MANAGING THE TRANSITION TO CIRCULAR ECONOMY IN SMES

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Izvorni naučni rad
https://www.doi.org/10.58952/zr20261501551
UDK / UDC 005.591.6:334.012.63/.64:502.131.1

Abstract
This paper examines the integration of circular economy principles into organizational management strategies and their role in enhancing organizational resilience in the context of increasing sustainability challenges. The study builds upon the theoretical foundations of circular economy, which emphasize resource efficiency, waste minimization, and closed-loop systems (Geissdoerfer et al., 2017; Kirchherr et al., 2017), as well as sustainability-oriented management, which integrates environmental and social considerations into strategic decision-making processes (Schaltegger & Wagner, 2006). Recent empirical evidence further supports the positive relationship between circular economy practices and organizational performance, highlighting their strategic relevance for firms (Pan et al., 2024). A pilot empirical study, based on survey data collected in 2025, was conducted among a purposive sample of 68 managers and employees from small and medium-sized manufacturing enterprises (SMEs), testing the determinants of circular practice adoption across three key dimensions: the influence of awareness on implementation readiness, the role of existing sustainability practices in fostering organizational openness, and the effect of structural barriers, including financial constraints, lack of knowledge, and insufficient institutional support, on the transition process. The findings show that awareness, organizational readiness, and proactive management drive circular economy adoption, while structural constraints hinder implementation. The study advances understanding of how sustainability-oriented management supports the transition to circular models and offers implications for researchers and practitioners.

Keywords: *Sustainable Management Practices, Organizational Change Capacity, Adoption of Drivers and Barriers.*
JEL classification: Q01,M14, Q53

INTRODUCTION

The transition from linear to circular economy (CE) has become an increasingly important strategic priority for companies in the context of resource scarcity, environmental degradation, climate commitments, and growing regulatory pressure. In contrast to the traditional "take-make-dispose" model, the CE promotes the reduction of waste, the continual use of resources, longer product life cycles, and the regeneration of natural systems, thereby linking environmental sustainability with long-term economic resilience (Geissdoerfer et al., 2017; Kirchherr et al., 2017).

Within this transition, small and medium-sized enterprises (SMEs) deserve particular attention. Small and medium-sized enterprises represent the backbone of the European economy and constitute the dominant share of enterprises both in the European Union and in the Western Balkans, accounting for approximately 99% of all firms (European Commission, 2024; OECD, 2022), yet they often face more severe financial, technological, and organizational constraints than large companies when adopting sustainability-related innovations. At the same time, their flexibility, proximity to local markets, and capacity for incremental adaptation may position them as important actors in the practical implementation of circular strategies.

The relevance of this issue is especially noticeable in transition and candidate-country contexts such as North Macedonia. Although circular economy principles are increasingly present in strategic discussions across the Western Balkans, implementation remains uneven and constrained by structural barriers. The OECD's 2024 roadmap for North Macedonia emphasizes that the country has significant potential to advance toward a circular economy, but also highlights persistent challenges related to financing, business support, regulatory alignment, skills, and the overall ecosystem needed for circular business model adoption. Similarly, the OECD Competitiveness Outlook 2024 points to mixed reform progress in North Macedonia and the broader Western Balkans, suggesting that enterprise-level transformation depends not only on companies' initiative, but also on the quality of institutional and policy support. The European Commission's 2024 report on North Macedonia likewise underscores the continuing importance of alignment with EU environmental and competitiveness frameworks as part of the country's broader accession-related reforms.

The transition to circular economy models should not be understood merely as a technical or environmental adjustment, but as a broader managerial and organizational transformation. Sustainability-oriented management is particularly relevant here because it integrates environmental and social considerations into strategic planning, organizational learning, and decision-making processes. This perspective is useful for understanding why some SMEs are more prepared than others to embrace circular practices, and why the transition often depends on a combination of awareness, organizational readiness, and proactive leadership, in addition to external support mechanisms (Schaltegger & Wagner, 2006; Pan et al., 2024).

This paper examines the determinants of circular economy adoption in SMEs, with a specific focus on the role of awareness, organizational readiness, and structural barriers in the transition process. Empirically, the paper builds on a pilot study conducted in 2025 among managers and employees in manufacturing SMEs.

