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The Impact of Production and Operations Management Practices in Improving Organizational Performance: The Mediating Role of Supply Chain Integration

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Abstract: While prior research has consistently established a significant link between production and operations management (POM) practices and organizational financial performance (OFP) across various contexts, the mechanisms driving this connection remain unclear. This study addresses this gap by examining the mediating role of supply chain management (SCM) integration in the relationship between POM practices and OFP within manufacturing firms. Drawing on established theories and concepts such as the resource-based view (RBV) of firm and operation strategies, this study employed a quantitative research design. Survey data were collected from 209 managers in Jordanian manufacturing firms and analyzed using structural equation modeling (SEM). The results confirmed a positive and significant association between POM practices and both SCM integration and OFP. Furthermore, SCM integration partially mediated the impact of POM practices on OFP, thereby underscoring its role in transmitting positive effects to financial performance. This research contributes to the field by integrating POM practices with SCM integration and by elucidating the mechanisms through which these practices influence financial performance in Jordanian manufacturing firms. Through this, our understanding of these relationships for practitioners and researchers alike is enhanced.

Keywords: production and operations management practices; supply chain management integration; organizational financial performance; structural equation modeling; Jordanian manufacturing firms

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1. Introduction

Production and operations management (POM) and supply chain management (SCM) are vital disciplines in the contemporary business environment [1,2], playing key roles in ensuring the efficient flow of materials, information, and resources across organizational boundaries. POM encompasses the design, planning, and control of production processes to transform inputs into outputs efficiently [3]. In contrast, SCM focuses on coordinating activities across multiple organizations to deliver products and services to end customers [4]. Recent research emphasizes the importance of integrating POM and SCM practices to enhance organizational performance [5,6].

The interdependence between POM and SCM can be attributed to several factors. Integrating these practices enables organizations to optimize production processes, reduce costs, and enhance operational efficiency. Effective SCM ensures timely access to raw materials, reduces inventory costs, and minimizes production disruptions. Close coordination between POM and SCM improves demand forecasting, inventory management, and order fulfillment, leading to enhanced customer satisfaction and increased revenue [7–11]. Therefore, an organization's financial performance, including indicators like profitability

and return on investment, is a critical measure of its success and sustainability [12]. Improving financial performance allows businesses to invest in innovation, expand operations, and generate value for stakeholders. In recognizing the link between POM, SCM, and financial performance, researchers have focused on understanding how the integration and alignment of these areas improve organizational outcomes [13–18].

Despite growing recognition of the link between POM practices and financial performance, further research is needed to explore the specific mechanisms underlying these relationships [19–21]. This study aims to bridge this gap by investigating how POM practices enhance organizational financial performance through SCM integration. These gaps in the literature highlight a limited understanding of how POM practices and SCM integration contribute to financial performance [22,23]. Through leveraging established theories such as the resource-based view (RBV) theory; emphasizing unique resources and capabilities for competitive advantage [24–27]; and investigating operations strategies (which aligns operations with an overall strategy for a competitive edge [28–30]), this paper explores how integrating POM and SCM can enhance financial outcomes. Additionally, supply chain coordination, lean manufacturing, and total quality management theories shed light on the mechanisms through which this integration improves financial performance [31–33]. Synthesizing these theoretical perspectives advances our understanding of the relationships between POM, SCM, and organizational financial performance, offering practical insights for organizations aiming to enhance financial outcomes through integration.

The integration of POM with SCM practices has gained increasing attention as a means to improve organizational performance, thus substantiating the interdependence between these disciplines and suggesting that effective integration enhances financial performance. This paper contributes to the existing body of knowledge by investigating the mechanisms and strategies through which POM practices positively influences organizational financial performance. The findings will assist practitioners in developing and implementing effective POM–SCM integration practices to achieve superior financial outcomes. The research questions guiding our investigation are the following:

1. What is the effect of POM practices on SCM integration and organizational financial performance?
2. Does SCM integration mediate the relationship between POM practices and organizational performance?

The remainder of this paper is structured as follows. In the subsequent section, we provide an overview of related theories and concepts, outlining our research model and hypotheses, laying the foundation for our empirical investigation. Following this, in Section 3, we elucidate the methodology employed to operationalize the objectives of this study. Section 4 presents the empirical results. Lastly, in Section 5, we engage in a comprehensive discussion of the theoretical and practical implications of our research, while also addressing key limitations along with future research directions and conclusions.

2. Literature Review and Hypothesis

2.1. Theoretical Framework

The theoretical foundation of this research paper is rooted in several key theories and concepts within the domains of POM and SCM. These theories and concepts collectively form the framework that guides our exploration of how POM practices and SCM integration influences organizational financial performance. While discussing these theories, it is imperative to delve deeper into their implications and contributions to our study. The resource-based view (RBV) theory, as advanced by Barney [24], offers a fundamental perspective. It posits that organizations can achieve a sustained competitive advantage by leveraging unique resources and capabilities. In our context, the RBV theory provides a valuable lens through which we can comprehend how the integration of POM and SCM practices creates a competitive advantage. This is achieved by harnessing internal resources such as advanced production technologies and efficient supply chain networks. However, it is essential to note that while the RBV theory provides a conceptual framework, its

practical implications and limitations should be critically examined. For instance, we must consider whether all organizations possess the same potential for resource integration and competitive advantage. Additionally, the operations strategy concept, as articulated by Hayes and Wheelwright [34], underscores the strategic alignment of an organization's overall goals with its operational activities. We argue that the integration of POM and SCM practices enhances this alignment by optimizing resource allocation, improving production efficiency, and reducing costs. Critically, we should assess the challenges and barriers that organizations face when attempting to achieve such alignment and operational synergy.

