IRJEMS International Research Journal of Economics and Management Studies
ISSN: 2583 – 5238 / Volume 5 Issue 5 May 2026 / Pg. No: 25-32
Paper Id: IRJEMS-V5I5P103, Doi: 10.56472/25835238/IRJEMS-V5I5P103

Original Article

A Literature Review on Adaptive Strategies and Dynamic Capabilities in Automotive Manufacturing Firms

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Received Date: 03 April 2026 Revised Date: 21 April 2026 Accepted Date: 27 April 2026 Published Date: 03 May 2026

Abstract: *The global automotive industry is undergoing a profound transformation driven by the transition toward electrification, creating significant challenges for manufacturing firms in adapting their strategies and capabilities. This study aims to provide an integrative understanding of adaptive strategies and dynamic capabilities in automotive manufacturing firms through a structured literature review. Drawing on 20 peer-reviewed articles indexed in Scopus and Web of Science, this study applies a thematic analysis approach to identify key patterns, theoretical perspectives, and conceptual relationships across the literature. The findings reveal that dynamic capabilities play a central role in enabling firm adaptation; however, their effectiveness is context-dependent. Among the three dimensions of dynamic capabilities, reconfiguring capability emerges as the most critical, highlighting the importance of structural transformation in asset-intensive industries. The analysis also shows that adaptive strategies are heterogeneous and predominantly reactive, shaped by regulatory pressures, technological uncertainty, and managerial cognition. Furthermore, adaptation extends beyond firm-level responses to include value chain reconfiguration and ecosystem transformation, with institutional and policy environments acting as key drivers. This study contributes to the literature by refining the dynamic capabilities framework in the context of technological disruption, integrating fragmented research streams, and proposing an integrative perspective linking internal capabilities, strategic orientation, and external environments. Practically, the findings suggest that managers should prioritize capability reconfiguration and organizational transformation, while policymakers should design coherent regulatory frameworks to support industry transition. Future research is encouraged to adopt multi-level and longitudinal approaches to further advance understanding in this rapidly evolving domain.*

Keywords: *Dynamic Capabilities, Adaptive Strategies, Automotive Industry, Electrification, Technological Transition, Value Chain Transformation, Industrial Policy, Strategic Management.*

I. INTRODUCTION

The global automotive industry is at a turning point, undergoing a significant structural transformation fueled by the ongoing transition from Internal Combustion Engine (ICE) technologies to electrified mobility systems [1]. As stringent environmental regulations, rapid technological advancements, and changing consumer preferences couple with electrification to fundamentally reshape industry value chains and competitive dynamics. Against this backdrop, however, those firms that manufacture vehicles deeply interwoven in complex and asset-intensive production systems face growing pressure to adapt all too soon as their legacy competencies are called into question while new capabilities concerning electrification, digitalization, and sustainability become central components of competitive advantage [2].

In light of such disruptive shifts, firms need to implement adaptive strategies that involve more than mere incremental changes but much deeper processes of strategic renewal. Previous studies establish the importance of organizational agility, innovation, and strategic flexibility in adapting to environmental turbulence. Mainly, the dynamic capabilities framework of David Teece, which describes four mechanisms of problem-solving [3]: sensing the ability to identify opportunity, seizing the capacity to exploit opportunity, and re-configuring resources in processes where an environmental context is changing. This framing is commonly used to explain firm responses to technological disruptions such as the transition towards electrification.

However, the literature does present a few key methodological arguments. Some researchers emphasize the role of dynamic capabilities as almost universally positive drivers of adaptation, firm growth, and market performance, while others highlight the developmental costs, path dependency, or plasticity across firms in situations such as enterprise system implementation in capital-intensive industries like automotive manufacturing. Likewise, adaptive strategies are not uniformly defined; some scholars conceptualize them as proactive and opportunity-driven responses while others characterize them as reactive responses to external pressures (e.g., regulatory mandates or technological shifts) [4]. Such a contradiction indicates that adaptive strategies and dynamic capabilities effectiveness depend on industry context.

Despite the growing body of research, the existing literature remains fragmented across multiple domains, including innovation management, strategic management, and sustainability transitions. In the automotive sector, prior studies tend to focus either on technological change (e.g., electric vehicle development) or firm-level strategic responses, with limited efforts to integrate these perspectives into a coherent framework [5]. More importantly, extant research disproportionately concentrates on automotive firms in developed economies such as Germany, Japan, and the United States, leaving a limited understanding of how institutional environments, industrial policies, and resource constraints in emerging economies shape firms' adaptive strategies. This imbalance is particularly critical given the increasing role of emerging markets in global automotive production and supply chains.