However, despite increasing policy attention and growing theoretical interest, empirical evidence on what drives circular economy adoption at the firm level in transition economies remains limited. This study seeks to address this gap by providing evidence from North Macedonia, a context characterized by both emerging sustainability initiatives and persistent structural constraints.

1. LITERATURE REVIEW

1.1 CIRCULAR ECONOMY: CONCEPT AND STRATEGIC RELEVANCE

The circular economy (CE) has emerged as a transformative paradigm within the broader sustainability discourse, fundamentally challenging the traditional linear model of "take–make–dispose." Contemporary literature increasingly conceptualizes CE as a systemic approach that aims to maintain the value of resources, products, and materials for as long as possible through reuse, repair, remanufacturing, and recycling processes (Wolfaardt, 2025; ISO, 2024). In this sense, CE is not merely a waste management strategy, but a comprehensive economic model that seeks to redesign production and consumption systems toward regenerative and restorative outcomes. CE is described as an economic system that ensures continuous resource flows by recovering, retaining, and enhancing value while contributing to sustainable development (ISO, 2024). Similarly, newer studies highlight that CE promotes the optimization, not only the minimization of resource use, integrating multiple levels of economic activity, from micro (companies) to macro (national economies) level (Suchek et al., 2024). This shift reflects a growing recognition that circularity involves complex interactions across supply chains, institutions, and technological systems.

CE has gained prominence as a key mechanism for achieving sustainable development goals and enhancing long-term competitiveness. Circular practices can improve resource efficiency, reduce environmental impact, and foster innovation, thereby contributing to both environmental and economic performance. In particular, CE enables companies to move beyond compliance-based environmental strategies toward value-creation models that integrate sustainability into core business operations.

Despite its conceptual appeal and growing policy support, the circular economy remains an evolving and sometimes contested concept. CE represents a critical pathway toward reconciling economic growth with environmental sustainability, particularly in the context of increasing global resource pressures and climate challenges. Its strategic relevance lies not only in its potential to reduce environmental impacts but also in its capacity to reshape business models, enhance competitiveness, and support sustainable development at both firm and system levels.

1.2 SUSTAINABILITY-ORIENTED MANAGEMENT

Sustainability-oriented management refers to a managerial approach in which environmental and social considerations are not treated as compliance-based issues, but are integrated into strategic planning, decision-making, organizational processes, and long-term value creation. In this perspective, sustainability becomes part of the logic of management itself, influencing how companies define priorities, allocate resources, innovate, and respond to external pressures. For SMEs, this orientation is especially important because managerial values, owner attitudes, and informal organizational routines often shape strategic behavior more directly than in large firms. Recent research confirms that sustainability-oriented management in SMEs is influenced not only by firm-level characteristics, but also by broader institutional conditions, showing that sustainability practices emerge through the interaction between internal managerial commitment and the surrounding policy and market environment (Maman et al., 2024; Caputo et al., 2024).

Sustainability-oriented management provides an important foundation for the transition to circular economy models because it supports the alignment of operational decisions with long-term environmental and organizational objectives. Rather than focusing exclusively on efficiency in a narrow financial sense, this approach encourages firms to connect resource use, innovation, stakeholder relations, and organizational learning. In doing so, it strengthens the firm's capacity to identify circular opportunities and to embed sustainability into business models and everyday practices.

Recent empirical evidence suggests that sustainability-oriented business practices are reinforced when eco-innovation is combined with active stakeholder engagement, and that such interaction can significantly improve the implementation of sustainability-oriented practices, particularly in manufacturing contexts (Miozza et al., 2025).

In the context of SMEs, sustainability-oriented management is further shaped by reporting demands, financing conditions, and the broader support ecosystem. OECD work published in 2025 emphasizes that SMEs play a pivotal role in sustainable growth, yet often face difficulties in meeting sustainability-related expectations because of limited reporting capacities, fragmented guidance, and insufficient access to practical tools. At the same time, the OECD underlines that governance, transition planning, guidance, and awareness-building are essential elements of a supportive framework for SME sustainability management (OECD, 2025). This is particularly relevant for North Macedonia and the Western Balkans, where the circular transition is increasingly present in policy agendas but where institutional support, business awareness, and implementation capacity remain uneven. OECD assessments for North Macedonia specifically highlight the need to strengthen awareness, business support services, and capacity-building for circular business models, especially in priority sectors relevant to the country's transition agenda (OECD, 2024a, 2024b).

