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RESEARCH ARTICLE

Linking Agile Strategy to Sustainability-Oriented Innovation Through the Learning Organization: An AMO Theory Perspective

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ABSTRACT

Managing sustainability-oriented strategies remains a persistent challenge for organizations operating in dynamic environments. Drawing on Ability–Motivation–Opportunity (AMO) theory, this study examines the relationship between agile strategy (AS) and sustainability-oriented innovation (SOI), highlighting the mediating role of the learning organization (LO). Data were collected from a stratified random sample of 303 senior and middle managers in Jordanian public shareholding industrial companies (JPSICs) using a structured questionnaire. The data were analyzed using SmartPLS 3.3.9 and SPSS 25. The results indicate that AS has a positive and significant effect on SOI and significantly enhances the development of a learning organization. Moreover, LO fully mediates the relationship between AS and SOI, suggesting that agile strategies contribute to sustainability-oriented innovation primarily by strengthening employees' abilities, motivation, and opportunities for continuous learning and knowledge sharing. These findings extend AMO theory to the sustainability and innovation literature and demonstrate that embedding agility within a learning-oriented context is critical for translating strategic flexibility into sustainable innovation outcomes, particularly in emerging economies.

INTRODUCTION

Organizations have long faced accelerating environmental, technological, and market change; however, the pace and complexity of recent transformations have rendered traditional approaches to strategic planning increasingly inadequate (Sibony et al., 2017). Conventional strategy models—largely based on prediction, linear planning, and stability assumptions—struggle to cope with high uncertainty, rapid digitalization, and sustainability pressures (Morrison et al., 2019). As a result, the very viability of long-range strategic planning has been questioned, prompting organizations to seek more adaptive and iterative strategic approaches (Morrison, 2013).

Agile strategy (AS) has emerged as a response to this challenge. Rather than emphasizing static plans, AS focuses on continuous adjustment, experimentation, and learning in response to environmental change (Munteanu et al., 2020). In digitally intensive and volatile contexts, agile strategy has become a critical organizational capability, enabling firms to sense changes early, reconfigure resources rapidly, and sustain competitiveness (Parker Gates & PA, 2021). Yet, beyond competitiveness, organizations now face a more profound dilemma: how to remain agile while simultaneously achieving long-term sustainability and minimizing negative environmental and social impacts (Bos-Brouwers, 2010; Schiederig et al., 2012).

Sustainability has moved from a peripheral concern to a central strategic imperative. A sustainable organization not only survives economically but also generates positive environmental and social outcomes while maintaining a clear long-term strategic direction (Cândea, 2007). Integrating

sustainability into strategy reflects ethical responsibility and shapes organizational values, influencing both current and future employees (Almansoori & Nobanee, 2019). Importantly, sustainability-oriented practices increasingly align with economic performance, corporate reputation, and quality improvement, thereby reinforcing the business case for sustainability (Aguinis & Glavas, 2012; Kuckertz & Wagner, 2010).

Within this context, innovation plays a pivotal role. Sustainability-oriented innovation (SOI) refers to the development of products, processes, organizational practices, and business models that simultaneously improve environmental and social performance while maintaining economic viability (Tseng et al., 2019). SOI encompasses resource efficiency, cleaner production, and novel value propositions, positioning sustainability as a driver—rather than a constraint—of innovation (Klewitz & Hansen, 2014). Although prior research has examined sustainable, green, and sustainability-driven innovation from multiple perspectives (Kiron et al., 2011; Wagner, 2010), the mechanisms through which strategic approaches enable SOI remain underexplored, particularly in emerging economy and industrial settings (Adams et al., 2016; Cosenz et al., 2020).

A critical yet underexamined mechanism is the learning organization (LO). Embedding sustainability and agility into organizational routines requires continuous learning, knowledge sharing, and capability development. From an Ability–Motivation–Opportunity (AMO) perspective, agile strategies may enhance employees' abilities, motivate engagement with sustainability goals, and create opportunities for experimentation and innovation—effects that are institutionalized through learning organization practices. However, empirical evidence linking agile strategy, learning organization, and sustainability-oriented innovation remains limited.

Addressing this gap, the present study investigates the impact of AS on SOI, with particular attention to the mediating role of LO, within the context of JPSICs. By doing so, the study contributes to the strategic sustainability literature by clarifying how and through which organizational mechanisms agile strategies translate into sustainability-oriented innovation outcomes, offering insights relevant to both theory and practice in emerging economy contexts.

LITERATURE REVIEW

Theoretical Framework: Ability–Motivation–Opportunity (AMO) Theory

This study is grounded in AMO theory originally developed by Appelbaum et al. (2000). AMO theory posits that organizational performance is a function of employees' abilities (skills and knowledge), motivation (willingness to exert effort), and opportunities (structural and social conditions that enable participation). Performance outcomes are maximized when managerial practices systematically enhance all three dimensions through coherent high-performance work systems.