Furthermore, supply chain coordination, lean manufacturing, and total quality management (TQM) theories also deserve deeper scrutiny. These theories illuminate how POM practices and SCM integration can enhance financial performance. For instance, supply chain coordination, as per Lambert et al. [32], emphasizes collaboration and integration across the supply chain, thereby leading to cost reduction and improved customer satisfaction. Examining how organizations navigate the complexities of coordinating across diverse supply chain elements is crucial. Likewise, lean manufacturing, derived from the work of Womack et al. [33], emphasizes operational efficiency and cost reduction. Understanding the practical implementation of lean principles and their impact on financial performance is pivotal. TQM focuses on quality improvement across all organizational functions, and it can indirectly influence financial performance through improved product quality and customer satisfaction. An in-depth analysis of how TQM practices within POM and SCM contribute to financial outcomes would provide valuable insights. In conclusion, while we have established a strong theoretical foundation, further critique and analysis of these theories are necessary to comprehensively understand their relevance and limitations in the context of POM, SCM, and organizational financial performance. This deeper examination will enhance the robustness of our theoretical framework and the subsequent empirical analysis.

2.2. POM Practices and SCM Integration

Production and operations management (POM) is a multifaceted field encompassing the orchestration of production processes within an organization. Its mandate extends from designing and planning these processes to efficiently converting inputs into outputs, which is achieved with meticulous resource management, including labor, materials, and technology utilization [35]. POM comprises a gamut of activities, spanning capacity planning, process design, quality management, inventory control, scheduling, etc. Over time, the field has evolved, notably with the advent of concepts such as material requirements planning (MRP) and just-in-time (JIT) systems [36]. MRP brought about effective inventory and production planning by synchronizing demand with material availability [37]. Today, POM holds a pivotal role as a discipline that is crucial for enhancing productivity, quality, and customer satisfaction, all while optimizing resource allocation and minimizing costs.

Scholars and practitioners have made substantial contributions to POM's theory and practice, spawning concepts and frameworks to tackle various challenges. These encompass TQM, lean manufacturing, Six Sigma, and the theory of constraints (TOC), among others [36,38,39]. These frameworks offer tools and techniques through which to boost operational efficiency, augment product and service quality, and drive continuous improvement in production and operations management. Given its emphasis on efficiency, effectiveness, and customer value, POM is a linchpin for organizational success and competitiveness in the dynamic business arena. This study particularly focuses on POM practices, encompassing approaches such as TQM, JIT inventory, and process and capacity design (PCD) [15–17,20,40]. These practices aim to refine logistical processes, heighten efficiency, curtail waste, and optimize resource employment in production operations. Their adoption empowers organizations to elevate operational performance, ultimately bolstering overall performance and financial outcomes.

Research by Kannan and Tan [17] underscores the positive correlation between effective POM practices, such as TQM and JIT, and SCM integration. POM practices encompass

a gamut of activities, including capacity planning, quality management, and process enhancement, which exert direct influence on production process efficiency and effectiveness [17,41]. These practices are pivotal for achieving operational excellence and elevating supply chain performance. Moreover, certain investigations have revealed that POM practices are instrumental in instituting and upholding effective SCM integration. For instance, Tarn et al. [42] ascertained that organizations adopting advanced production planning and control systems, such as enterprise resource planning (ERP) systems, witness enhanced SCM integration. These systems facilitate real-time data sharing, activity coordination, and informed decision making across the supply chain [43,44]. Furthermore, the research of Flynn et al. [14] suggested that POM practices, such as lean manufacturing and just-in-time production, offer a constructive contribution to SCM integration. Lean manufacturing zeroes in on waste reduction, resource optimization, and production flow enhancement. When amalgamated with SCM integration, lean practices usher in streamlined material flows, reduced lead times, and amplified synergy with suppliers and customers [18,45]. Effective POM practices, including TQM, PCD, and JIT systems, can thus fortify coordination and integration within the supply chain [20]. Consequently, we propose the following hypothesis:

H1. *POM practices are positively related to SCM integration.*

2.3. POM Practices and Organizational Financial Performance

The nexus between POM practices and organizational financial performance stands as a well-established domain within the annals of social science literature. A preponderance of research underscores the salutary effects of adept POM practices on financial outcomes [39,40]. The insightful investigation by Dao et al. [15] attests that organizations that embrace sophisticated POM practices—exemplified by efficient production planning, inventory management, and quality control—tend to chart a course toward superior financial performance. These practices (by refining operational efficiency, curtailing costs, and elevating product quality), engender heightened profitability and overarching financial prosperity. Additionally, a study by Csiki et al. [46] unearthed a positive interrelation between POM practices and firm performance. Their findings elucidated that organizations effectively entwining production processes with supply chain activities experience an uptick in profitability and returns on investment. This fusion empowers organizations to fine tune resource allocation, waste minimization, and overall operational efficacy, thus culminating in an ameliorated financial outlook. In a complementary vein, Fullerton et al. [47] shed light on the affirmative sway of POM practices, including JIT, on financial performance metrics, encompassing sales growth and asset turnover. Others have corroborated that the assimilation of cutting-edge manufacturing technologies, concomitant with effective POM practices, begets enhanced financial performance [35,48]. In summation, these studies unveil that diverse POM practices supercharge productivity, prune production costs, and facilitate the provisioning of top-notch products, thereby propelling revenue expansion and ameliorating financial benchmarks. Consequently, the following hypothesis is proffered:

H2. *POM practices are positively related to organizational financial performance.*

2.4. SCM Integration and Organizational Financial Performance

SCM integration stands as a pivotal concept within the realm of supply chain management, accentuating the imperative of orchestrating and harmonizing activities across diverse organizations that are entrenched in the supply chain [49–53]. It entails the amalgamation of multifarious functions—encompassing procurement, production, distribution, and logistics—with the overarching goal of attaining seamless coordination and unfettered information exchange throughout the labyrinthine tapestry of the supply chain network [54,55]. As articulated by Flynn et al. [14], SCM integration assumes the guise of "the degree to which an organization's internal functions and external supply chain

partners strategically and operationally collaborate with each other to jointly manage intra- and inter-organizational quality-related relationships, communications, processes, etc., with the objective to achieve high levels of quality-related performance at low costs" [56]. In accordance with the prevailing literature, this research paper gauges SCM integration through metrics encompassing internal, customer, and supplier integration, as per the tenets postulated by contemporary research [57–59].

Within the purview of the RBV theory and the dynamic capabilities view [60], the saga unfolds wherein supply chain integrative capabilities emerge as vanguards of firm performance [22,61,62]. Verona [63], although devoid of empirical validation, expounded upon the transformative potential that SCM integrations, spanning external and internal dimensions, harbor in terms of fortifying both product efficacy and process efficiency. Notwithstanding the occasional variance in findings [64,65], a corpus of scholarship substantiates the pivotal role of SCM integration in the attainment of commendable financial performance [66–68]. While studies such as Flynn et al. [14] hesitate to attest to a robust correlation between customer integration and financial performance, contrarian discoveries have staked their claim. Nara-simhan and Kim [50] and Koufteros et al. [69], for instance, have unveiled the affirmative impacts of customer integration on financial outcomes. Furthermore, the narrative unfurls a new dimension, as espoused by Droge et al. [51], wherein both customer and supplier integration unveil potential, not merely for the augmentation of market share, but also for the invigoration of financial performance.

In the annals of empirical studies in the social science literature [70–73], the symbiotic relationship between SCM integration and organizational financial performance basks in substantial corroboration. These investigations underscore the momentous imprint of SCM integration on financial outcomes, which spans profitability, returns on investment, and the panorama of overall financial performance [13,74]. Grounded in these discernments, a proposition emerges that SCM integration constitutes a linchpin in the financial performance of manufacturers. The affirmative nexus between SCM integration and organizational financial performance finds resonance in the extensive literature, which underscores the pivotal role of integrative capabilities in the augmentation of process efficiency, product efficacy, and overarching financial performance. Consequently, the following hypothesis is proffered:

H3. *SCM integration is positively related to organizational financial performance.*

2.5. The Mediation Effect of SCM Integration

Drawing from the RBV theory, which underscores the creation of valuable resources and capabilities for competitive advantage [24], we propose that the level of SCM integration serves as a mediating mechanism in the relationship between POM practices and financial performance (Figure 1). Empirical studies in the social science literature have supported the mediating role of SCM integration [58,75–77]. For instance, Abdallah et al. [58] provided evidence of the positive mediating effect of SCM integration in the link between quality management practices and organizational performance. Their study showed that organizations that effectively integrate production and supply chain activities experience higher profitability and sales growth. This alignment of production processes with supply chain coordination enables cost savings, reduced inventory levels, and more efficient customer demand fulfillment, thus ultimately improving financial performance.

Similarly, Liu et al. [75] demonstrated the positive relationship between effective business model design and operational performance. Firms adopting such designs exhibited higher organizational performance. Effective integration empowers organizations to optimize resource allocation, streamline production processes, and enhance overall operational efficiency, thus positively impacting financial performance indicators. These findings support the idea that various POM practices indirectly and positively impact organizational financial performance through SCM integration. Aligning and integrating production and supply chain activities enables cost reduction, improved operational efficiency, increased

customer satisfaction, and—consequently—enhanced financial outcomes [78]. To assess the impact of POM practices on organizational performance and to understand the mechanisms involved, it is crucial to measure the degree of SCM integration. Thus, through combining the positive associations of our first three hypotheses, we propose the following hypothesis:

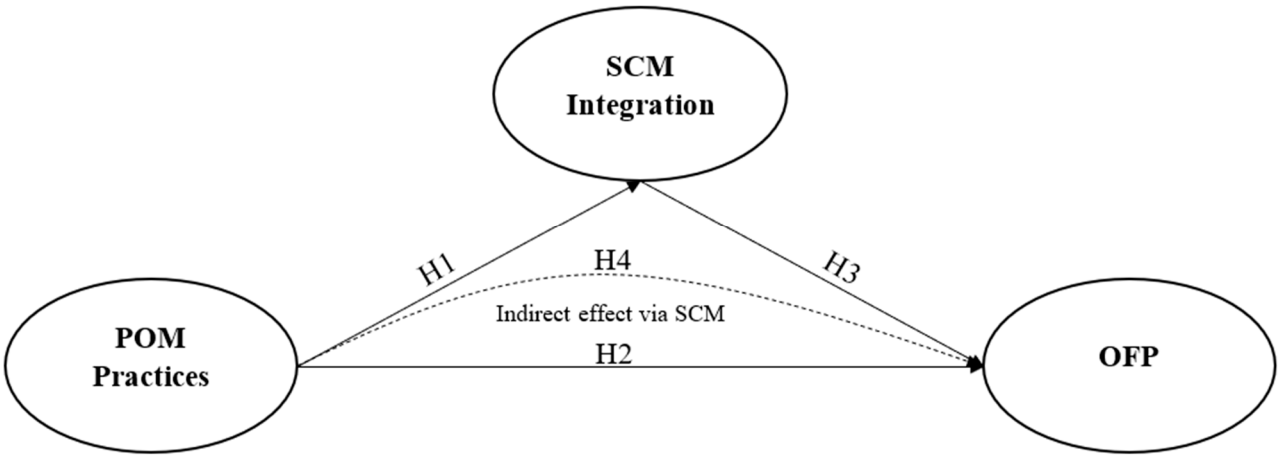

Figure 1. Research model. Note(s)—solid arrows: direct effect; dashed arrows: indirect effect.

H4. *SCM integration mediates the positive relationship between POM practices and organizational financial performance.*

3. Methodology

3.1. Sample and Data Collection Procedure

The data collection process for this study involved the construction of a sample frame from the Jordan Chamber of Industry (JCI), which provided a list of Jordanian manufacturing firms from various industries. The sample comprised 700 manufacturing firms, which is considered representative as it accounts for about 29.6% of all manufacturing firms in Jordan [79]. To ensure adequate representation of different industries, a diverse set of manufacturing firms were targeted. The unit of analysis for this study was the manufacturing firm, and one respondent in a managerial position with sufficient knowledge regarding POM and SCM was selected from each firm to participate in the study. In cases where specific POM and SCM managers were not present due to the prevalence of small and medium-sized enterprises (SMEs) in Jordan's manufacturing sector [58], managers responsible for POM and SCM activities, such as quality, plant, and purchasing managers, were instead targeted.

The data collection process employed a simple random sampling method to select the participating companies. Data collection took place over a period from April to June 2022. The selected firms were approached through in-person visits conducted by one of the authors, and each received a cover letter explaining the study's objective and the confidentiality of responses for academic purposes [80]. A total of 231 questionnaires were collected; however, 22 of them were considered unusable due to missing data, leaving 209 questionnaires that could be used for analysis. The effective response rate for the study was 29.85%, indicating a satisfactory level of participation. Table 1 provides an overview of the respondents' demographics and an outline of the surveyed firms, thus offering insights into the characteristics of the sample used for the study.

Table 1. Surveyed industry and respondent profiles.

Measures	Item	Frequency	Percentage (%)
Gender	Male	126	60.3%
	Female	83	39.7%
Age	Less than 30 years old	7	3.3%
	31–40	80	38.3%
	41–50	87	41.6%
	51–60	21	10.0%
	More than 60 years old	14	6.7%
Job Position	Operations manager	58	27.8%
	Supply chain manager	53	25.4%
	Plant manager	40	19.1%
	Quality manager	36	17.2%
	Others	22	10.5%
Experience	Less than 5 years	49	23.4%
	5–less than 10	63	30.1%
	10–less than 15	40	19.1%
	15–less than 20	35	16.7%
	20 and above	22	10.5%
Industry sector	Pharmaceutical and medical	14	6.7%
	Chemical and cosmetic	34	16.3%
	Food and beverages	48	23.0%
	Leather and garment	17	8.1%
	Plastic and rubber	21	10.0%
	Electrical and IT	35	16.7%
	Machinery and hardware	30	14.4%
	Others	10	4.8%
Number of employees	Less than 100	58	27.8%
	100–less than 200	122	58.4%
	200–less than 300	14	6.7%
	300 and above	15	7.2%
Total		209	100%

3.2. Measurement

The measurement of variables in this study was carefully conducted by drawing upon relevant works and the preceding literature. The survey questionnaire was initially designed in English and then later translated into Arabic to ensure accessibility and comprehensibility for the respondents [60]. The adapted measurement scales used in the survey showed sufficient levels of reliability in the original published studies, thus providing content validity for the constructs [58]. To further assess the face validity, the questionnaire underwent evaluation by 10 academics specializing in POM and SCM and five managers with ample knowledge and experience in manufacturing firms. Their feedback was taken into consideration, and necessary refinements were made to improve the questionnaire's clarity and relevance.