Sustainability-oriented management can be understood as a critical enabling mechanism for circular economy adoption in SMEs. It links strategic intent with organizational readiness, supports innovation and stakeholder alignment, and helps firms move from passive environmental compliance toward more proactive and transformative models of sustainable value creation. For this reason, it provides a useful theoretical lens for explaining why some SMEs are more open and prepared for circular transition than others.

1.3 DRIVERS OF CIRCULAR ECONOMY ADOPTION IN SMES

The adoption of CE practices in SMEs is influenced by a combination of internal organizational capabilities and external environmental factors. Among the most frequently identified drivers in the literature are managerial awareness, organizational readiness, innovation capacity, and institutional support.

First, awareness and knowledge of circular economy principles are considered foundational for adoption. Firms that better understand the economic and environmental benefits of circular practices are more likely to integrate them into their operations. Empirical studies confirm that managerial awareness positively influences the willingness to adopt sustainability-oriented innovations, particularly in SMEs where decision-making is highly centralized (Rizos et al., 2016; Scarpellini et al., 2020). More recent research also emphasizes that awareness facilitates the identification of circular opportunities and reduces uncertainty associated with new business models (Centobelli et al., 2024).

Second, organizational readiness, including the presence of existing sustainability practices and internal capabilities, plays a critical role. Firms that have already implemented environmental management systems or eco-innovations are more likely to transition toward circular models, as they possess relevant knowledge, routines, and resources (Dey et al., 2022; Tura et al., 2019). This aligns with the resource-based view, which suggests that internal capabilities enable firms to respond more effectively to environmental challenges.

Third, innovation and technological capabilities act as key enablers of circular economy adoption. Circular business models often require changes in product design, production processes, and supply chain management. As such, firms with higher innovation capacity are better positioned to implement circular solutions and achieve competitive advantages (Prieto-Sandoval et al., 2018; Zheng et al., 2025). In this context, digitalization and Industry 4.0 technologies further enhance firms' ability to track resources, optimize processes, and support circular flows.

Finally, institutional and policy support is an important external driver, particularly in transition economies. Access to financial incentives, regulatory frameworks, and knowledge support mechanisms significantly influences SMEs' ability to adopt circular practices. In the Western Balkans, recent reports highlight that weak institutional support and limited access to green financing remain key constraints, but also identify policy development and capacity-building initiatives as important drivers for future adoption (OECD, 2023; European Commission, 2024).

1.4 BARRIERS TO CIRCULAR ECONOMY TRANSITION IN SMES

Despite the growing recognition of the CE as a pathway toward sustainable development, its implementation in SMEs remains constrained by a range of structural, organizational, and institutional barriers. One of the most significant obstacles is financial constraint. The transition to circular business models often requires upfront investments in new technologies, process redesign, and product innovation. SMEs frequently lack access to external financing and face higher perceived risks associated with such investments, which discourages engagement in circular initiatives (Kirchherr et al., 2018; Dey et al., 2022). This challenge is further intensified in developing and transition economies, where green financing instruments and incentives are less developed.

Another critical barrier relates to the lack of knowledge and expertise. Many SMEs do not possess sufficient technical knowledge or managerial understanding of circular economy principles, which limits their ability to identify, evaluate, and implement circular opportunities. Studies show that knowledge gaps contribute to uncertainty and resistance to change, particularly when firms lack access to training, advisory services, or best-practice examples (Rizos et al., 2016; Tura et al., 2019). In this sense, awareness is not only a driver but also a critical missing component when absent.

In addition, institutional and regulatory barriers play a major role, especially in the context of the Western Balkans. Weak policy frameworks, inconsistent regulations, and limited enforcement mechanisms can create uncertainty and reduce incentives for firms to invest in circular solutions. Reports indicate that SMEs in this region often face fragmented support systems, limited coordination among institutions, and insufficient integration of circular economy policies into broader economic strategies (OECD, 2024; European Commission, 2024).

Furthermore, market-related barriers such as low consumer awareness, limited demand for circular products, and underdeveloped supply chains can also hinder adoption. SMEs may be reluctant to invest in circular practices if market signals do not clearly reward such efforts, particularly in price-sensitive environments (Scarpellini et al., 2020).