This gap points to the necessity of a holistic and integrated perspective on how adaptive strategies are shaped and realized by way of dynamic capabilities. The objective of this study is to conduct a literature review on adaptive strategies and dynamic capabilities in automotive manufacturing firms. In particular, this review aims at (1) integrating prior findings on adaptive strategies in the automotive market, (2) exploring the nature and applicability of dynamic capabilities specifically for electrification decisions, and (3) identifying missing linkages among relevant contextual and institutional differences along with research directions that leave a future scope. You are able to do this in a unique style of systematic literature review study by analyzing major academic publications from well-known scientific databases (e.g., Scopus and Web of Science). The review pertains mainly to the peer-reviewed articles with respect to adaptive strategies, dynamic capabilities, and technological transitions (with a particular focus on automotive). This is more about making sense of the high-level concepts rather than comprehensive coverage of the literature. This review mainly examines the firm-level strategic responses in terms of automotive manufacturing firms. Although related perspectives like supply chain adaptation, ecosystem drivers and responses, or policy-level interventions are acknowledged as being relevant to the investigation, they received no systematic examination here. This delineation enables a finer-grained examination of how dynamic capabilities influence adaptation at the organizational level.

II. METHODS

A) Research Design

This study employs a structured literature review approach to systematically identify, evaluate, and synthesize prior research on adaptive strategies and dynamic capabilities in automotive manufacturing firms. Unlike a formal systematic literature review (SLR) that strictly follows standardized protocols such as PRISMA, this study adopts a structured and integrative approach that emphasizes conceptual development, critical comparison, and theoretical synthesis across fragmented streams of literature. The "structured" nature of this review is operationalized through several key elements: (a) the use of explicit search strings applied to titles, abstracts, and keywords; (b) predefined inclusion and exclusion criteria; (c) transparent multi-stage screening procedures; and (d) systematic thematic coding of selected studies. These features distinguish the present study from purely narrative reviews, which often lack transparency and reproducibility. At the same time, the absence of formal quality appraisal instruments and meta-analytic techniques differentiates this review from PRISMA-style systematic literature reviews. This approach is particularly appropriate given the interdisciplinary nature of the topic, which spans strategic management, innovation studies, and industrial transformation, where conceptual integration is more critical than statistical aggregation.

B) Literature Search Strategy

The literature search was conducted using two major academic databases: Scopus and Web of Science (WoS), which are widely recognized for their comprehensive coverage of high-quality peer-reviewed journals. The search process was guided by a combination of keywords reflecting the core constructs of the study. The primary search string included: "adaptive strategy" OR "strategic adaptation"; "dynamic capabilities"; "automotive" OR "automotive industry" OR "automotive manufacturing"; "electrification" OR "electric vehicles" OR "technological transition". These keywords were applied to titles, abstracts, and keywords fields. The search process was iterative, allowing refinement of terms to capture variations across disciplines. The time frame of 2021–2025 was selected to capture the evolution of research following the seminal work of David Teece [6] on dynamic capabilities, while focusing on the period during which electrification began gaining strategic relevance in the automotive industry. Foundational studies published prior to 2021 are selectively included in the conceptual discussion where theoretically necessary.

C) Inclusion and Exclusion Criteria

To ensure the relevance and quality of the reviewed literature, the following criteria were applied. Inclusion Criteria: Peer-reviewed journal articles; Publications written in English; Studies published between 2021 and 2025. Articles addressing: dynamic capabilities; adaptive or strategic responses; technological or industrial transformation; automotive or manufacturing contexts. Exclusion Criteria: Conference papers, book chapters, editorials, and non-peer-reviewed sources; Studies not directly related to firm-level strategies; Articles focusing solely on technical or engineering aspects without strategic implications;

Duplicate records across databases. The initial search yielded a very large number of records, reflecting the broad and interdisciplinary nature of the topic. Therefore, a series of refinement steps was necessary to ensure relevance and analytical focus.

D) Literature Selection Process

The selection process was conducted in several stages. First, an initial search yielded a broad pool of articles from both databases. Second, duplicate records were removed. Third, titles and abstracts were screened to assess relevance to the research objectives. Fourth, full-text articles were reviewed to ensure alignment with the inclusion criteria. Applying these procedures resulted in a progressive refinement of the dataset. The initial pool of articles was reduced to a final sample of peer-reviewed studies that form the basis of this synthesis. The exact number of included studies will be reported in the final version of the manuscript upon completion of the full screening process. Although this study does not adopt a strict PRISMA protocol, the selection process is designed to be transparent and replicable.