Within strategic and sustainability research, AMO theory provides a robust micro–macro explanatory lens by linking managerial practices to discretionary employee behaviors that drive organizational outcomes (Li et al., 2019; Wagner, 2010). Rather than treating strategy as a top-down planning exercise, AMO emphasizes how strategy is enacted through people, learning processes, and organizational systems—an approach particularly relevant in dynamic and sustainability-driven contexts.

Agile strategy aligns closely with the AMO logic. From an ability perspective, agile strategy emphasizes continuous skill development, experimentation, and problem-solving capabilities that allow employees to respond to environmental uncertainty (Alavi & Wahab, 2013). Through iterative planning and feedback loops, agile strategy strengthens employees' cognitive and technical competencies needed to identify sustainability challenges and innovation opportunities. From a motivation perspective, agile strategy fosters intrinsic motivation by empowering employees, encouraging initiative, and aligning strategic goals with meaningful outcomes, including environmental and social responsibility. From an opportunity perspective, agile strategy creates organizational structures—such as cross-functional collaboration, rapid decision-making,

and decentralized authority—that enable employees to actively contribute ideas, share knowledge, and participate in innovation processes.

Prior research suggests that AMO-based systems are particularly effective when change is driven through employee-centered learning rather than purely managerial control (Bos-Nehles et al., 2013). Managers play a critical role in reinforcing AMO mechanisms by providing organizational support, facilitating learning, and enabling participation in strategic initiatives (Bainbridge, 2015; Marin-Garcia & Tomas, 2016). This perspective is especially salient in sustainability contexts, where environmental objectives cannot be achieved through technology alone but require employee engagement and behavioral change (Daily & Huang, 2001; Zhu et al., 2008).

Sustainability-oriented innovation further reinforces the relevance of AMO theory. Translating environmental knowledge into innovative outcomes depends on employees' green skills (ability), incentives and values aligned with sustainability (motivation), and opportunities to contribute to environmental decision-making and innovation activities (opportunity) (Siguaw et al., 2006). While green technologies are essential, their successful implementation relies on organizational learning, employee involvement, and knowledge-sharing mechanisms (Sherehiy et al., 2007; Söderholm, 2020).

In this study, LO represents the institutionalization of AMO mechanisms. LO practices embed continuous learning (ability), foster a shared commitment to improvement (motivation), and provide participatory structures for knowledge exchange and experimentation (opportunity). Accordingly, AMO theory offers a coherent explanation of how agile strategy influences sustainability-oriented innovation indirectly by shaping a learning-oriented organizational context.

By integrating AMO theory with AS and SOI, this study advances a theoretically grounded framework that explains not only whether agile strategies support sustainability outcomes, but how these effects materialize through learning and people-centered organizational processes—an issue of central relevance to strategy and sustainability scholarship.

The agile strategy (AS)

Although traditional strategic planning and agile practices originate from different paradigms, they can be effectively integrated through agile strategy (AS). AS emphasizes achieving strategic intent through continuous learning, experimentation, and innovation while maintaining coherence with organizational boundaries and long-term objectives (Alshurideh et al., 2023; Lyngso, 2017; Srinivasan et al., 2020). Rather than relying on rigid long-range plans, agile strategy addresses the growing gap between strategy formulation and implementation by fostering openness, adaptability, and iterative decision-making (Fuertes et al., 2020).

A reframes strategy as a process of strategic discovery rather than a static planning exercise. Through iterative cycles of sensing, testing, and learning, organizations continuously refine strategic choices based on real-time evidence and feedback (Srinivasan et al., 2020; Tsilionis & Wautelet, 2022). This approach enables leaders and teams to remain receptive to emerging insights, environmental shifts, and stakeholder expectations—capabilities that are increasingly critical in sustainability-oriented contexts.

When embedded across organizational practices, AS extends beyond software development to encompass strategy formulation, execution, change management, and performance management systems (Ragas & Ragas, 2021). In doing so, AS becomes a key driver of organizational agility by aligning short decision cycles with business velocity while maintaining strategic coherence (Spagnoletti et al., 2021). Agile organizations prioritize value creation through frequent reassessment of goals, rapid execution, and continuous improvement, allowing them to sustain strategic momentum under conditions of uncertainty (Ahmed, 2022; Wiraeus & Creelman, 2019).