For the measurement of POM, the authors distinguished between three dimensions: TQM, JIT, and PCD. To capture the scale of the POM practices, 12 items were adapted from previous studies on manufacturing firms [15–17,20,40]. For the mediating effect of SCM integration, a 10-item scale was adapted from recent studies [57,58]. This scale assesses the degree of SCM integration within the organization. Participants were asked to rate their agreement or disagreement with each item on a five-point Likert scale, where 1 represented "strongly disagree" and 5 indicated "strongly agree". Finally, the measurement of OFP utilized a scale composed of three items, which were adopted from previous studies [14,74]. Participants were asked to evaluate their performance relative to their competitors using a five-point Likert scale, where 1 denoted "much worse" and 5 indicated "much better".

3.3. Common Method Variance

In this study, the researchers were mindful of the potential issue of common method variance (CMV) due to the data collection approach [81], where data was obtained from a single informant in each participating company through self-reported questionnaires [82]. To address this concern, the researchers employed Harman's single-factor test [83] to assess the presence of CMV in the collected data. In this test, all the items from the research variables are subjected to a factor analysis together. If a single factor emerges and explains a large proportion (more than 50%) of the variance in the data, it indicates the potential presence of CMV. The results of Harman's single-factor test in this study revealed that no single factor emerged from the factor analysis. Additionally, the largest factor explained about 33% of the variance, which is well below the 50% threshold. This finding indicates that there were no significant concerns regarding CMV in the collected data.

3.4. Statistical and Analytic Approaches

To address the research questions, this study used structural equation modeling (SEM), which has been widely recognized as a robust statistical technique in operations management research for its ability to comprehensively analyze complex relationships among latent constructs [84]. As Kline [85] emphasized, SEM enables the assessment of both direct and indirect effects within a unified framework, making it particularly suited for investigating intricate phenomena such as the impact of POM practices on OFP mediated by SCM integration. Moreover, SEM provides a means through which to address measurement error and to account for unobservable constructs effectively [86]. In this study, SEM was chosen as the analytical tool through which to evaluate the relationships between latent constructs—namely POM practices, SCM integration, and OFP—in alignment with the established practices in the social sciences [87]. The comprehensive nature of SEM, coupled with its ability to evaluate model fit [88], makes it an ideal choice for scrutinizing the interplay between these constructs, thereby enhancing the robustness and depth of our empirical analysis.

4. Analysis and Results

4.1. Measurement Model Assessment

The researchers conducted a structural equation modeling (SEM), as proposed by Anderson and Gerbing [89], and the analysis was conducted using Amos 24.0 to evaluate the validity and reliability of the constructs used in the study. The final measurement items, along with the results of the validity and reliability tests, are reported in Table 2. First, a confirmatory factor analysis (CFA) was conducted to check the convergent validity of the study variables and to assess the measurement model's fit. Items that showed factor loadings of at least 0.50 were retained, providing evidence for measurement scales [90]. Furthermore, all items in the measurement scales were statistically significant ($p < 0.01$), supporting the requirements for convergent validity [90].

Table 2. Measurement model results.

First-Order Constructs	Second-Order Constructs	Items	Mean	Std. dev.	Factor Loadings	Cronbach's Alpha Values	CR	AVE
Total Quality Management (TQM)						0.72	0.75	0.52
		TQM1	3.72	0.91	0.74			
		TQM2	3.76	0.99	0.65			
		TQM3	3.60	0.98	0.67			
		TQM4 *	3.77	2.38	-			
		TQM5	3.69	1.04	0.66			
Just-in-Time Inventory (JIT)						0.71	0.73	0.54
		JIT1	3.18	1.14	0.78			
		JIT2	3.19	1.17	0.60			
		JIT3	3.13	1.09	0.61			
Process and Capacity Design (PCD)						0.74	0.77	0.53
		PCD1	4.01	1.01	0.64			
		PCD2 *	2.57	1.42	-			
		PCD3	4.02	1.05	0.90			
		PCD4	3.61	1.06	0.69			
	Production and Operations Management (POM)					0.73	0.76	0.53
		TQM	3.71	0.87	0.92			
		JIT	3.16	0.90	0.67			
		PCD	3.55	0.75	0.51			
Supply Chain Management Integration (SCI)						0.92	0.93	0.57
		SCI1	3.00	1.09	0.68			
		SCI2	3.30	1.11	0.79			
		SCI3	3.41	1.09	0.76			
		SCI4	3.44	1.05	0.75			
		SCI5	3.39	1.14	0.85			
		SCI6	3.29	1.15	0.83			
		SCI7	3.26	1.08	0.78			
		SCI8	3.28	1.01	0.63			
		SCI9	3.29	1.10	0.77			
		SCI10	3.36	1.07	0.79			
Organizational Financial Performance (OFP)						0.80	0.82	0.56
		OFP1	3.01	1.19	0.78			
		OFP2	3.29	1.06	0.75			
		OFP3	3.62	1.16	0.71			

Note(s): Composite reliability (CR), average variance extracted (AVE), and * item related due to low factor loading.