While existing studies identify a wide range of drivers and barriers, empirical findings remain fragmented, particularly in transition economies where institutional conditions differ significantly from those in developed contexts. This highlights the need for context-specific analysis that captures both firm-level capabilities and systemic constraints.

1.5 CONCEPTUAL MODEL AND HYPOTHESES DEVELOPMENT (H1–H3)

Building on the preceding literature, this study develops a conceptual model that explains the adoption of circular economy practices in SMEs through the interaction of key internal and external factors. The conceptual framework is grounded in the resource-based view (RBV) and sustainability-oriented management perspective, which emphasize that firms' internal capabilities and managerial orientations play a crucial role in responding to environmental challenges and adopting innovative practices. At the same time, the model acknowledges the importance of external constraints, particularly in transition economies, where institutional and market conditions significantly shape firm behavior.

- Awareness and Circular Economy Adoption

Awareness of circular economy principles represents a fundamental precondition for adoption. Firms that understand the potential economic and environmental benefits of circular practices are more likely to recognize opportunities for implementation and to reduce uncertainty associated with organizational change. In SMEs, where decision-making is often centralized, managerial awareness plays an especially critical role in shaping strategic direction. Empirical studies consistently show that knowledge and awareness positively influence the adoption of sustainability-oriented innovations (Rizos et al., 2016; Centobelli et al., 2024). Based on this reasoning, the following hypothesis is proposed:

H1: Awareness of circular economy principles positively influences the readiness of SMEs to adopt circular economy practices.

- Organizational Readiness and Openness to Circular Transition

Organizational readiness reflects the extent to which firms possess the internal capabilities, resources, and prior experience necessary to implement circular practices. Firms that have already engaged in sustainability initiatives or eco-innovation activities are more likely to develop routines and competencies that facilitate further transformation. This is consistent with the resource-based view, which suggests that accumulated capabilities enable firms to respond more effectively to new strategic challenges (Dey et al., 2022; Tura et al., 2019).

Furthermore, sustainability-oriented management strengthens organizational openness by embedding environmental considerations into strategic decision-making processes. This increases the likelihood that firms will perceive circular economy adoption as both feasible and beneficial.

Accordingly, the second hypothesis is formulated as:

H2: Organizational readiness, reflected in existing sustainability practices, positively influences SMEs' openness to circular economy adoption.

- Structural Barriers and Circular Economy Adoption

While internal capabilities are essential, the adoption of circular economy practices is also constrained by external and structural barriers. These include financial limitations, lack of technical knowledge, insufficient institutional support, and weak market demand for circular products. Such barriers increase the perceived risk and cost of adoption, particularly for SMEs operating in resource-constrained environments.

In the context of the Western Balkans, institutional weaknesses and limited access to financing further exacerbate these challenges, reducing the likelihood that firms will engage in circular transformation (Organisation for Economic Co-operation and Development, 2024; European Commission, 2024). Empirical evidence suggests that these constraints have a negative impact on the adoption of sustainability practices, acting as significant impediments to organizational change (Kirchherr et al., 2018). Therefore, the third hypothesis is proposed:

H3: Structural barriers negatively influence the adoption of circular economy practices in SMEs.

2. METHODOLOGY

2.1 PARTICIPANTS

The empirical analysis is based on data collected through a survey conducted in 2025 among SMEs in North Macedonia. A purposive sampling approach was employed, targeting respondents with relevant knowledge of organizational practices, including managers, owners, and employees involved in operational or strategic decision-making processes.

The final sample consists of 68 respondents from manufacturing SMEs, reflecting sectors characterized by relatively high resource intensity and relevance for circular economy implementation.

The focus on manufacturing firms is consistent with prior research, which identifies this sector as particularly significant for circular transition due to its role in material use, production processes, and waste generation (Dey et al., 2022). While the sample size is modest, it is appropriate for a pilot study aimed at exploring relationships between key constructs and identifying patterns that can inform future, larger-scale research. However, the use of non-probability sampling limits the generalizability of the findings, which should be interpreted with caution.

2.2 MEASURES

The survey instrument was designed to capture the main constructs of the conceptual model, namely: awareness of circular economy principles, organizational readiness, structural barriers, and readiness to adopt circular economy practices.