From an AMO theory perspective, AS activates critical performance mechanisms. AS enhances ability by promoting learning-by-doing, experimentation, and problem-solving skills; strengthens

motivation by empowering employees and aligning strategic goals with meaningful outcomes; and expands opportunity by enabling cross-functional collaboration, decentralized decision-making, and participation in strategy execution. These mechanisms collectively create conditions under which employees can actively contribute to innovation and sustainability initiatives.

Importantly, agility does not imply the absence of planning. Instead, AS balances flexibility with stability by combining clear strategic intent with adaptive execution (Francis, 2017; Francis, 2020). This balance distinguishes agile organizations from reactive ones and enables firms to integrate sustainability considerations into strategic decisions without sacrificing responsiveness. By continuously aligning strategy, learning, and execution, agile strategy provides a critical foundation for SOI.

Sustainability-oriented innovation (SOI)

Innovation is widely recognized as a central mechanism through which firms achieve long-term sustainability, competitiveness, and value creation (Bansal et al., 2012; Hansen et al., 2009; Schaltegger & Wagner, 2011). Beyond incremental improvements, sustainability-oriented innovation (SOI) reflects a strategic commitment to integrating environmental and social objectives into innovation processes while maintaining economic viability (Hansen et al., 2009; Tseng et al., 2019). Accordingly, SOI extends conventional innovation by embedding sustainability considerations into products, processes, organizational practices, and business models.

SOI encompasses innovations that are novel to the firm and successfully implemented in the market or organizational processes, whether developed internally or adopted externally (Jaumotte & Pain, 2005; Arsawan et al., 2022). Such innovations enable firms to improve resource efficiency, reduce environmental impacts, and respond proactively to regulatory, stakeholder, and market pressures (Konar & Cohen, 2001; Opal & Nicholls, 2005). From a strategic perspective, SOI is increasingly viewed as a source of competitive advantage rather than a compliance-driven cost (Schaltegger & Wagner, 2011).

Prior literature identifies three interrelated domains through which SOI contributes to corporate sustainability: (1) resource optimization, including process efficiency and circular practices such as reducing, reusing, and recycling; (2) stakeholder and legitimacy enhancement, achieved through compliance, transparency, and responsible engagement; and (3) business model innovation, targeting environmentally conscious market segments willing to reward sustainable value propositions (Özkan & Ağ, 2021). These domains highlight that SOI is not limited to technological change but also involves organizational and strategic transformation.

Early discussions of SOI emerged from research on environmental innovation, defined as new or improved products, processes, or organizational methods that reduce negative environmental impacts (Beise & Rennings, 2005; Rennings et al., 2006). Environmental innovations—spanning product, process, and organizational dimensions—have been shown to support employment, ecological performance, and long-term sustainability (Carrillo-Hermosilla et al., 2010). More recent perspectives emphasize that SOI is a dynamic and cumulative process, involving continuous improvement rather than one-time radical change (Cosenz et al., 2020).

From an AMO theory perspective, SOI represents a performance outcome that depends on employees' ability to generate and apply knowledge, motivation to pursue sustainability goals, and opportunity to participate in innovation-related decision-making and implementation. Strategic planning and execution mechanisms that align resources, reduce uncertainty, and support iterative experimentation are therefore critical enablers of SOI (Battistella et al., 2017). AS, in particular, support SOI by enabling incremental, learning-driven, and adaptive innovation processes that respond effectively to environmental and market turbulence (Mani & Mishra, 2020).

Drawing on these arguments, this study posits that AS provides a strategic foundation for SOI by fostering the capabilities, incentives, and participatory structures necessary for embedding sustainability into organizational innovation outcomes.

Table 1: Reference-to-Theory Mapping: AMO → AS → LO → SOI

Theoretical Layer	Key Construct	Conceptual Role in the Model	Representative References
Foundational Theory	**AMO Theory**	Explains how managerial practices enhance employee abilities, motivation, and opportunities, enabling strategic execution and innovation	Bainbridge (2015); Marin-Garcia & Tomás (2016); Edgar et al. (2021)
Strategic Capability	**AS**	Dynamic strategic capability enabling rapid sensing, flexible decision-making, and adaptive resource deployment in turbulent environments	Lee et al. (2015); Battistella et al. (2017); Ahmed (2022); Morrison et al. (2019)
Organizational Mechanism	**LO**	Converts agile strategic intent into sustained action through knowledge sharing, continuous learning, and collective sense-making	Armanious (2019); Armanious & Padgett (2021); Iqbal & Ahmad (2021); Chen & Cuervo (2022)
Innovation Outcome	**SOI**	Innovation outcomes that integrate environmental, social, and economic objectives into products, processes, and business models	Adams et al. (2016); Klewitz & Hansen (2014); Bos-Brouwers (2010); Hansen et al. (2009)
Capability Link	**AS → LO**	Agile strategies require a learning-oriented culture to be internalized and routinized across the organization	López-Alcarria et al. (2019); Forés & Camisón (2016)
Outcome Link	**LO → SOI**	Learning mechanisms facilitate experimentation, knowledge recombination, and sustainability-focused innovation	Carrillo-Hermosilla et al. (2010); Tseng et al. (2019); Arsawan et al. (2022)
Integrated Path	**AMO → AS → LO → SOI**	Managers enable agility (AS) by enhancing employee ability, motivation, and opportunity, which—through LO practices—culminates in sustainability-oriented innovation	

