable Operations Management Practices (SOMP, hereinafter). A survey technique was used to gather data from 345 respondents in a variety of sectors. Structural Equation Modelling (SEM hereinafter) was used in the study and a questionnaire modified from previously approved scales was used to guarantee validity and reliability of the study. The findings show that SOMP has a substantial impact on supply chain profitability and efficiency. The study offers helpful advice on coordinating sustainability objectives with operational plans and emphasizes the strategic significance of SCMP in attaining long-term resilience and profitability.

Key-Words: - Sustainable Operations Management Practices (SOMP), Supply Chain Management Practices (SCMP), Structural Equation Modelling (SEM), efficiency, profitability, reliability, validity.

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1 Introduction

For businesses looking to strike a balance between environmental, social, and economic performance, sustainable and Global Supply Chain Management (GSCM, hereinafter) practices have become essential. These methods improve resilience and profitability while addressing global environmental issues, [1], [2]. GSCM greatly improves both environmental and financial performance through tactics including eco-design, green manufacturing, and partnerships with suppliers that share this value, [3], [4], [5]. Sustainability and profitability may coexist and improve business performance, as demonstrated by green supply chain activities, [2]. The value of sustainable practices is increased when they are in line with the Sustainable Development Goals (SDGs), which address social and environmental issues while improving financial results, [6], [7]. This integration emphasizes how important it is for businesses to incorporate sustainability into their main plans, as seen in Huawei’s efforts to gain competitive advantages through Sustainable supply chain management.

Organizational culture and human resource strategies, such as training and development, are essential for the effective implementation of GSCM in emerging economies, particularly for small and medium-sized businesses (SMEs). These efforts enhance overall performance, dedication, and job satisfaction, [8], [9]. Enforcing sustainability norms among lower-tier suppliers presents difficulties for multinational companies (MNCs), who frequently experience a lack of control and visibility, which can lead to inefficiencies and reputational hazards. This emphasizes the necessity of strong frameworks for supply chain governance, [10]. In supply chain operations, the incorporation of AI-driven

technology, including robot-advisors, improves decision-making and transparency, [11], [12]. For long-term resilience and profitability, SSCM combines social, environmental, and economic factors. In order to solve global issues, promote innovation, and guarantee operational effectiveness, sustainable supply chain management (SSCM hereinafter) methods are essential, [13]. Supported by moral leadership, circular supply chains promote company sustainability by addressing economic and environmental objectives, [14]. Through green manufacturing and sustainable partnerships, GSCM also benefits industries like pharmaceuticals and emerging markets. This is in line with more general trends like combining Supply Chain Integration (SCI) and Production and Operations Management (POM) for increased sustainability and performance, [15]. Nowadays, modern company strategies must prioritize sustainability, especially when it comes to supply chain management, [14]. Businesses are facing growing pressure to incorporate sustainable practices into their operations as worries about resource depletion and environmental degradation grow on a worldwide scale, [13], [16]. The findings of the paper show that SOMP has a substantial impact on supply chain profitability ($\beta = 0.233$, $p < 0.01$) and efficiency ($\beta = 0.214$, $p < 0.01$). The impacts of SOMP on performance outcomes were enhanced by SCMP, which emerged as a crucial mediator: SOMP → SCMP ($\beta = 0.310$, $p < 0.01$), SCMP → efficiency ($\beta = 0.290$, $p < 0.01$), and SCMP → profitability ($\beta = 0.320$, $p < 0.01$). The results are further supported by robust model fit indices (RMSEA = 0.045, CFI = 0.96, TLI = 0.95). According to the study's findings, financial success and operational excellence are fuelled by the integration of SOMP and SCMP. The need for cooperative, resource-optimized supply chain solutions for long-term competitive advantage is highlighted by SCMP's mediating function. Businesses can improve their connections with suppliers and customers and adopt sustainable practices like energy efficiency and green logistics. To maximize results, investments in SCMP-supporting digital technology and training are crucial.

1.1 Research Problem

Although there is ample evidence of the advantages of sustainability in operations and supply chain management, there are still many unanswered questions on how SOMP affects supply chain results, [17]. Notwithstanding the growing focus on sustainability, little is known about how SOMP impacts supply chain profitability and efficiency, which makes implementation difficult, [17]. Finding a balance between environmental sustainability and economic success is one of the main issues, [1]. Since trade-offs frequently arise in practice, many businesses struggle to align these goals. By incorporating sustainability into supply chain and operational procedures, GSCM methods seek to close this gap, [17]. Despite the long-term advantages of sustainable practices, companies may be discouraged from implementing them due to the short-term financial expenses, [1], [15]. These expenses make it more difficult for small and medium-sized businesses (SMEs) to embrace sustainability, especially when combined with few resources and tight budgets [1].

The unclear relationship between SOMP and quantifiable increases in productivity and profitability is a related problem, [17]. Although frameworks such as GSCM indicate possible avenues, businesses frequently lack the knowledge or resources necessary to accurately measure these effects, [1]. Furthermore, the achievement of sustained supply chain advantages is further hampered by inefficiencies brought on by organizational misalignment, such as poor staff training or low work satisfaction, [9]. These inefficiencies have the potential to decrease operational effectiveness and profitability by reverberating across the supply chain, [9], [15]. Limited integration between sustainable practices and more comprehensive supply chain strategies also contributes to the trade-offs between sustainability and profitability. Businesses could, for instance, adopt discrete green efforts, such energy efficiency or waste reduction, without integrating them into a coherent supply chain architecture, [17]. The scalability and overall effect of sustainability initiatives are restricted by this disjointed approach, [1], [15]. To achieve seamless integration, other challenges include high implementation costs and the requirement for cutting-edge technology, such as supply chain tools powered by AI, [1], [11], [12]. Notwithstanding these obstacles, there is mounting proof that a strong SCMP combined with an efficient SOMP may greatly improve supply chain results, [15], [16]. As crucial intermediaries, SCMP helps businesses use sustainability as a competitive advantage and match sustainability goals with operational objectives. However, businesses' capacity to completely optimize their sustainability strategies is constrained by the paucity of empirical research investigating these mediating linkages, [17]. By examining the direct and indirect effects of SOMP on supply chain profitability and efficiency through SCMP, this study aims to close

these gaps [17]. The study is to enable businesses to get over current obstacles and take use of SSCM's competitive advantages by finding workable methods and providing useful suggestions [1], [15].