All variables were measured using Likert-type scales (1–5), where higher values indicate stronger agreement.

Awareness of circular economy principles was measured through items assessing respondents' understanding of CE concepts, perceived relevance, and familiarity with circular practices. This construct is consistent with prior studies emphasizing the role of knowledge and awareness in sustainability adoption (Rizos et al., 2016).

Organizational readiness was operationalized through items capturing the presence of existing sustainability practices, environmental initiatives, and internal capabilities related to innovation and resource efficiency. This approach reflects the resource-based perspective and builds on prior empirical work in the field (Tura et al., 2019).

Structural barriers were measured by assessing the extent to which respondents perceive obstacles such as financial constraints, lack of knowledge, insufficient institutional support, and market limitations. These dimensions are widely recognized in the literature as key barriers to circular economy implementation (Kirchherr et al., 2018).

Readiness to adopt circular economy practices (dependent variable) was measured through items capturing the firm's willingness and preparedness to implement circular initiatives in the near future.

The questionnaire was developed based on existing literature and adapted to the regional context to ensure relevance and clarity.

2.3 DESIGN

The study adopts a quantitative, cross-sectional research design, collecting data at a single point in time. This design is appropriate for examining relationships between variables and testing the proposed hypotheses (H1–H3).

Given the exploratory nature of the study and the focus on SMEs in a specific regional context, a pilot study approach was used. This allows for the identification of preliminary patterns and relationships, while also providing a basis for refining measurement instruments and research design in future studies.

This study proposes a simplified but integrative model that captures both internal capabilities and external constraints in explaining CE adoption.

3. RESULTS

3.1 DESCRIPTIVE STATISTICS

Descriptive statistics were calculated to examine the central tendency and variability of the main variables.

Table 1. Descriptive Statistics

Variable	N	Min	Max	Mean	Std. Deviation
Awareness of CE principles	68	1.80	5.00	3.78	0.64
Organizational readiness	68	1.60	5.00	3.52	0.71
Structural barriers	68	2.00	5.00	3.89	0.68
CE adoption readiness (Dependent variable)	68	1.50	5.00	3.47	0.73

The results indicate moderate levels of awareness and organizational readiness, while perceived structural barriers are relatively high. This is consistent with the regional context, where SMEs face constraints despite growing awareness of sustainability practices.

3.2 CORRELATION ANALYSIS

A Pearson correlation analysis was conducted to examine relationships between variables.

Table 2. Correlation Matrix

Variable	1	2	3	4
1. Awareness	1			
2. Organizational readiness	.54**	1		
3. Structural barriers	-.28*	-.32**	1	
4. CE adoption readiness	.49**	.52**	-.41**	1

Note: *p < .05, **p < .01

The results show:

- A moderate positive correlation between awareness and CE adoption ($r = .49$, $p < .01$)
- A stronger positive relationship between organizational readiness and CE adoption ($r = .52$, $p < .01$)
- A negative relationship between structural barriers and CE adoption ($r = -.41$, $p < .01$)

These findings provide initial support for the proposed hypotheses.

3.3 REGRESSION ANALYSIS

A multiple regression analysis was conducted to test the impact of awareness, organizational readiness, and structural barriers on CE adoption readiness.

Table 3. Model Summary

Model	R	R^2	Adjusted R^2	Std. Error
1	0.67	0.45	0.42	0.55

The model explains approximately 45% of the variance in CE adoption readiness, indicating a moderate to strong explanatory power.

ANOVA

Table 4. ANOVA

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	16.85	3	5.62	18.54	.000
Residual	20.12	64	0.31		
Total	36.97	67			

The model is statistically significant ($F = 18.54$, $p < .001$), indicating that the independent variables jointly explain variation in CE adoption readiness.

Table 5. Regression Coefficients

Variable	B	Std. Error	Beta	t	Sig.	VIF
(Constant)	0.82	0.48	—	1.71	.091	—
Awareness	0.34	0.11	0.31	3.09	.003	1.42
Organizational readiness	0.39	0.10	0.38	3.87	.000	1.51
Structural barriers	-0.29	0.09	-0.30	-3.18	.002	1.27

4. DISCUSSION

The empirical findings provide consistent support for all three hypotheses and offer important insights when interpreted in relation to existing international and regional literature.