The overall measurement model exhibited satisfactory fit indices: $\chi^2 = 405.736$, df = 193, $\chi^2/df = 2.102$, comparative fit index (CFI) = 0.911, Tucker–Lewis index (TLI) = 0.900, incremental fit index (IFI) = 0.912, standardized root mean square residual (SRMR) = 0.069, and a root

mean square error of approximation (RMSEA) = 0.073. These fit indices indicate that the model adequately captures the relationships between the observed variables and the latent constructs [88,91]. The average variance extracted (AVE) for each measurement scale was also computed (Table 2), and all values exceeded the recommended cut-off value of 0.50 [92]. This further supports convergent validity, indicating that the measurement scales accurately measure their respective constructs.

Second, reliability analyses were conducted to assess the internal consistency and reliability of the measurement scales. Both composite reliability (CR) and Cronbach's alpha coefficients were calculated for each of the five constructs used in the study (Table 2). The values of both CR and Cronbach's alpha for all constructs exceeded the suggested threshold of 0.70, indicating that the measures are internally credible, reliable, and consistent [90,92,93].

To evaluate discriminant validity as a final step of the measurement model, the researchers followed the recommendations of Fornell and Larcker [92]. To establish discriminant validity, it was necessary to ensure that the square root of the AVE value for each construct was greater than its correlation with other constructs [92]. As shown in Table 3, the square root of the AVE value for each construct exceeded the correlation values with other constructs, confirming that the measurement scales accurately differentiated between the different constructs. Thus, the requirement for discriminant validity was met for all the constructs (Table 3).

Table 3. Discriminant validity results.

Factors	1	2	3
1. Supply chain management integration	**0.747**		
2. Organizational financial performance	0.557 ***	**0.749**	
3. Production and operations management	0.556 ***	0.725 ***	**0.722**

Note(s): Square root of average variance extracted (AVE) is shown on the diagonal (in bold) of the matrix; the inter-construct correlations are shown off the diagonal; and *** significant at level of 0.001.

4.2. Structural Model Assessment

In the structural model assessment, the researchers employed SEM using AMOS 24 to test the hypotheses and examine the relationships between the variables. The model fit statistics showed acceptable values, indicating that the model adequately fits the data (χ^2 = 15.285, df = 6, χ^2/df = 1.548, CFI = 0.989, TLI = 0.915, IFI = 0.988, RMR = 0.026, and RMSEA = 0.066). As depicted in Figure 2 and reported in Table 4, the results revealed significant direct impacts of POM practices on SCM integration (β = 0.508, p = 0.001), supporting H1. This suggests that POM practices positively influence the level of SCM integration within the organization.

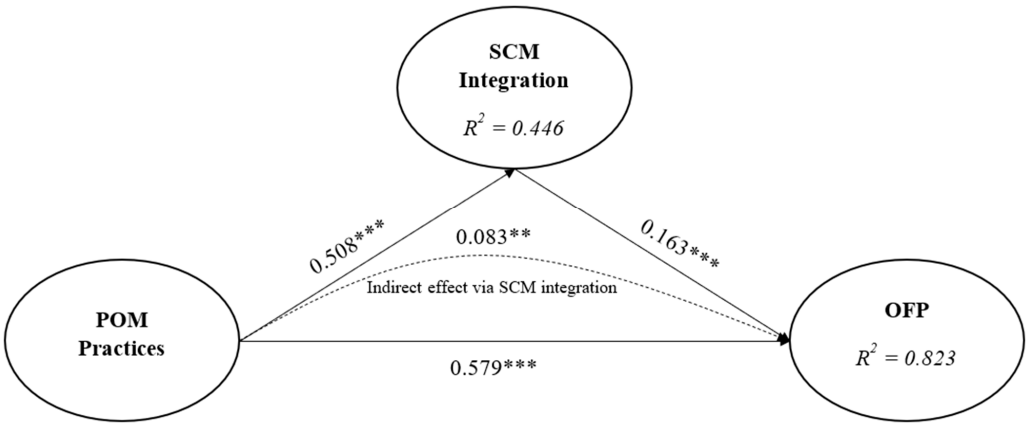

Figure 2. Structural model results. Note(s)—**: $p < 0.010$, ***: $p < 0.001$; solid arrows: direct effect; and dashed arrows: indirect effect.

Table 4. Direct effect results.

Direct Effect	Standardized Coefficients	Standard Errors	t-Values	*p*-Values	Decision
H1: POM practices → SCM integration	0.508 ***	0.067	8.488	0.001	Supported
H2: POM practices → OFP	0.579 ***	0.095	10.853	0.001	Supported
H3: SCM integration → OFP	0.163 ***	0.063	4.161	0.001	Supported

Note(s): Production and operation management (POM), supply chain management (OFP), organizational financial performance (OFP), and *** statistically significant at $p < 0.001$.

Additionally, the impact of POM practices on OFP was found to be positive and significant (β = 0.579, $p = 0.001$), thus providing support for H2. This implies that effective POM practices contribute positively to the organization's financial performance. Moreover, this study found positive and significant impacts of SCM integration on OFP (β = 0.190, $p = 0.001$), thus confirming H3. This indicates that a higher level of SCM integration is associated with improved organizational financial performance.