1.2 Research Objectives

This study aims to address knowledge gaps on the impact of Sustainable Operations Management Practices (SOMP) on supply chain performance. The objectives include:

- Examining the direct effects of SOMP on supply chain efficiency, focusing on practices like waste reduction and green procurement [17]. Assessing the financial benefits of SOMP on organizational profitability through techniques like energy efficiency and reverse logistics [1], [15].
- Investigating how Supply Chain Management Practices (SCMP) mediate the relationship between SOMP and both efficiency and profitability, emphasizing collaboration and information sharing [14].

1.3 Research Questions

This study addresses key gaps in the relationship between supply chain outcomes, SCMP, and SOMP with the following questions:

1. What is the direct effect of SOMP on supply chain efficiency?

SOMP enhances efficiency through logistics optimization, waste reduction, and energy efficiency [17].

2. How does SOMP affect organizational profitability?

Sustainable practices, like eco-friendly techniques and green supplier alliances, improve financial outcomes [1], [15].

3. How does SCMP mediate the link between SOMP and efficiency?

SCMP fosters collaboration and aligns operations with sustainability objectives, improving SOMP's impact [3], [14].

4. How does SCMP mediate the link between SOMP and profitability?

SCMP enhances financial benefits by reducing inefficiencies and leveraging economies of scale [23].

This research unfolds over six sections, exploring how SOMP shapes supply chain efficiency and profitability. Section 1 introduces the study's context, objectives, and the role of SOMP and SCMP [17]. Section 2 identifies theoretical gaps through a literature review. The methodology, focusing on SEM analysis which is strictly PLS based in the whole paper, is detailed in section 3. Sections 4 and 5 present results and interpretations, highlighting SCMP's mediating role. Finally, Section 6 discusses limitations and future research.

2 Literature Review

To provide readers a comprehensive grasp of the theoretical and empirical underpinnings of SOMP and SCMP, this section combines the literature review and conceptual framework development [17]. Along with establishing the conceptual connections between these practices, supply chain efficiency, and profitability, it also concludes with the formulation of study hypotheses, [7], [18].

A variety of tactics are included in SOMP with the goal of incorporating social, economic, and environmental aspects into operating procedures. As businesses look to achieve a competitive edge and integrate their operations with sustainability goals, these approaches have become more popular. Green purchasing, reverse logistics, and waste reduction are important elements of SOMP that together improve organizational effectiveness and environmental sustainability, [3]. Green buying lessens the environmental effect of supply chains by acquiring goods and resources that adhere to environmental standards, [3]. Businesses may cut costs and improve their sustainability performance by giving eco-friendly procurement top priority. Green procurement methods, for example, are essential for attaining both economic and environmental results, according to research. Another essential component of SOMP is reverse logistics, which is concerned with resource recovery and reuse across the supply chain. By decreasing waste and encouraging resource optimization, this approach promotes circular economy models and enhances operational and environmental results, [14]. In industries including manufacturing and retail, reverse logistics has also been connected to cost reductions and increased profitability, [13], [19]. Because waste reduction has a direct influence on resource efficiency and environmental compliance, it is essential to sustainable operations. While tackling environmental issues, practices like waste reduction, lean manufacturing, and sustainable warehousing support operational excellence, [20]. According to research, waste minimization is a major source of competitive advantage as it lowers expenses while simultaneously improving organizational sustainability, [21]. Beyond operational effectiveness, SOMP has an impact on wider organizational and environmental results. It has

been demonstrated that sustainable techniques like eco-design and sustainable manufacturing greatly enhance both organizational profitability and environmental performance, [1], [22]. Additionally, by addressing stakeholder expectations and regulatory challenges, these strategies support long-term company resilience, [16]. Despite these advantages, there are still a lot of gaps in the literature. Few studies, for example, offer a thorough grasp of how these practices jointly affect supply chain efficiency and profitability, even while many examine individual SOMP components, [17]. Furthermore, little research has been done on integrating SOMP with cutting-edge technologies like AI and IoT, which have the potential to further enhance their effectiveness, [7]. SCMPs are essential for encouraging cooperation and integration within supply chains, which helps businesses attain sustainability and operational efficiency. In order to improve supply chain performance and align with sustainability goals, these practices include reverse logistics, logistics optimization, strategic collaboration with suppliers and customers, and the adoption of green information systems, [1]. SCI, which stresses the smooth coordination of operations among supply chain participants, is one of the main responsibilities of SCMP. SCI has been demonstrated to greatly improve company performance through cooperation and operational simplification, [23]. Organizational culture has a crucial role in attaining sustainable supply chain performance, according to theoretical models like the Competing Values Framework (CVF), [8]. SCMP enhances operational effectiveness and environmental sustainability by including social and environmental factors into conventional supply chain management, [24]. Additionally, SCMP play a crucial role as intermediaries in the supply chain's adoption of sustainable practices. According to empirical research, companies may match their sustainability ambitions with more general operational objectives by using strategies like supplier relationship management, green purchasing, and reverse logistics, [7]. To improve triple bottom line (TBL) performance in terms of environmental, economic, and social results, for instance, eco-design and green procurement are essential for incorporating sustainability into supply chain operations. Another essential component of SCMP is collaboration, as establishing alliances with clients and suppliers is essential to putting sustainable practices into action. Working together effectively makes it easier to share resources, solve problems together, and embrace cutting-edge technologies that promote operational excellence and environmental sustainability, [25]. Furthermore, especially in developing nations, incorporating Industry 4.0 technologies like blockchain and the Internet of Things into SCMP improves sustainability, agility, and transparency, [26].

With the use of SCMP, companies may attain zero waste and maximize resource use through circular supply chain practices (CSC), which improves financial results and environmental sustainability, [14]. For example, sustainable storage and reverse logistics have been shown to be successful in lowering environmental effects and increasing profitability. Notwithstanding these developments, there are still unanswered questions about how SCMP influences the connection between supply chain performance and SOMP. Even though studies show how they can increase sustainability and efficiency, further study is required to measure their effects in a variety of settings and sectors, [7], [23].

Although they provide particular implementation issues, the dual objectives of supply chain profitability and efficiency are essential to the success of every firm. While profitability is measured by financial metrics like revenue growth, return on assets (ROA), and market competitiveness, supply chain efficiency usually entails cutting operational costs, optimizing resource utilization, and enhancing delivery reliability. As businesses incorporate sustainable principles into their operations, achieving these results becomes more difficult. It has been demonstrated that implementing sustainable supply chain methods (SSCM), such as waste reduction, reverse logistics, and green purchasing, improves productivity and profitability. These methods help achieve operational excellence while minimizing environmental effects by cutting expenses and optimizing resources, [23]. For instance, energy conservation and emission reduction are two examples of green manufacturing strategies that increase operational efficiency and support profitability objectives, [1].