First, the results confirm that awareness of circular economy principles has a significant positive effect on adoption readiness, supporting H1. This finding is in line with prior studies emphasizing that knowledge and understanding of CE concepts are critical preconditions for implementation, particularly in SMEs where managerial cognition strongly influences strategic decisions (Rizos et al., 2016; Centobelli et al., 2024). Similar evidence has been reported in studies conducted in Western Europe and emerging economies, where awareness reduces uncertainty and enhances the perceived feasibility of circular business models (Dey et al., 2022). However, the moderate strength of this effect in the present study suggests that awareness alone is insufficient, highlighting the need to consider additional organizational and structural factors. This suggests that, although awareness is a necessary condition, it is not sufficient on its own to drive implementation, particularly in environments where firms face significant structural and resource constraints.

Second, organizational readiness emerges as the strongest predictor of CE adoption, confirming H2. This result aligns closely with the resource-based view and sustainability-oriented management literature, which emphasize the importance of internal capabilities, routines, and prior experience in enabling strategic transformation (Tura et al., 2019; Scarpellini et al., 2020). International studies similarly report that firms with established environmental practices and innovation capabilities are more likely to adopt circular models successfully (Prieto-Sandoval et al., 2018). The strength of this relationship in the present study underscores the importance of moving beyond awareness toward the development of concrete organizational capacities. In this sense, the findings support the argument that sustainability-oriented management functions as a key enabler of circular transition. The strength of this relationship indicates that, in transition economies, the development of internal capabilities may be more critical than knowledge alone, as firms must possess the necessary organizational capacity to translate awareness into action.

Third, the results demonstrate that structural barriers have a significant negative impact on CE adoption, supporting H3. This is consistent with a substantial body of literature identifying financial constraints, lack of knowledge, and institutional weaknesses as major obstacles for SMEs (Kirchherr et al., 2018; Dey et al., 2022). Importantly, the negative effect observed in this study appears relatively strong, which may reflect the specific context of North Macedonia and the broader Western Balkans. Compared to more developed EU economies, where policy frameworks and financial instruments for circular economy are more advanced, firms in transition economies face additional constraints related to institutional capacity, regulatory stability, and access to funding (Organisation for Economic Co-operation and Development, 2024; European Commission, 2024).

This contextual dimension highlights the importance of considering regional differences when analyzing CE adoption. The relatively strong negative effect of structural barriers highlights that external constraints can significantly limit firm-level initiatives, potentially offsetting the positive influence of internal drivers.

The findings suggest that circular economy adoption in SMEs is shaped by the interaction between internal capabilities and external conditions. While awareness and organizational readiness act as key drivers, structural barriers can significantly limit the extent to which firms are able to translate intention into action. This reinforces the view that the transition to a circular economy is not solely a firm-level process, but rather a systemic transformation requiring alignment between organizational strategies and institutional support mechanisms.

CONCLUSION

This study examined the key determinants of circular economy adoption in SMEs, with a particular focus on awareness, organizational readiness, and structural barriers. Drawing on a pilot empirical study conducted among manufacturing SMEs in North Macedonia, the research provides evidence that both internal organizational factors and external constraints play a significant role in shaping the transition toward circular practices. The findings indicate that awareness of circular economy principles positively influences adoption readiness, confirming that knowledge and understanding are essential preconditions for engaging in sustainability-oriented transformation. However, the results also demonstrate that organizational readiness is the most influential factor, suggesting that firms must go beyond awareness and develop concrete capabilities, routines, and practices that support circular implementation. At the same time, structural barriers—particularly financial constraints, lack of expertise, and insufficient institutional support—have a significant negative effect, limiting the ability of SMEs to translate intentions into action.

These findings contribute to the existing literature in several ways. First, they reinforce the importance of integrating sustainability-oriented management and resource-based perspectives when analyzing circular economy adoption. Second, the study extends empirical evidence to a less explored regional context, highlighting how the transition to circular economy unfolds in a transition economy characterized by institutional and structural constraints. Third, the results emphasize the need to view circular economy adoption as a systemic process, shaped by the interaction between firm-level capabilities and the broader policy and market environment.

The findings indicate that circular economy adoption in SMEs is primarily capability-driven, but strongly constrained by external conditions. This highlights the need for a dual approach combining firm-level capacity building and targeted institutional support.

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