Finally, a mediation analysis was conducted to explore the role of SCM integration as a mediator in the relationship between POM practices and OFP. The researchers applied bootstrapping re-sampling procedures using AMOS 24 [94], following the procedures outlined by Hayes [95]. The analysis involved generating 5000 bootstrapping samples with confidence intervals (CIs) set at the 95% level. The significance of the indirect effect was evaluated through the lower bound (LB) and upper bound (UB) of the bias-corrected CIs. If both limits of the CI do not include zero, it provides support for the alternative hypothesis, thus indicating with 95% confidence that the intervening impact is not equal to zero.

The results of the mediation analysis showed that SCM integration partially mediated the impact of POM practices on OFP. As shown in Table 5, the mediation impact of the SCM integration on the impact of POM on OFP was found to be 0.083, with the CI_{LB} at 0.075 and the CI_{UB} at 0.243. This indicated that SCM integration plays a significant role in transmitting the impact of POM practices on OFP. To compute the total impact of POM on OFP, both the direct and indirect impacts of POM on OFP were summed. The total impact of POM on OFP was calculated to be 0.662, which is the sum of the direct impact of POM on OFP (0.579) and the indirect impact mediated by SCM integration (0.083). These findings demonstrate the importance of SCM integration in influencing the relationship between POM practices and OFP.

Table 5. Indirect effect results.

Hypothesized Path	Indirect Effect	Lower Bound	Upper Bound	*p*-Values	Results
H4: POM practices → SCM integration → OFP	0.083 **	0.075	0.243	0.002	Supported
Total: POM practices → OFP	0.662 ***	0.576	0.759	0.001	Partial mediation

Note(s): Production and operation management (POM), supply chain management (OFP), organizational financial performance (OFP), ** statistically significant at $p < 0.010$, and *** statistically significant at $p < 0.001$.

5. Discussion and Implications

The results of the structural model assessment provide valuable insights into the relationships between POM practices, SCM integration, and organizational financial performance. The significant findings highlight the importance of effective POM practices in fostering SCM integration and enhancing the organization's financial performance. This evidence contributes to a better understanding of the mechanisms through which POM and SCM practices can lead to improved financial outcomes for the organization. Additionally, the partial mediation effect indicates that while POM practices have a direct impact on OFP, part of this impact is also transmitted through SCM integration. Understanding this

mediation mechanism provides valuable insights for organizations seeking to improve their financial performance by enhancing both POM and SCM integration practices. Overall, the mediation analysis contributed to a comprehensive understanding of the complex interplay between POM practices, SCM integration, and OFP.

5.1. Discussion

The findings of this study show that POM practices positively influence SCM integration (Hypothesis 1), indicating that organizations that excel in POM are more likely to have integrated and efficient supply chains. This aligns with the RBV theory's emphasis on the strategic importance of unique resources in gaining competitive advantages [25,60,96,97]. By integrating POM practices with SCM, organizations can create a distinctive capability that leads to improved supply chain coordination, reduced lead times, and enhanced responsiveness to market demands [98,99]. Moreover, the study demonstrates the positive impact of POM practices on OFP (Hypothesis 2), emphasizing the financial benefits organizations can reap by focusing on efficient production and operations. This is in line with prior research that has shown a strong link between POM practices and financial performance [49,53]. The positive relationship between POM and OFP further reinforces the idea that operational excellence and effective production management are crucial drivers of overall organizational success and profitability [50,100].

Finally, the study's findings provide empirical evidence that SCM integration acts as a mediator, thereby transmitting the positive effects of POM practices on OFP (Hypotheses 3 and 4). This is consistent with prior research that has emphasized the role of supply chain integration in enhancing organizational performance [52,70,101]. SCM integration facilitates better collaboration, communication, and coordination among supply chain partners, thus leading to improved operational efficiency, reduced lead times, and enhanced customer satisfaction [57]. These factors contribute to the positive and significant mediation effect observed in this study. Furthermore, the mediation effect of SCM integration on POM practices and OFP highlights the importance of developing a holistic and interconnected approach to managing production, operations, and supply chain activities. Organizations should recognize that their POM practices and supply chain integration are interdependent and should be strategically aligned to achieve optimal performance outcomes [102]. This aligns with the contingency theory, which posits that organizations should adapt their practices to fit the specific demands and challenges they face [103,104]. Integrating POM and SCM practices allows organizations to respond more effectively to market dynamics, customer demands, and competitive pressures.

5.2. Theoretical Implication

This study contributes significant theoretical implications by filling important gaps in the existing literature on the relationships between POM practices, SCM integration, and OFP. First, the study addresses the critical gap of integrating POM practices and SCM integration in the context of organizational financial performance. While prior research has examined these concepts in isolation [41], this study offers a comprehensive analysis of their interplay, shedding light on how organizations can enhance financial outcomes through an integrated approach [6]. By demonstrating that effective POM practices positively influence SCM integration and, in turn, enhance financial performance, this study provides a more holistic understanding of the strategic implications for organizations seeking to optimize their operations and supply chain management strategies [2,18,29,30]. Second, this study bridges the gap in previous research by identifying and testing the mediation effect of SCM integration on the relationship between POM practices and OFP. This aspect has been overlooked in many studies that have examined the impact of POM practices on financial performance [8,15,40,47,78]. By revealing that SCM integration serves as a significant mediator, this study uncovers a crucial mechanism through which POM practices influence financial outcomes. This finding provides deeper insights into the underlying dynamics

and emphasizes the strategic importance of SCM integration in transmitting the positive effects of POM practices to organizational financial performance.