In order to reconcile environmental and economic goals, research emphasizes how crucial it is to include green practices into supply chains. Through waste reduction and increased market competitiveness, studies show that GSCM techniques, such as eco-design and sustainable procurement, enhance triple bottom line (TBL) performance, economic, environmental, and social dimensions, [3]. Evidence from industrial companies, where implementing sustainable logistics has resulted in notable cost reductions and

profitability gains, lends credence to these results, [19]. SCI (SCI), which encourages cooperation and simplifies procedures amongst supply chain stakeholders, is one of the most important elements in reaching efficiency and profitability. By enhancing resource alignment and cutting down on redundancies, SCI mediates the link between profitability and sustainable practices, [8], [20]. In order to achieve these results, cooperative connections with suppliers and consumers are essential since they facilitate information exchange and make it possible to use creative approaches, [25].

Studies that show how cutting waste and improving resource usage may save money further emphasize the relationship between sustainability, profitability, and efficiency. For example, circular supply chain techniques like waste reduction and resource recovery help companies achieve zero-waste targets while increasing their profitability, [14]. Furthermore, by automating procedures and improving decision-making, cutting-edge technologies like rob advisors and Industry 4.0 solutions raise supply chain profitability and efficiency, [12], [26]. Even with these benefits, there are still difficulties. Efficiency and profit increases may be hampered by the short-term expenses of adopting sustainable practices and the requirement for agreement amongst many stakeholders, [7], [10]. Additionally, empirical data indicates knowledge gaps about the effects of different supply chain management (SSCM) strategies on financial results, especially in industries with intricate supply chains.

2.1 Conceptual Framework and Hypotheses Development

In order to examine how both SOMP and SCMP together affect supply chain effectiveness and organizational profitability, the conceptual framework for this study combines the two methodologies. The framework, which builds on well-established theoretical models and empirical data, shows both direct and mediated links and offers a thorough method for comprehending how supply chain outcomes are improved by sustainable policies. The framework (Figure 1) is structured around the following relationships:

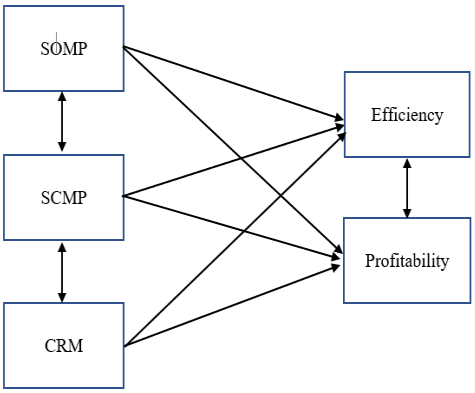

Fig. 1: Relationship between supply chain, efficiency and profitability
Source: authors construction

SOMP → Supply Chain Efficiency: By cutting waste and maximizing resource use, SOMP techniques including eco-design, reverse logistics, and green manufacturing immediately enhance operating procedures, [17], [24].

SOMP → Organizational Profitability: Research shows that sustainable practices increase profitability through cost reduction, reputation enhancement, and innovation, [7].

The effect of SOMP on productivity and profitability is mitigated by SCMP, which includes lean supply chain tactics, green purchasing, and supplier collaboration. By facilitating efficient resource integration, these procedures promote congruence between operational performance and sustainability objectives, [8]. Theoretical foundations like the Leader-Member Exchange Theory (LMXT) and Institutional Theory shed light on how moral leadership and outside forces affect the adoption of sustainable supply chain practices, [5], [27].

2.1.1 Research Hypotheses

The following theories are put out in light of the conceptual framework:

- H1. SOMP has a significant positive impact on supply chain efficiency.

Research indicates that SOMP improves waste reduction and process optimization, which directly increases efficiency.

- H2. SOMP has a significant positive impact on organizational profitability.

According to research, SOMP techniques increase market competitiveness, improve resource utilization, and reduce costs, all of which contribute to profitability, [1].

- H3. SCMP mediates the relationship between SOMP and supply chain efficiency.

The efficiency benefits made possible by SOMP are further enhanced by SCMP, which includes supplier integration and reverse logistics, [25].

- H4. SCMP mediates the relationship between SOMP and organizational profitability.

Research indicates that SCMP increases profitability through cost reduction and customer satisfaction by coordinating sustainability measures with operational objectives.

3 Research Methodology

The research design, sample strategies, survey tools, and data analysis approaches used for this study are all thoroughly explained in this section. In line with the methods suggested in earlier SSCM research, the goal is to investigate the link between SOMP, SCMP, supply chain efficiency, and profitability.

3.1 Research Design

This study adopts a quantitative research approach, focusing on systematically collecting and analysing numerical data to examine relationships and test hypotheses, [18]. Grounded in a positivist perspective, this method emphasizes objectivity and causality, ensuring the reliability and generalizability of findings, [28]. A cross-sectional design was utilized to collect data at a single point, allowing for simultaneous evaluation of multiple variables and their interactions. This approach is particularly effective for testing theoretical frameworks and assessing correlations, [7]. The study's conceptual framework explores the mediating role of SCMP in the relationship between SOMP and supply chain outcomes. Insights from on lean methods and strategic collaboration on supplier management and process improvement. To analyse data, Structural Equation Modelling (SEM) was used, enabling simultaneous testing of multiple hypotheses and examination of direct and mediated relationships between SOMP, SCMP, efficiency, and profitability, [22], [23]. Partial Least Squares SEM (PLS-SEM) further assessed the effectiveness of green supply chain strategies and their impact on organizational performance [17], providing robust insights into sustainable practices.

3.2 Sample and Data Collection

The study targeted supply chain managers and operational executives in industries such as manufacturing, retail, and logistics, selected for their significant role in implementing sustainable practices and influencing supply chain performance. A stratified random sampling approach ensured diverse representation across sectors and organizational sizes, aligning with best practices. The sample size exceeded 200 participants, meeting SEM requirements for reliable analysis, [29]. Data were collected via an online survey using Google Forms for broad geographic reach and efficiency, [11], [30]. Structured questionnaires, incorporating validated items from prior studies, gathered firm-level insights on SOMP, SCMP, profitability, and efficiency, [23]. Demographic details, including respondent roles, industry, and company size, provided contextual depth, enhancing analytical rigor.