The AS and LO

In a dynamic digital economy, organizational agility has become a critical determinant of competitiveness. AS enables organizations to respond rapidly to environmental turbulence by encouraging experimentation, flexibility, and continuous adaptation. Such responsiveness, however, depends fundamentally on the presence of a learning-oriented organizational context that supports knowledge acquisition, reflection, and capability development (Rigolizzo, 2019). Agile core competencies are therefore cultivated through knowledge workers who actively interpret environmental signals and translate them into adaptive strategic responses (Armanious & Padgett, 2021).

LO are characterized by continuous learning and transformation at individual, team, and organizational levels. By embedding learning into everyday practices, LO enhance organizational responsiveness and facilitate ongoing strategic renewal. Continuous learning enables organizations to revise assumptions, adjust strategic priorities, and transform knowledge, attitudes, and behaviors in ways that support innovation and long-term growth (Forés & Camisón, 2016). In such contexts, organizational experiences—whether successful or unsuccessful—are systematically leveraged as learning opportunities that reinforce agility.

From a strategic perspective, AS creates the conditions under which learning can flourish by promoting openness, experimentation, and decentralized decision-making. However, agile intent alone is insufficient to generate sustained innovation outcomes unless it is supported by a learning infrastructure that enables employees to enact agile principles in practice. Prior studies have shown that LO function as key mechanisms through which strategic orientations are translated into organizational performance and innovation outcomes (Chen & Cuervo, 2022; Iqbal & Ahmad, 2021).

Accordingly, this study argues that LO plays a pivotal mediating role in the relationship between agile strategy and sustainability-oriented innovation. By fostering continuous learning, shared

understanding, and knowledge exchange, LO institutionalize agility and enable organizations to align strategic flexibility with sustainability objectives.

RESEARCH HYPOTHESES

Drawing on the above theoretical arguments, the following hypotheses are proposed:

H1*: Agile strategy is positively related to sustainability-oriented innovation (**AS → SOI**).*

H2*: Agile strategy is positively related to the development of a learning organization (**AS → LO**).*

H3*: The learning organization mediates the relationship between agile strategy and sustainability-oriented innovation (**AS → LO → SOI**).* The conceptual framework illustrating these hypothesized relationships is presented in Figure 1.

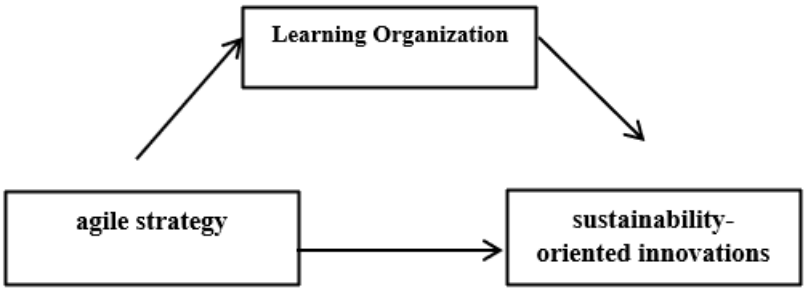

Figure 1. Theoretical framework.

METHODOLOGY

Sample and Data Collection Procedure

Data were collected through a self-administered questionnaire between April and November 2022. The study population comprised all 56 JPSICs, identified using data from the Securities Depository Center of Jordan (SDC-Jordan, 2021). A stratified random sampling approach was employed to ensure adequate representation across organizations.

Senior and middle managers were targeted as respondents due to their central role in strategy formulation, implementation, and organizational learning processes. A total of 350 questionnaires were distributed, of which 303 valid responses were returned and used for analysis, yielding a response rate of 86.5%. This response rate exceeds commonly accepted thresholds for survey-based research and indicates a high level of data reliability (Sekaran, 2016).

Measurement Instruments

The questionnaire consisted of three main constructs and a demographic section. Demographic variables included respondents' age, gender, educational level, managerial position, and organizational age (see Table 1).

AS was measured using items reflecting four strategic applications: deep and broad environmental scanning, strategic commitment, full deployment, and a flexible performance scoreboard, adapted from established strategy models (Model, 2017).