Third, this study validates and extends theoretical frameworks such as the RBV [26,27,97,98,105] and operation strategy concept [18,29,30,106] in the context of POM practices, SCM integration, and OFP. By empirically demonstrating the positive impact of POM practices on SCM integration and financial performance, as well as the mediating role of SCM integration, this study provides strong support for these theoretical perspectives. This validation enhances their applicability and relevance in real-world settings, reinforcing the notion that organizations can achieve a sustainable competitive advantage through effective POM practices and strategic SCM integration. This finding is consistent with recent research [26,60,107–110], which suggests that firms can gain a sustainable competitive advantage by leveraging their unique resources and capabilities. In the context of this study, the effective implementation of POM practices can be considered as a valuable resource for organizations. These practices, such as TQM, JIT, and PCD, enable organizations to improve operational efficiency, quality, and coordination in their production processes [15,16,20]. Lastly, this study fills a contextual gap in the literature by focusing on Jordanian manufacturing firms [54,58,60]. While previous research has largely centered on Western contexts [18,35,51,52,55,111,112], this study contributes valuable insights into how the proposed relationships hold in a unique geographical and industrial context. By examining these relationships in Jordan, the study offers nuanced findings that contribute to the understanding of the implications for organizations operating in similar environments. This contextual relevance enhances the study's generalizability and practical implications for organizations in the region.

5.3. Managerial Implications

The findings of this study offer practical implications that can guide managers in improving their organizations' performance through effective POM practices and SCM integration. Firstly, this study highlights the significance of integrating POM practices with SCM activities to achieve greater operational efficiency and responsiveness. Managers should prioritize aligning their production processes with their supply chain strategies to optimize resource utilization and minimize wastage. By fostering collaboration among different departments and supply chain partners, organizations can enhance the flow of information and materials, thus leading to improved lead times and customer satisfaction [70]. Implementing cross-functional teams and sharing information in real-time can facilitate a seamless production and supply chain process, thereby positively impacting overall performance. Secondly, this study underscores the importance of strategic investment in POM practices to enhance OFP. Managers should consider adopting TQM principles to ensure that quality is maintained throughout the production process. Additionally, implementing JIT manufacturing practices can help reduce inventory costs and improve production flexibility. Furthermore, PCD practices can aid in streamlining production processes and reducing lead times. By strategically investing in these POM practices, organizations can achieve cost savings and gain a competitive advantage, leading to improved financial outcomes. Finally, this study emphasizes the crucial role of SCM integration in transmitting the impact of POM practices to OFP. Managers should focus on creating a well-integrated supply chain that facilitates seamless communication and collaboration among all supply chain partners. This can be achieved by adopting advanced information systems, supplier integration programs, and effective logistics and transportation management. An integrated supply chain enables organizations to respond quickly to market changes, reduce operational costs, and enhance overall supply chain efficiency, thereby positively influencing financial performance.

5.4. Limitations and Directions for Future Research

This study has several limitations that should be acknowledged. Firstly, the cross-sectional design of the study only allows for the examination of relationships between

variables at a specific point in time. As a result, causality cannot be established definitively. Future research could adopt a longitudinal approach to observe changes in POM practices, SCM integration, and financial performance over time. Longitudinal studies would provide more robust evidence of causal relationships and offer deeper insights into the dynamics of these relationships over the long term. Secondly, this study only examined the mediating role of SCM integration in the relationship between POM practices and financial performance. There may be other potential mediators that were not considered in this study. Future research could explore additional mediators—such as organizational culture, innovation capabilities, or information technology adoption—to provide a more comprehensive understanding of the mechanisms through which POM practices impact financial performance. Lastly, while the study measured SCM integration using a single scale, the concept of SCM integration utilized was multifaceted [49]. Future research could adopt a more comprehensive approach to measure SCM integration, one that considers multiple dimensions and levels of integration, such as internal, external, and supplier–customer integrations [61]. This would provide a more nuanced understanding of the various aspects of SCM integration and their specific impact on financial performance.

6. Conclusions

To conclude, this study has delved into the intricate relationships among POM practices, SCM integration, and OFP within the context of Jordanian manufacturing firms. Our findings underscore the significant influence of POM practices on both SCM integration and OFP, validating their role as critical drivers of operational efficiency and financial success. Importantly, our research establishes SCM integration as a crucial mediator, thereby highlighting its pivotal function in translating effective POM practices into enhanced financial performance. These insights offer valuable guidance to practitioners in the Jordanian manufacturing sector, emphasizing the importance of aligning production strategies with supply chain integration efforts to achieve sustained competitive advantage and superior financial outcomes. This study not only advances academic understanding, but also provides a practical framework for organizations seeking to thrive in today's competitive business landscape by optimizing their production and supply chain operations.

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