3.3 Survey Instrument

The survey instrument was a structured questionnaire designed with validated measures to assess profitability, supply chain efficiency, SCMP, and SOMP. A 5-point Likert scale ensured reliability, [31]. It comprised four sections: demographics (industry type, size), SOMP practices SCMP aspects and performance outcomes (profitability, efficiency; A pilot study with 30 participants improved clarity and reliability. This approach provided a robust foundation for analyzing the relationships between SOMP and SCMP, [19], [20].

3.4 Data Analysis Techniques

The study utilized SPSS and AMOS for data analysis, combining descriptive and inferential statistical methods to test hypotheses rigorously. Descriptive statistics summarized sample characteristics, such as industry type and organizational size, providing a foundation for targeted analysis, [7], [32]. Reliability of measurement scales was ensured using Cronbach's alpha (≥ 0.70\ geq 0.70), confirming internal consistency, [15], [21]. Exploratory Factor Analysis (EFA) identified potential cross-loadings, validating the underlying structure of constructs.

Structural Equation Modelling (SEM) was employed to analyse direct and mediated relationships among SOMP, SCMP, supply chain efficiency, and profitability. Partial Least Squares SEM (PLS-SEM) ensured robust results, aligning with established methodologies in sustainable supply chain research, [22]. This approach provided actionable insights into sustainable practices' role in enhancing supply chain performance.

4 Results

The analysis of the study was conducted using STATA, leveraging its robust statistical tools to examine relationships and trends within the data. Descriptive statistics provided an initial understanding of the dataset, highlighting the distribution of key variables such as company type, industry sector, employee size, and duration of sustainability practice implementation.

4.1 Descriptive Statistics

The descriptive statistics put a clear picture in front of the participants in the study. As can be shown from Table 1, most of the participants are having private employment which accounts for about two-thirds of the sample, while the public sector and non-profits/NGOs form a dismally small part.

Table 1. Demographic characteristics of sample

Variable	Freq.	Percent	Cum.	Mean	Std.dev
Type of company					
Private company	230	66.67	66.67	.667	.472
Public sector company	69	20.00	86.67	.2	.401
Non-profit/NGO	46	13.33	100.00	.133	.34
Sector/Industry					
Manufacturing	46	13.33	13.33	.133	.34
Service	161	46.67	60.00	.467	.5
Retail	92	26.67	86.67	.267	.443
Construction	23	6.67	93.33	.067	.25
Education	23	6.67	100.0	.067	.25
Number of employees					
Under 50	115	33.33	33.33	.333	.472
50–250	161	46.67	80.00	.467	.5
250–1000	46	13.33	93.33	.133	.34
Over 1000	23	6.67	100.0	.067	.25
Role in company					
Senior Management (CEO, Director)	92	26.67	26.67	.267	.443
Middle management (manager, supervisor)	161	46.67	73.33	.467	.5
Technical specialist (engineer, analyst)	46	13.33	86.67	.133	.34
Other (accountant, sales agent, administrative staff)	23	6.67	93.33	.067	.25
Duration of implement of sustainable practices.					
Under 1 year	/	/	/	/	/
1–3 year	92	26.67	26.67	.267	.443
4-7 year	115	33.33	60.00	.333	.472
Over 7 years	138	40.00	100.0	.4	.491

Source: Kosovo Small and Medium enterprises (2024). Author's processing

Most participants are from the service industry sector, followed by retail and manufacturing, with construction and education sectors present just a little. The sample has mid-sized companies that employ 50–250 people dominating the sample; smaller companies (fewer than 50 employees) and larger organizations constitute a minor share.

Nearly half of respondents are middle managers, with a notable portion from senior management. Around 40% of companies have practiced sustainability for over seven years, while others are in early stages. The diverse sample, spanning industries, company sizes, and roles, offers a robust basis for analyzing sustainability dynamics. Manufacturing companies, predominantly small-sized (fewer than 50 employees), have implemented sustainability practices for 4–7 years or longer. Table 2 highlight the distribution of sustainability practices across sectors and company sizes.

Table 2. Distribution of Sector by Duration of Sustainability Implementation and Company Size

Sector Industry	Duration of implementation of sustainable practices			Number of employees			
	1-3 y	4-7 y	Over7 y	Under 50	50-250	250-1000	Over 1000
Manufacturing	0	23	23	46	0	0	0
Service	92	46	23	46	92	0	23
Retail	0	0	92	0	46	46	0
Construction	0	23	0	0	23	0	0
Education	0	23	0	23	0	0	0
Total	92	115	138	115	161	46	23

Source: Source: Kosovo Small and Medium enterprises (2024). Author's processing

In the service sector, most companies have been practicing sustainability for 1–3 years, with a significant number in the 50–250 employee range. Retail companies mostly implement sustainability practices for over 7 years, with a mix of mid-sized and larger companies. Construction and education sectors have fewer companies, all with fewer than 50 employees, and most in these sectors have sustainability practices lasting 4–7 years. These highlights sectoral differences in the duration and scale of sustainability initiatives.

4.2 Reliability and Validity

The results of the reliability test (Table 3) indicate that the scale employed in this study exhibits strong internal consistency. With a total of 31 items, the Cronbach's Alpha coefficient of 0.9059 exceeds the commonly accepted threshold of 0.7, signifying that the scale demonstrates high reliability.

This suggests that the items are consistently measuring the underlying construct, providing evidence of the scale's robustness and suitability for subsequent analysis in the study.

Table 3. Reliability analysis

Scale reliability coefficient:	
Number of items in the scale:	31
Cronbach's Alpha	0.9059

Source: Kosovo Small and Medium enterprises (2024). Author's processing.

4.3 Factor Loadings from EFA

The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy assesses the suitability of the data for factor analysis. In our case, as shown in Table 4, the KMO values for the individual variables range from 0.725 to 0.842, indicating good to very good sampling adequacy. The overall KMO value is 0.774, suggesting that the dataset as a whole is suitable for factor analysis. These findings suggest that the variables in issue are suitable for determining underlying determinants and that the data is suitable for more investigation.

Table 4. Kaiser-Meyer-Olkin measure of sampling adequacy

Variable	KMO
SOP	0.842
SCHM	0.793
CRM	0.725
OPER	0.744
PROF	0.765
Overall	0.774

Source: Kosovo Small and Medium enterprises (2024). Author's processing.