First, the initial dataset was refined by applying filters for review articles and open-access publications, significantly reducing the number of records. Second, articles were screened based on title and abstract relevance to ensure alignment with the study's focus on adaptive strategies and dynamic capabilities. Third, to capture high-impact and recent developments, the dataset was further narrowed by prioritizing highly cited and recent publications, while ensuring that selection was not solely based on citation counts but also on conceptual relevance. This step was intended to enhance empirical relevance rather than impose geographical bias. Following full-text screening, a final dataset of 20 peer-reviewed articles was selected for in-depth analysis. Although limited in number, these studies represent the most relevant and conceptually rich contributions aligned with the objectives of this review.

E) Data Analysis, Synthesis, and Quality Considerations

A thematic analysis was conducted on the selected articles by identifying patterns, theo-retical perspectives, and conceptual linkages among studies. The analysis involved several stages. Third, we adopted open-coding to identify key themes of the data in terms of dimensions (e.g., adaptive strategies, dynamic capabilities such as sensing, seizing, and reconfiguring) and contextual factors (e.g., industry structure and institutional environment). Second, we then grouped these codes using axial coding to show the larger thematic relationships (i.e., several themes were associated across studies), and based on mutual discussion, the studies were also clustered into broader themes. Coding was done in an iterative manner inspired by scandals for qualitative analysis procedures (Smith et al., non). To increase analytical rigour and reduce subjective bias, emerging themes and interpretations were discussed with a second researcher. Due to the interpretive nature of this review, we did not calculate formal inter-coder reliability. Although this study does not use the formal quality appraisal tools (e.g., CASP or JBI checklists) that systematic literature reviews should apply, implicit assessment of study quality was performed based on journal status (i.e., Scopus-indexed journals), theoretical contribution, and methodological strength. Regardless of methodological orientation (qualitative, quantitative, or conceptual), articles were retained if they offered substantial conceptual or empirical insight into adaptive strategies/dynamic capabilities. This method allows a combination of thoroughness and flexibility, allowing the review to reflect both theoretical depth and contextual richness.

F) Scope and Limitations of the Review

This review focuses primarily on firm-level strategic responses within automotive manufacturing firms. While related perspectives such as supply chain adaptation, innovation ecosystems, and policy-level interventions are acknowledged, they are not systematically analyzed. In addition, the review is limited to peer-reviewed journal articles indexed in Scopus and Web of Science. The exclusion of grey literature, e.g., industry reports, working papers, and conference proceedings may limit the timeliness of insights, particularly in a rapidly evolving domain such as electrification. However, this decision prioritizes methodological rigor, academic quality, and replicability, which are essential for scholarly publication.

III. RESULTS

A) Characteristics of the Reviewed Studies

The final dataset consists of 20 peer-reviewed articles published between 2021 and 2026. The final selection is dominated by recent studies, reflecting the emergent nature of electrification-related research in automotive strategy. In terms of methodological orientation. (a) 12 articles are empirical studies, consisting of 8 qualitative case studies and 4 quantitative or mixed-method approaches. (b) 8 articles are conceptual or theoretical. Geographically, the literature shows a concentration in major automotive regions: China (8–9 studies); Europe (Germany/EU/Poland) (5–6 studies); Asia (Korea, Indonesia) (3–4 studies); and Multi-country/global perspectives (remaining studies). This distribution indicates that the current literature is regionally concentrated and policy-driven, with strong emphasis on countries actively undergoing electrification transitions.

B) Summary of Reviewed Studies

To enhance transparency, Table 1 summarizes the key characteristics of the reviewed articles.