SOI was assessed across three dimensions: product, process, and organizational innovation, consistent with the sustainability and innovation literature.

LO was measured using the diamond model, which captures core learning dimensions at multiple organizational levels (Moilanen, 2001). All construct items were measured using a five-point Likert scale, ranging from 1 ("strongly disagree") to 5 ("strongly agree").

DATA ANALYSIS

Data analysis was conducted using SmartPLS 3.3.9 and SPSS 25. Following recommended procedures for partial least squares structural equation modeling (PLS-SEM), analysis proceeded in two stages: assessment of the measurement model and evaluation of the structural model (Hair et al., 2023). Prior to model estimation, preliminary analyses were performed, including response rate evaluation, descriptive statistics, and data screening. Tests for missing values, outliers, normality, and multicollinearity indicated that the dataset met the assumptions required for multivariate analysis. These results confirmed the suitability and robustness of the data for subsequent hypothesis testing.

RESULTS

Demographic Profile of the Respondents

As Table 2 summarizes the demographic characteristics of the respondents. The majority of participants were aged 41–50 years (43.2%), followed by those aged 30–40 years (29.4%) and 51–60 years (20.8%). Respondents aged over 60 accounted for 4.6%, while those under 30 represented 2.0% of the sample. Male respondents constituted 72.6% of the sample. In terms of educational attainment, 57.4% held a bachelor's degree, 23.8% a master's degree, 15.2% a higher diploma, and 3.6% a PhD. Regarding managerial position, 37.6% of respondents occupied senior management roles, while 62.4% were in middle management.

With respect to organizational age, 41.6% of respondents worked in firms younger than 20 years, whereas 58.4% were employed in organizations operating for more than 20 years. Overall, the demographic distribution indicates a well-qualified and experienced managerial sample suitable for examining strategic and sustainability-related organizational practices.

Table 2: Demographic profile of the respondents (N=303).

Variable	Category	Frequency	Percentage
Age	< 30	6	2.0
	30-40	89	29.4
	41-50	131	43.2
	51-60	63	20.8
	>60	14	4.6
Gender	Male	220	72.6
	Female	83	27.4
Academic Qualifications			
	Bachelor	174	57.4
	Higher Diploma	46	15.2
	Master	72	23.8
	Ph.D.	11	3.6
The current job location	Senior Management	114	37.6
	Middle Management	189	62.4
Age of the organization	<20	126	41.6
	≥20	177	58.4

Descriptive Statistics

Table 3 reports the means and standard deviations for the main study variables. Agile strategy (AS) recorded the highest mean (M = 3.53, SD = 1.27), followed by sustainability-oriented innovation (SOI) (M = 3.33, SD = 1.29). The learning organization (LO) construct exhibited a moderate mean value (M = 2.90, SD = 1.34).

Table 3: Mean and standard deviation (SD) of the Study Variables (N=303).

Variables	Mean	SD
Agile strategy (AS)	3.53	1.27
Learning organization (LO)	2.90	1.34
Sustainability-oriented innovations (SOI)	3.33	1.29

Measurement Model Assessment Convergent Validity and Reliability

Convergent validity was assessed using factor loadings, average variance extracted (AVE), and composite reliability (CR). As shown in Table 4, all standardized factor loadings exceeded the recommended threshold of .70. AVE values ranged from .71 to .80, surpassing the minimum acceptable value of .50, while CR values ranged from .88 to .97, exceeding the recommended cutoff of .70. These results indicate satisfactory convergent validity and internal consistency reliability (Fornell & Larcker, 1981; Hair et al., 2023).

Table 4: Convergent Validity and Reliability of the Measurement Model (N=303).

Construct		Items	Factor loading	Average variance extracted (AVE)	Composite reliability (CR)
AS		AS1	0.82	0.74	0.97
		AS2	0.86		
		AS3	0.86		
		AS4	0.85		
		AS5	0.83		
		AS6	0.89		
		AS7	0.86		
		AS8	0.86		
		AS9	0.90		
		AS10	0.89		
		AS11	0.72		
		AS12	0.90		
		AS13	0.86		
		AS14	0.85		
		AS15	0.92		
LO	Empowerment	EM1	0.88	0.76	0.90
		EM2	0.83		
		EM3	0.89		
	Driving Forces	DF1	0.89	0.74	0.89
		DF2	0.83		
		DF3	0.85		
	Finding Purpose	FP1	0.85	0.72	0.88
		FP2	0.80		
		FP3	0.90		
	Questioning	QU1	0.89	0.71	0.88
		QU2	0.75		
		QU3	0.87		
	Evaluating	EV1	0.89	0.78	0.91
		EV2	0.84		
		EV3	0.91		
SOI	Product Innovations	BROD1	0.89	0.80	0.94
		BROD2	0.88		
		BDOD3	0.90		
		BDOD4	0.90		
	Process Innovation	BROC1	0.85	0.76	0.92
		BROC2	0.90		
		BROC3	0.87		
		BROC4	0.86		