The findings in Table 5 of factor analysis performed to a dataset of 345 observations using main factors with orthogonal varimax rotation are shown in the table. Out of the eight components identified, Factor 1 accounts for 17.4% of the overall variation, while components 2 and 3 each contribute 13.2%.

Table 5. Factor analysis/correlation

Factor	Variance	Difference	Proportion	Cumulative
Factor1	4.536	1.095	0.174	0.174
Factor2	3.442	0.002	0.132	0.307
Factor3	3.440	0.229	0.132	0.439
Factor4	3.211	0.084	0.124	0.563
Factor5	3.127	1.004	0.120	0.683
Factor6	2.123	0.050	0.082	0.765
Factor7	2.073	0.030	0.080	0.844
Factor8	2.042	.	0.079	0.923
Method: principal factors		Number of obs = 345		
Rotation: orthogonal varimax		Retained factors = 8		

Source: Kosovo Small and Medium enterprises (2024). Author's processing.

The eight variables successfully account for the bulk of the variability in the data, as seen by the cumulative variance explained by them reaching 92.3%. Given that Factor 5's variance (3.127) is noticeably higher and differs significantly from the preceding factor, it may indicate a more significant or potent pattern in the data.

Table 6. Rotated factor loadings (pattern matrix) and unique variances

Variable	Factor1	Factor2	Factor3	Factor4	Factor5	Factor6	Factor7
POQ1	0.811						
POQ2	0.900						
POQ3	0.687		0.540				
PMZF1		0.833					
PMZF2		0.770					
PMZF3		0.821	0.351				
PMZF4				0.365	0.598		0.422
PMZF5		0.461					
PMZF6					0.738		
PMZF7	0.561						
PMZF8	0.389			0.359	0.584		
PMZF9							
PMZF10	0.726	0.385					
CRM1			0.877				
CRM2			0.929				
CRM3							0.928
CRM4				0.752			
CRM5						0.930	
CRM6	0.376						
CRM7					0.657		0.358
PO1			0.568				0.473
PO2		0.620	0.525				
PO3	0.664					0.507	
PRO1				0.955			
PRO2					0.941		
PRO3	0.589						

Source: Kosovo Small and Medium enterprises (2024). Author's processing.

Table 6 presents the unique variances (uniqueness) and rotated factor loadings, revealing the relationships between variables and factors. Lower uniqueness values indicate stronger explanation by the factors, enhancing the clarity of the variable-factor associations. Factor 1 focuses on sustainability and strategic partnerships, including variables SOP1–SOP3, which emphasize collaboration with partners and sustainable production practices. Factor 2 highlights supply chain collaboration and information sharing, represented by SCHM1–SCHM5, stressing the importance of communication, long-term relationships, and quality partnerships within the

supply chain. Factor 3 addresses supplier operations and performance management through SCHM6–SCHM10, capturing practices like just-in-time management, safety stocks, and supplier evaluation. Factor 4 emphasizes customer relationship management (CRM1–CRM5), detailing the company's approach to client partnerships, satisfaction evaluation, and defining customer expectations. Factor 5 underscores the use of customer feedback in service design, represented by CRM6–CRM7, which highlight how client insights influence product and service development. Factor 6 centres on operational efficiency and flexibility (OP1–OP3), reflecting cost reductions, improved delivery times, and adaptability to customer needs. Factor 7 focuses on profitability and operational impact (PRO1–PRO3), showing how sustainable practices and inventory management enhance revenue and profitability. Factor 8 integrates strategic operational impacts, illustrating the financial advantages of adopting sustainability through cost reductions and increased sales.

4.4 Multiple Regression Analysis

The study evaluated the impact of Sustainable Operations Management Practices (SOMP) on supply chain performance and profitability using multiple regression analysis, a robust method for predicting dependent outcomes. The results are shown on Table 7. Results revealed a significant positive relationship between SOMP and performance (β=0.214, p<0.01\beta = 0.214, p < 0.01), aligning with prior research emphasizing waste reduction and resource optimization [14]. SOMP also significantly enhanced profitability (β=0.233, p<0.01\beta = 0.233, p < 0.01), highlighting its role in reducing costs and improving financial outcomes. These findings support earlier studies demonstrating the value of sustainable practices in driving organizational success.

The regression results reveal the significant impact of sustainable practices (SUSTAIN) on operational efficiency (β=0.191, p<0.01\beta = 0.191, p < 0.01), profitability (β=0.244, p<0.01\beta = 0.244, p < 0.01), and strategic outcomes (β=0.435, p<0.01\beta = 0.435, p < 0.01). Supply chain collaboration (SCHC) positively influences profitability (β=0.187, p<0.01\beta = 0.187, p < 0.01) and strategy (β=0.196, p<0.01\beta = 0.196, p < 0.01) but has a negligible effect on efficiency. Support operations (SUPPOP) improve efficiency (β=0.283, p<0.01\beta = 0.283, p < 0.01) and strategy (β=0.291, p<0.01\beta = 0.291, p < 0.01) but show no significant effect on profitability. Customer relationship management (CRM) enhances efficiency (β=0.294, p<0.01\beta = 0.294, p < 0.01) and strategy (β=0.106, p<0.01\beta = 0.106, p < 0.01) but negatively impacts profitability (β=−0.189, p<0.01\beta = -0.189, p < 0.01). Information and service design (CISD) positively affects profitability and strategy but not efficiency. High R-squared values confirm model robustness, emphasizing sustainability's role in improving outcomes.