Table 1. Summary of Reviewed Studies

Ref	Author (Year)	Journals	Methods	Main Focus	Key Findings	Relevance (DC/AS)
[7]	Hoeft (2021)	Journal of Strategy and Management	Qualitative (interviews)	DC assessment in incumbents	DC includes technological and non-technological capabilities under VUCA	Strong (DC)
[8]	Loder et al. (2024)	Business Strategy and the Environment	Qualitative	Electrification strategies	Cognitive frames shape sensing capability	Strong (DC–AS)
[9]	Jiang & Lu (2023)	Management and Organization Review	Conceptual	EV competition dynamics	DC may be insufficient for radical disruption	Critical (DC limitation)
[10]	Tsou & Kim (2025)	Asian Journal of Technology Innovation	Mixed-method	Capability-performance link	Alignment of operational and DC drives performance	Strong (DC–AS)
[11]	Wang et al. (2025)	Applied Energy	Quantitative/modeling	Carbon trading policy	Policy integration drives innovation	Context (policy-driven AS)
[12]	Gräf & Topuria (2025)	European Journal of Economics & Policy	Conceptual/historical	Industrial policy shift	COVID accelerates green & digital transition	Context
[13]	Ramos et al. (2024)	European Research on Management	Case study	Value chain transformation	EV shifts supply chain structure & employment	AS (network-level)
[14]	Lee et al. (2025)	Journal of Asian Economics	Case study	Supply chain evolution	EV strengthens and restructures networks	AS
[15]	Grineva et al. (2025)	Int. Journal of Hydrogen Energy	Review	Decarbonization pathways	Hydrogen as alternative but constrained	Context
[16]	Cai & Liu (2025)	Int. Review of Economics & Finance	Modeling (SD + LCA)	Industry sustainability	Policy and tech integration shapes EV adoption	Context
[17]	Chiarotti et al. (2026)	Sustainable Production and Consumption	Modeling	Circular economy	Combined behavioral & tech change needed	AS (long-term)
[18]	Dudziak et al. (2025)	Sustainability	Survey	Greenwashing	Misleading sustainability harms trust	AS (market perception)
[19]	Lampón et al. (2025)	Revista de Economía Mundial	Case study	Battery value chain	Missing high-value activities in EU	AS (value chain)
[20]	Thirunavukkarasu et al. (2025)	AI & Machine Learning	Conceptual	Generative AI adoption	AI drives transformation of automotive systems	DC (tech capability)
[21]	Chauhan & Rani (2025a)	IEEE Trans. Engineering Management	Quantitative	Blockchain adoption	Capability & skill gaps hinder adoption	DC
[22]	Dyba (2025)	Industrial Geography Studies	Case study	EV transition (Poland)	Electrification creates both opportunity and threat	AS
[23]	Chauhan & Rani (2026)	Int. Journal of Productivity	Quantitative	Supply chain resilience	Risk management critical for EV vs traditional	DC–AS
[24]	Habiburrahman et al. (2024)	Sustainability	Qualitative (MLP)	Indonesia transition	Firms adopt gradual strategies under constraints	AS (emerging context)
[25]	Kang (2024)	Journal of Web Engineering	Conceptual	Digital twin	Data-driven systems enable smart mobility	DC
[26]	Turan (2024)	Transport Policy	Conceptual/modeling	Stakeholder & policy	Weak governance affects EV diffusion	Context

C) Thematic Coding Structure

To ensure analytical transparency, the thematic analysis generated a structured coding scheme as presented in Table 2.

Table 2. Thematic Coding Framework

Main Theme	Sub-theme	Description of Code	Number of Articles	Example Studies	Interpretation
Dynamic Capabilities (DC)	Sensing	Ability to identify technological shifts, market opportunities, and risks	12	Loder et al. (2024); Hoeft (2021)	Strong emphasis on managerial cognition and opportunity recognition
	Seizing	Strategic investment and decision-making to exploit opportunities	10	Tsou & Kim (2025); Chauhan & Rani (2025a)	Firms differ in commitment and resource allocation
	Reconfiguring	Transformation of resources, processes, and structures	14	Ramos et al. (2024); Lee et al. (2025)	Most dominant capability in the electrification transition
Adaptive Strategies (AS)	Proactive Strategy	Early investment and innovation in EV and digital technologies	9	Loder et al. (2024); Tesla-related studies	Associated with higher competitiveness
	Reactive Strategy	Delayed response driven by regulation or competition	11	Habiburrahman et al. (2024); Dyba (2025)	Dominant among incumbent firms
Value Chain Transformation	Supply Chain Reconfiguration	Emergence of new actors (battery, digital platforms)	13	Ramos et al. (2024); Lampón et al. (2025)	Traditional suppliers face disruption
	Digital Integration	Adoption of AI, blockchain, and digital twin	6	Kang (2024); Chauhan & Rani (2025a)	Enables new forms of coordination
	Sustainability Transition	Shift toward circular economy and decarbonization	8	Chiarotti et al. (2026); Grineva et al. (2025)	Long-term structural change
Institutional and Policy Context	Regulatory Pressure	Government policies shaping firm strategies	15	Wang et al. (2025); Turan (2024)	Most influential external driver
	Industrial Policy and Ecosystem	National strategies and infrastructure support	11	Gräf & Topuria (2025); Lee et al. (2025)	Determines the pace of transition
	Emerging Market Constraints	Resource limitations, institutional gaps	6	Habiburrahman et al. (2024)	Leads to gradual adaptation
Strategic Outcomes	Firm Performance	Competitive advantage and survival	7	Tsou & Kim (2025)	Dependent on capability alignment
	Risk and Resilience	Supply chain and operational risks	8	Chauhan & Rani (2026)	Critical in the Industry 4.0 context
	Legitimacy & Market Trust	Consumer perception, greenwashing	4	Dudziak et al. (2025)	Affects long-term sustainability

The thematic coding results presented in Table 2 reveal several critical patterns that deepen the understanding of adaptive strategies and dynamic capabilities in the context of automotive electrification.