	Organizational Innovations	**ORG1**	0.86	0.72	0.91
		ORG2	0.90		
		ORG3	0.77		
		ORG4	0.85		

Discriminant Validity

Discriminant validity was examined using the heterotrait–monotrait (HTMT) ratio of correlations. As shown in Table 5, all HTMT values ranged between .177 and .739, well below the conservative threshold of .85, indicating adequate discriminant validity among the constructs (Franke & Sarstedt, 2019; Cheung et al., 2024).

Table 5: HTMT Ratios for Discriminant Validity.

Construct	SOI	LO	AS
SOI	-		
LO	0.64	-	
AS	0.67	0.61	-

Structural model Assessment

After confirming the validity and reliability of the outer model, the next step was to evaluate the structural model to examine the model's predictive capabilities and the relationships between variables (Hair et al., 2023). The structural model evaluation includes the coefficient of determination (R^2), cross-validated redundancy (Q^2), The goodness of fit (GoF), Effect size (F^2), and Path coefficients.

Coefficient of determination (R^2)

As shown in **Table** , the internal structures of LO and SOI have R^2 values of 0.378 and 0.541, respectively. Based on the literature, R^2 values higher than or equivalent to 0.67 are considered substantial, while those ranging from 0.19 to 0.33 are deemed moderate. These values demonstrate the predictive accuracy of the structural model developed in this study (Chen et al., 1998).

Table 6: Coefficient of determination (R^2) values for the endogenous constructs.

Endogenous Construct	R^2	Interpretation
LO	0.37	Moderate
SOI	0.54	Moderate

Cross-validated redundancy (Q^2)

According to Q^2, the validated repetitions using LO and SOI had respective values of 0.225 and 0.373, as shown in **Table** . Therefore, the model in this investigation possesses predictive validity. Studies have suggested that prognostic relevance exists when the value for Q^2 exceeds zero ($Q^2 > 0$), as per the blindfolding technique incorporated in SmartPLS (Henseler et al., 2016).

Table 7: The cross-validated redundancy (Q^2) values for the endogenous constructs.

Endogenous Construct	SSO	SSE	Cross validated redundancy Q^2 (1-SSE/SSO)
LO	4545.00	3522.14	0.22
SOI	3636.00	2278.65	0.37

The goodness of fit (GoF)

The values of the GoF indicate a GoF value of 0.579, as shown in Table . Therefore, it can be deduced that the GoF model possesses an adequate magnitude to ensure the proper validity as a global PLS model. According to Wetzels et al. (2009), GoF values exceeding 0.36 are considered significant, values ranging from 0.25 to 0.36 are considered medium, values between 0.1 and 0.25 are considered small, and GoF values below 0.1 are deemed inappropriate (Wetzels et al., 2009).

Table 8: The goodness of fit (GoF) of the model.

Construct	R^2	AVE
AS	-	0.74
Empowerment	-	0.76
Driving Forces	-	0.74
Finding Purpose	-	0.72
Questioning	-	0.71
Evaluating	-	0.78
Quality of Management	-	0.80
Openness & Action Orientation	-	0.76
Long-Term Orientation	-	0.72
Continuous Improvement & Renewal	-	0.80
Quality of Employees	-	0.77
LO	0.37	0.62
SOI	0.54	0.71
Total Average	**0.45**	**0.74**
Goodness of Fit (GoF)	**0.57**	

Effect size (F^2)

The F^2 of the exogenous variables, as determined by Cohen (2013) criteria, are presented in Table . F^2 are deemed significant for F^2 values exceeding 0.35, moderate for values between 0.15 and 0.35, and insignificant for values ranging from 0.02 to 0.15. A F^2 value below 0.02 indicates the absence of an effect magnitude (Chen et al., 1998).

Table 9: Effect sizes (F^2) of the latent variables.

Exogenous Construct	Endogenous Construct	Effect Size (F^2)	F^2 Rating
AS	LO	0.60	High Effect
	SOI	0.28	Medium Effect
LO	SOI	0.17	Medium Effect

Hypothesis Testing and Mediation Analysis

The p-values and t-values associated with each path coefficient were computed for 5000 resamples using the bootstrapping method, as presented in Figure 2 and

Hypotheses	Path coefficient	E	t-value	LL	UL	p-value	Decision
AS →SOI	0.45	0.05	8.89	.36	.55	0.00	Supported***
AS → LO	0.61	0.02	22.92	.56	.66	0.00	Supported***
LO→ SOI	0.36	0.05	6.40	.25	.46	0.00	Supported***

The significant results of the hypothesis testing are presented in Table . It is necessary for the relationship between the exogenous and endogenous constructs to be mediated by an important relationship ($p<0.05$).