Table 7. Regression results

VARIABLES	OPEREF	PROFIOP	STRAOP
SUSTAIN	0.191***	0.244***	0.435***
	(0.0303)	(0.0234)	(0.0467)
SCHC	0.00888	0.187***	0.196***
	(0.0219)	(0.0235)	(0.0245)
SUPPOP	0.283***	0.00850	0.291***
	(0.0242)	(0.0243)	(0.0284)
CRM	0.294***	-0.189***	0.106***
	(0.0226)	(0.0145)	(0.0335)
CISD	0.0252	0.167***	0.192***
	(0.0440)	(0.0509)	(0.0657)
Constant	-2.487***	7.389***	4.902***
	(0.493)	(0.560)	(0.787)
Observations	345	345	345
R-squared	0.804	0.565	0.790

Robust standard errors in parentheses
**** p<0.01, ** p<0.05, * p<0.1*
Source: Author's processing

4.5 SEM Analysis

SEM (SEM) was used to test the hypothesized relationships and evaluate the mediating role of SCMP in the relationship between operational management practices that Sustainable (SOMP) supply chain efficiency and ability to make a profit Participation is an examination of complexity. As shown in previous research [22], [1], the model shows strong consistency with the data. As indicated by the main fit indices: RMSEA = 0.054, CFI = 0.997, and TLI = 0.977, these values reflect good model alignment with the observed data. Consistent with best practices in SEM analysis [33], [17], path analysis revealed several important relationships:

- The positive relationship between SOMP and SCMP (β = 0.310, p < 0.01) suggests that SCI and cooperation are improved by sustainable operations methods.
- SCMP had a substantial influence on supply chain efficiency (β = 0.290, p < 0.01), indicating that operational performance is enhanced by efficient supply chain methods.
- Moreover, SCMP had a beneficial impact on profitability (β = 0.320, p < 0.01), highlighting the monetary advantages of effective supply chain management.

The evaluation confirmed the mediating function of SCMP, highlighting that supply chain control practices make the positive effects of SOMP greater on each efficiency and profitability. It also resonates with latest studies demonstrating the function of SCMP in fostering environmental and economic overall performance, [14], [24].

Table 8. SEM Results

Endogenous variables	Observed: OPER PROF				
Exogenous variables	Observed: SOP SCHM CRM				
Structural equation model					
Estimation method = Maximum Likelihood Log likelihood= -2949.8147					
Structural	Coef.	Std. Err.	z	P>|z|	[95% Conf. Interval]
OPER					
SOP	.2143745	.0271776	7.89	0.000	.1611074
SCHM	.1457078	.0105957	13.75	0.000	.1249406
CRM	.2233652	.0195148	11.45	0.000	.185117
cons	-3.172462	.5073098	-6.25	0.000	-4.166771
PROF					
SOP	.232712	.0257567	9.04	0.000	.1822298
SCHM	.0975075	.0100418	9.71	0.000	.077826
CRM	-.0945444	.0184945	-5.11	0.000	-.1307929
cons	7.912823	.4807865	16.46	0.000	6.970499
var(e.OPER)	.4226722	.0321817			.3640779 .4906966
var(e.PROF)	.379631	.0289046	.3270034		.4407284
LR test of model vs. saturated: chi2(1) = 3.59, Prob > chi2 = 0.0583					

Source: Kosovo Small and Medium enterprises (2024). Author's processing.

The SEM analysis as shown in Table 8, highlights the relationships between Sustainable Operations Practices (SOP), Supply Chain Management Practices (SCHM), and Customer Relationship Management (CRM) with operational efficiency (OPER) and profitability (PROF). SOP significantly enhances efficiency (β=0.214, p<0.01\beta = 0.214, p < 0.01) and profitability (β=0.233, p<0.01\beta = 0.233, p < 0.01), emphasizing the role of sustainability in achieving operational and financial success. SCHM also positively impacts efficiency (β=0.145, p<0.01\beta = 0.145, p < 0.01) and profitability (β=0.098, p<0.01\beta = 0.098, p < 0.01), underscoring the importance of supply chain collaboration. CRM shows a strong positive effect on efficiency (β=0.223, p<0.01\beta = 0.223, p < 0.01) but negatively affects profitability (β=−0.095, p<0.01\beta = -0.095, p < 0.01), suggesting potential cost inefficiencies. The model fit indices (χ2(1) = 3.59, Prob>χ2=0.0583\chi^2(1) = 3.59, {Prob} > \chi^2 = 0.0583) and variance components indicate a robust model. These findings advocate for integrated sustainability and supply chain strategies to maximize performance.

Table 9. Model Fit Statistics

Fit statistic	Value	Description
Population error		
RMSEA	0.054	Root mean squared error of approximation
90% CI, lower bound	0.000	
upper bound	0.190	
pclose	0.170	Probability RMSEA <= 0.05
Information criteria		
AIC	5919.629	Akaike's information criterion
BIC	5958.065	Bayesian information criterion
Baseline comparison		
CFI	0.997	Comparative fit index
TLI	0.977	Tucker-Lewis's index
Size of residuals		
SRMR	0.009	Standardized root mean squared residual
CD	0.855	Coefficient of determination

Source: Kosovo Small and Medium enterprises (2024). Author's processing.

The outcome for the fit of the model is shown in Table 10, which shows that the explanatory power of the first model is 78 per cent, and the explanatory power of the second model is 51 per cent.

Table 10. Equation-level goodness

Variance						
depvars	fitted	predicted	residual	R-squared	mc	mc2
observed						
OPER	1.95	1.53	0.42	0.78	0.885	0.78
PROF	0.78	0.40	0.37	0.51	0.71	0.51
overall		.85				
mc = correlation between depvar and its prediction						
mc2 = mc^2 is the Bentler-Raykov squared multiple correlation coefficient						

Source: Kosovo Small and Medium enterprises (2024). Author's processing.

5 Discussion of the Results

This study supports hypotheses H1 and H2, demonstrating that Sustainable Operations Management Practices (SOMP) significantly enhance supply chain profitability and efficiency. The findings reveal a positive and substantial impact of SOMP on supply chain profitability (β=0.233, p<0.01\beta = 0.233, p < 0.01) and efficiency (β=0.214, p<0.01\beta = 0.214, p < 0.01). These results align with prior research on the benefits of sustainable practices in operational and financial performance, such as green procurement and waste reduction, [4]. The study also validates hypotheses H3 and H4, confirming that Supply Chain Management Practices (SCMP) mediate the

relationship between SOMP and performance outcomes. SCMP amplifies the effects of SOMP, with significant path coefficients for profitability (β=0.320, p<0.01\beta = 0.320, p < 0.01) and efficiency (β=0.290, p<0.01\beta = 0.290, p < 0.01). These findings emphasize the importance of integrating SCMP, such as sustainable storage, eco-friendly transportation, and supplier collaboration, to maximize the advantages of sustainability initiatives, [9], [27].

The integration of SOMP and SCMP demonstrates the dual benefits of financial and operational improvements, consistent with prior literature on sustainability's strategic role in supply chains, [3]. This integrated approach not only optimizes resource utilization and minimizes waste but also enhances long-term resilience in dynamic market environments. Furthermore, these results echo findings from [1], [3] and [29], which emphasize that Sustainable SCMP (SSCMP) can improve supply chain outcomes and environmental performance through collaborative strategies. Practically, organizations are encouraged to adopt SOMP by focusing on energy efficiency, green logistics, and reducing waste. Strengthening SCMP through sustainable supplier relationships and leveraging advanced technologies like AI and blockchain can further enhance transparency and decision-making, [12], [22], [28]. These strategies not only improve operational efficiency but also foster reputation and long-term growth, addressing barriers such as high implementation costs, [1], [12], [14]. Overall, this research underscores the transformative potential of integrating sustainability and supply chain practices for enhanced performance and competitiveness.

6 Conclusion

This section's goal is to provide an overview of the conclusions drawn from the research. According to [2], [19], [24], the benefits of SOMP and SCMP include improved supply chain efficiency and profitability as well as the development of SCMP's mediating role, which advances our understanding of how sustainable practices could ensure optimal operational and financial performance. This section addresses the study's shortcomings and offers suggestions for more research. Encourage research on moderators and mediators in these connections, [4], [13], [22]. This study explores the relationship between Sustainable Operations Management Practices (SOMP), Supply Chain Management Practices (SCMP), and their combined impact on supply chain performance and profitability. The findings confirm that SOMP significantly enhances efficiency (β=0.214, p<0.01\beta = 0.214, p < 0.01) and profitability (β=0.233, p<0.01\beta = 0.233, p < 0.01), consistent with prior research, [1], [2]. SCMP emerged as a critical mediator, amplifying SOMP's effects on efficiency (β=0.290, p<0.01\beta = 0.290, p < 0.01) and profitability (β=0.320, p<0.01\beta = 0.320, p < 0.01). Structural Equation Modelling (SEM) analysis validated these relationships with robust model fit indices (RMSEA = 0.054, CFI = 0.997, TLI = 0.977). Sustainable practices, such as green logistics, reverse logistics, and waste reduction, are pivotal for achieving economic, environmental, and social outcomes. SCMP facilitates these outcomes by fostering collaboration, resource optimization, and aligning sustainability goals with operational strategies, [15], [24].

6.1 Limitations and Future Research

This study's cross-sectional design limits causal inference, and sectoral underrepresentation affects generalizability, [30], [33], [34]. Future research should adopt longitudinal methods, examine cross-cultural and sector-specific factors and integrate emerging technologies like AI and blockchain to enhance global applicability.

References:

[1] Afzal, N., & Hanif, A., The impact of green SCMP on firm performance: Evidence from manufacturing industry. *Global Business Review,* Vol (2), No.1, 2022, pp. 25-42 https://doi.org/10.1177/09721509221125576.

[2] Islam, M. R., Monjur, M. E. I., & Akon, T., Supply chain management and logistics: How important interconnection is for business success. *Open Journal of Business and Management,* Vol. 11, No. 5, 2023, pp. 2505–2524. https://doi.org/10.4236/ojbm.2023.115139.

[3] Ahmad, A., Ikram, A., Rehan, M. F., & Ahmad, A., Going green: Impact of green SCMP on sustainability performance. *Frontiers in Psychology*, Vol.13, 2022, (973676). https://doi.org/10.3389/fpsyg.2022.973676.

[4] Gunasekara, K. R. H. L., Yapa, S. T. W. S., & Shantharachi, A. A., Impact of green SCMP on triple bottom line performance and moderating effect of institutional pressure. *Asian Journal of Management Studies*, Vol. 3, No. 1, 2023. pp. 1–21, https://doi.org/10.4038/ajms.v3i1.57.

[5] Hafi, M., Ujianto, & Andjarwati, T., The effects of SSCM and organizational learning abilities on the performance of the manufacturing companies. *Uncertain Supply Chain Management,* Vol. 10, No.10, 2022, pp.1345–1358.https://doi.org/10.5267/j.uscm.2022.7.004 .

[6] Khan, T., Ali, A., Khattak, M. S., Arfeen, M. I., Chaudhary, M. A. I., Syed, A. 2024. Green SCMP and sustainable organizational performance in construction organizations. Cogent Business & Management, 11(1), Article 2331990. https://doi.org/10.1080/23311975.2024.2331990.

[7] Raza, J., Liu, Y., Zhang, J., Zhu, N., Hassan, Z., Gul, H., & Hussain, S. Sustainable supply management practices and sustainability performance: *The dynamic capability perspective.* SAGE Open, Vol. 11, No. 1, pp. 1–14, 2021, https://doi.org/10.1177/21582440211000046.

[8] Asante-Darko, D., & Osei, V., Sustainable SCMP and firm performance: The mediating effect of firm capabilities. *Management of Environmental Quality,* Vol. 35, No. 4, 2024, pp. 751–779. https://doi.org/10.1108/MEQ-07-2023-0217.

[9] Osmani, Q., & Gashi, K., The predictive value of job satisfaction and relevant factors in predicting commitment in the workplace, job involvement, and job opportunity of bank employees. *Academic Journal of Interdisciplinary Studies,* Vol. 4, No.2, 2015, pp.168–175. https://doi.org/10.5901/ajis.2015.v4n2s1p168.

[10] Sharma, G., & Henriques, A., A more sustainable supply chain. *Harvard Business Review.* 2020, [Online]. https://hbr.org/2020/03/a-more-sustainable-supply-chain (Accessed Date: January 23, 2026).

[11] Gashi, K., The relationship between SME's organizational culture and training and development as a human resource management practice. Journal of Global Policy and Governance, Vol. 10, No. 2, 2021, pp. 139–161. https://doi.org/10.14666/2194-7759-10-2-008.

[12] Gashi, K., The future of robot-advisors in management. In Robo-Advisors in Management, 2024. pp. 35–56. IGI Global. https://doi.org/10.4018/979-8-3693-2849-1.ch003.

[13] Hilal, F., The effect of green SCMP and competitive advantage on financial performance. *International Journal of Business*, Vol. 27, No. 1, 2022, pp. 1345–1358. https://doi.org/10.5267/j.uscm.2022.7.004

[14] Agyabeng-Mensah, Y., Baah, C., Afum, E., & Kumi, C. A., Circular supply chain practices and corporate sustainability performance: Do ethical supply chain leadership and environmental orientation make a difference? *Journal of Manufacturing Technology Management*, Vol. 34, No.2, 2023, pp. 213–233. https://doi.org/10.1108/JMTM-08-2022-0296.