Table 10: Results of hypothesis testing

Hypotheses	Path coefficient	E	t-value	LL	UL	p-value	Decision
AS →SOI	0.45	0.05	8.89	.36	.55	0.00	Supported***
AS → LO	0.61	0.02	22.92			0.00	Supported***

				.56	.66		
LO→ SOI	0.36	0.05	6.40	.25	.46	0.00	Supported***

LL: Lower limit, UL: Upper limit

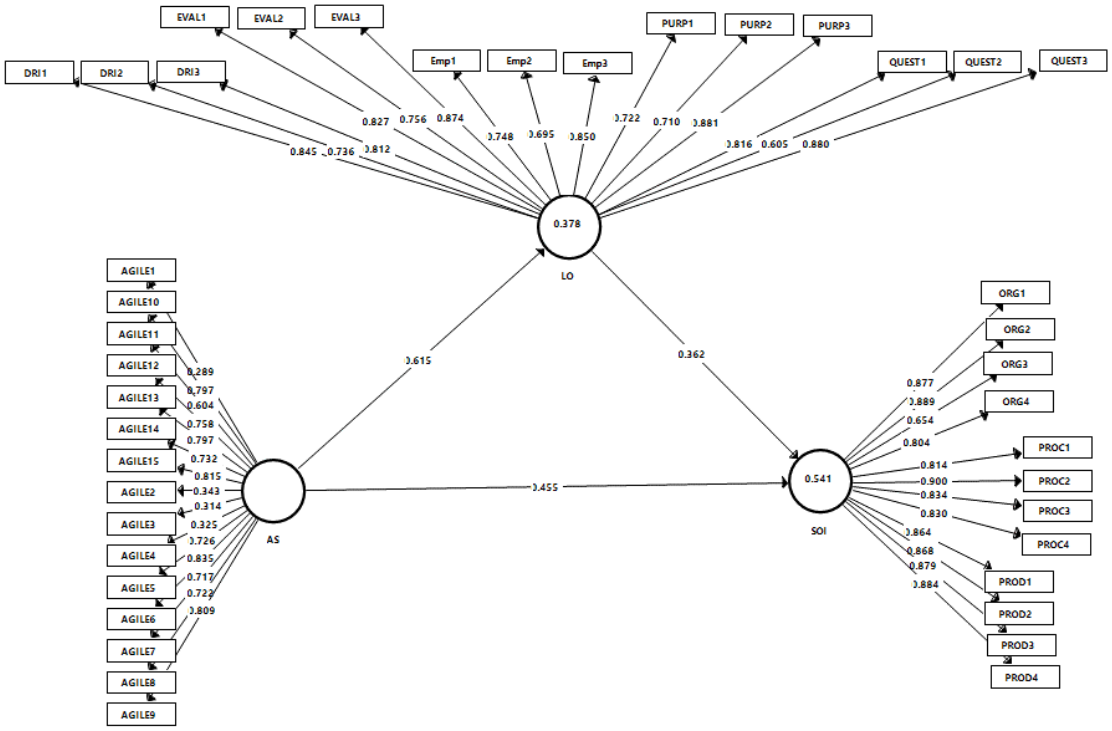

Figure 2: Path model significance results (t-value)

Table 11 displays the mediation test result. As suggested by Zhao et al. (2010), if the direct effect is significant ($p < 0.05$), the type of mediation variable is partial mediation. According to this suggestion, all direct impacts in this study are substantial. Thus, all mediation relationships in this study have partial mediation.

Table 11: Results of the mediating test.

Hypothesis	Path coefficient	t-value	LL	UL	p-value	Decision
AS → LO → SOI	0.22	5.54	0.14	0.30	0.00	Supported***

DISCUSSION

This study investigated how AS promotes sustainability in JPSICs, with LO acting as a mediator. By examining the relationships among AS, SOI, and LO, the study provides insights into how these factors collectively foster an environment conducive to sustainable growth.

The results indicate a strong positive relationship between AS components—including wide-deep scanning, strategic commitment, full deployment, and flexible scoreboards—and SOIs. These components align closely with the demands of today's dynamic business environment, confirming that AS capabilities are critical for organizational success in volatile and competitive markets (Lee et al., 2015; Babber & Mittal, 2023). By facilitating rapid adaptation, agile practices enable organizations to integrate sustainable initiatives into core operations, enhance flexibility, and strengthen resilience against regulatory, environmental, and market pressures (Pacheco-Cubillos et al., 2024).

Importantly, the findings demonstrate that LO fully mediates the AS–SOI relationship, reinforcing prior evidence that learning-oriented cultures amplify the effectiveness of agile strategies

(Armanious, 2019; López-Alcarria et al., 2019). LOs cultivate continuous improvement, knowledge sharing, and strategic alignment, enabling agility to translate into sustainable outcomes. This is consistent with AMO theory, which emphasizes that managerial practices enhancing employee ability, motivation, and opportunity are critical for achieving strategic goals (Bainbridge, 2015; Marin-Garcia & Tomas, 2016). Managers, by providing guidance, resources, and support, create conditions in which employees can experiment, innovate, and embed sustainability into daily operations (Christofi et al., 2024).

The mediating role of LO suggests that AS alone may not suffice for sustainability-oriented innovation; rather, a culture that supports learning and adaptability is essential. Agile methodologies, including Agile Project Management (APM) and design-thinking approaches, foster iterative problem-solving, resource efficiency, and waste reduction, which further enhance sustainability performance (Zakrzewska et al., 2022). Similarly, open innovation and stakeholder-focused strategies enable organizations to align sustainability initiatives with societal expectations and business objectives (van Lieshout et al., 2021).

The study contributes to theory by extending AMO theory into sustainability contexts, highlighting how managers can leverage LO to enhance employee engagement with agile and sustainability initiatives. From a practical perspective, organizations should prioritize both agile capabilities and learning-oriented practices to create a workforce capable of responding to emerging challenges and delivering sustainable innovations. Embedding agility into strategic planning, decision-making, and daily operations ensures that sustainability becomes a shared organizational value, reinforced through collaboration, inclusivity, and continuous knowledge development (Bertels et al., 2010; Yi et al., 2019).

Overall, this research demonstrates that combining AS and LO principles is essential for driving SOIs, providing both a theoretical and managerial framework for organizations aiming to achieve sustainable growth in rapidly changing environments.

CONCLUSION AND IMPLICATIONS

The findings of this study underscore the strategic importance of AS in managing and advancing SOI within organizations. AS facilitates the strategic alignment of innovation efforts with sustainability objectives, enabling organizations to overcome common barriers associated with implementing sustainable practices. Crucially, the results confirm that the learning organization fully mediates the relationship between AS and SOI, highlighting the indispensable role of continuous learning and knowledge integration in enabling adaptive strategic change.

Theoretical Implications

This study extends AMO theory into the sustainability and innovation domain by demonstrating how managerial practices that enhance employee ability, motivation, and opportunity contribute to agile and sustainability-oriented outcomes. The findings reveal that agile strategy must be complemented by a learning-oriented organizational context to effectively translate strategic intent into sustainable innovation. By positioning the learning organization as a central mediating mechanism, this research advances theoretical understanding of how agility and learning jointly influence sustainability performance.

Managerial Implications

From a managerial perspective, the results emphasize the need for organizations to simultaneously develop agile strategic capabilities and learning-oriented practices. Managers should act as facilitators by providing resources, strategic direction, and supportive environments that encourage experimentation, collaboration, and continuous improvement. Embedding agility into strategic planning, decision-making, and day-to-day operations ensures that sustainability becomes a shared organizational value rather than a peripheral initiative. Moreover, organizations

should actively engage stakeholders and adopt open innovation practices to incorporate diverse perspectives and enhance sustainability outcomes.

Policy Implications

From a policy standpoint, the study highlights the importance of institutional frameworks that promote agility, learning, and innovation within industrial sectors. Regulatory bodies and industry associations can support sustainability-oriented innovation by incentivizing learning-based management practices, facilitating inter-organizational collaboration, and encouraging knowledge sharing across firms. Such initiatives can accelerate the diffusion of sustainable innovations and enhance the long-term competitiveness of industrial organizations.

LIMITATIONS AND FUTURE RESEARCH

Despite its contributions, this study has several limitations. First, the empirical analysis was conducted exclusively within Jordanian public shareholding industrial companies, which may limit the generalizability of the findings to private-sector firms or organizations operating in different institutional and cultural contexts. Future research should replicate this study across diverse sectors and countries to assess the robustness and external validity of the proposed model.

Second, although LO was found to fully mediate the relationship between AS and SOI, future studies could explore additional mediating or moderating variables, such as organizational culture, leadership styles, digital capabilities, or environmental uncertainty. Finally, longitudinal and multi-sectoral research designs would provide deeper insights into the causal dynamics and temporal evolution of AS, LO, and SOI.

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CONFLICT OF INTEREST

The authors declare no conflicts of interest.

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DATA AVAILABILITY STATEMENT

The data analyzed and used in this study are available from the corresponding author upon reasonable request.

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