[15] Roffé, M. A., & González, F. A. I. The impact of sustainable practices on the financial performance of companies: A review of the literature. *Revista Científica Visión de Futuro*, Vol.28, No.1, 2024, 2024, pp. 221–240. https://doi.org/10.36995/j.visiondefuturo.2023.28.01.006.en.

[16] Dincă, G., Dincă, M.S., Dauti, B., Baba, M.C. & Popione, C., Cyclicality of fiscal policy in the European Union. *Romanian Journal of Economic Forecasting*, Vol. *23, No.1,* 2020. pp. 75-96, [Online]. https://ipe.ro/new/rjef/rjef1_20/rjef1_2020p75-96.pdf (Accessed Date: January 23, 2026).

[17] Adesoga, T. O., Olaiya, O. P., Onuma, E. P., Ajayi, O. O., & Olagunju, O. D., Review of reverse logistics practices and their impact on supply chain sustainability. *International Journal of Science and Research Archive*, Vol. 12, No.2, 2024, pp. 162–168. https://doi.org/10.30574/ijsra.2024.12.2.1216.

[18] Rana, J., Gutierrez, P. L., & Oldroyd, J. C., Quantitative methods. In A. Farazmand (Ed.), Global encyclopedia of public administration, public policy, and governance. Springer, Cham, 2021, https://doi.org/10.1007/978-3-319-31816-5_460-1.

[19] Al-Awamleh, H. K., Alhalalmeh, M. I., Alatyat, Z. A., Saraireh, S., Akour, I., Alneimat, S., Alathamneh, F. F., Abu-Farha, Y. S., & Al-Hawary, S. I., The effect of green supply chain on sustainability: Evidence from the pharmaceutical industry. *Uncertain Supply Chain Management,* Vol. 10, No. 4, 2022, pp. 1261–1270. https://doi.org/10.5267/j.uscm.2022.8.002.

[20] Meissel, K., & Brown, G. T. L., Quantitative research methods. In F. Meyer & K. Meissel (Eds.), 2023, Research methods in education and social work. NZCER.

[21] Ocran, J. N., The Tesco Group and sustainable operations management. *Journal of Earth and Environmental Science Research*, Vol. 5, No.12, 2023, pp. 1–6, https://doi.org/10.47363/JEESR/2023(5)212.

[22] Tsikada, C., Imran, S., Masengu, R., & Mugoni, E., Effect of green SCMP and operational performance on sustainable competitive advantage. *Brazilian Journal of Development*, Vol. 10, No. 6, 2024, pp. 1–33. https://doi.org/10.34117/bjdv10n6-019.

[23] Das, D., The impact of sustainable SCMP on firm performance: Lessons from Indian organizations. *Journal of Cleaner Production, 203*, 2018, pp. 179–196. https://doi.org/10.1016/j.jclepro.2018.08.250.

[24] Mugoni, E., Kanyepe, J., & Tukuta, M., Sustainable SCMP (SSCMPS) and environmental performance: A systematic review. *Sustainable Technology and Entrepreneurship*, 3, Article 100050, 2024. https://doi.org/10.1016/j.stae.2023.100050.

[25] Małys, Ł., The approach to supply chain cooperation in the implementation of sustainable development initiatives and company's economic performance. Equilibrium. *Quarterly Journal of Economics and Economic Policy,* Vol. 18, No. 1, 2023, pp. 255–286. https://doi.org/10.24136/eq.2023.008.

[26] Caiado, R. G. G., Scavarda, L. F., Vidal, G., de Mattos Nascimento, D. L., & Garza-Reyes, J. A., A taxonomy of critical factors towards sustainable operations and supply chain management 4.0 in developing countries. *Operations Management Research*, 2023, https://doi.org/10.1007/s12063-023-00430-8.

[27] Ghanad, A., An overview of quantitative research methods. *International Journal of Multidisciplinary Research and Analysis*, Vol. 6, No. 8, 2023, pp. 3794–3803. https://doi.org/10.47191/ijmra/v6-i8-52.

[28] Stavropoulou, A., Papoutsidakis, M., Misokefalou, E., Applications of Digital Twins (DT) and Internet of Things (IoT) in the Supply Chain: The Case of Food Industry, WSEAS Transactions on Environment and Development, Vol. 21, 2025, pp. 1225-1244. https://doi.org/10.37394/232015.2025.21.103.

[29] Yuanhao, M., The impact of sustainable supply chain management practices on business performance: A case study of Huawei. SHS Web of Conferences, 181, Article 03015, 2024. https://doi.org/10.1051/shsconf/202418103015.

[30] Iherobiem, A. C., The Effect of SSCM on Firm Innovative Performance: A Study of Manufacturing Firms in Nigeria. *European Journal of Logistics, Purchasing and Supply Chain Management*, Vol. 11, No. 3, 2023, pp. 1-14. https://doi.org/10.37745/ejlpscm.2013/vol11n3114.

[31] Salah, A., Çağlar, D., & Zoubi, K. The impact of POM practices in improving organizational performance: *The mediating role of SCI. Sustainability,* Vol. 15, 2023, 15140. https://doi.org/10.3390/su152015140.

[32] Mwenda, B., Israel, B., & Mahuwi, L., The influence of sustainable SCMP on financial sustainability of food processing SMEs. *LBS Journal of Management & Research*, Vol. 21, No. 2, 2023, pp. 218–235. https://doi.org/10.1108/LBSJMR-01-2023-0003.

[33] Pilcher, N., & Cortazzi, M., Qualitative and quantitative methods and approaches across subject fields: Implications for research values, assumptions, and practices. *Quality & Quantity*, Vol. 58, No.2, pp. 2357–2387. https://doi.org/10.1007/s11135-023-01734-4.

[34] Dinca, G., Baba, M. C., Dinca, M. S., Dauti, B., & Deari, F., Insolvency risk prediction using the logit and logistic models: some evidences from Romania. *Economic Computation & Economic Cybernetics Studies & Research*, Vol. 51, No.4, pp.139-157, [Online]. https://ipe.ro/RePEc/cys/ecocyb_pdf/ecocyb4_2017p139-157.pdf (Accessed Date: January 10, 2026).

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- Drita Krasniqi carried out the econometric assessment, methodology development and design of the hypothesis and estimations, as well as the conceptualization of the study.
- Ruzhdi Matoshi was responsible for the investigation process, execution of literature review part and the conclusion part.

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