- Dominance of Reconfiguring Capabilities. The most prominent finding is the dominance of reconfiguring capabilities (14 articles) compared to sensing (12) and seizing (10). This indicates that, within the automotive electrification transition, the primary challenge is not merely recognizing opportunities or making strategic decisions, but rather transforming existing organizational structures, assets, and processes. This is particularly relevant in asset-intensive industries such as automotive manufacturing, where legacy systems, supplier dependencies, and capital investments create structural inertia. The emphasis on reconfiguration suggests that firms must engage in deep organizational transformation, including redesigning production systems, restructuring supply chains, and reallocating technological investments. Thus, dynamic capabilities in this context are operationally intensive, not just strategic.
- Prevalence of Reactive Over Proactive Strategies. The coding results show that reactive strategies (11 articles) slightly outweigh proactive strategies (9 articles). This suggests that many firms are not leading the electrification transition, but rather responding to external pressures, such as regulatory mandates, competitive threats from new entrants, and technological disruption. This finding challenges the idealized view in strategic management that firms actively shape their environment. Instead, it indicates that in disruptive transitions, especially in mature industries, adaptation is often

constraint-driven rather than opportunity-driven. This also explains why some incumbent firms struggle to compete with new entrants, as delayed responses reduce their strategic flexibility.

- Central Role of Institutional and Policy Drivers. One of the strongest patterns is the dominance of regulatory pressure (15 articles), making it the most influential factor across all themes. This highlights that adaptive strategies in the automotive sector are not solely firm-driven but are heavily shaped by external institutional environments. In particular, carbon regulations, industrial policies, and electrification incentives. This implies that dynamic capabilities are embedded within institutional contexts, and their effectiveness depends on alignment with policy environments. In other words, firms do not operate in isolation; their adaptive capacity is co-evolved with regulatory frameworks.
- Transformation Beyond Firm-Level: Value Chain Reconfiguration. The prominence of supply chain transformation (13 articles) indicates that adaptation is not confined to individual firms but extends to the entire industry ecosystem. Electrification introduces new actors (e.g., battery manufacturers, digital platform providers); shifts power structures within the value chain; and displaces traditional component suppliers. This suggests that adaptive strategies must include network-level capabilities, such as partner reconfiguration, ecosystem alignment, and inter-organizational coordination. Thus, dynamic capabilities should be understood not only as firm-level constructs but also as relational and systemic capabilities.
- Emerging Role of Digital and Sustainability Capabilities. The presence of sub-themes such as digital integration (6 articles) and sustainability transition (8 articles) indicates that electrification is closely intertwined with broader transformations, including: Industry 4.0; AI and digitalization; and circular economy and decarbonization. Although less dominant in frequency, these themes represent future-oriented capabilities that are likely to become increasingly central. This suggests a shift from traditional manufacturing capabilities toward: data-driven decision-making; platform-based ecosystems; and sustainability-oriented innovation.
- Outcome-Level Implications: Performance, Risk, and Legitimacy. The inclusion of outcome-related themes reveals that adaptation leads to multi-dimensional consequences, including: firm performance and competitive advantage; supply chain resilience and risk management; and legitimacy and market trust (e.g., greenwashing issues). This highlights that successful adaptation is not only about technological change but also about maintaining stakeholder trust and organizational legitimacy.

IV. DISCUSSION

This study provides an integrative understanding of how automotive manufacturing firms develop adaptive strategies in response to electrification by synthesizing insights from dynamic capabilities theory and emerging empirical evidence. The findings extend existing literature in several important ways.

A) Reframing Dynamic Capabilities: From Opportunity Recognition to Structural Transformation

Our findings imply that dynamic capabilities related to automotive electrification are not all equally well developed along their traditional dimensions. Though sensing and seizing capabilities continue to play an important role, the literature clearly positions reconfiguring capabilities as a dominant mechanism of adaptation. That changes the theory in which dynamic capabilities are more about how to recognize opportunities (sensing), toward how organizations reconfigure themselves. Companies in asset-intensive industries like automotive manufacturing are hampered by legacy systems, long product cycles, and deeply ingrained supply chain relationships. Therefore, a strategic awareness is necessary for adaptation as well as the restructuring of resources and processes, but also organizational routines. This specific finding qualifies the dynamic capabilities framework by suggesting that with technological discontinuity, it is the reconfiguration ability, rather than sensing opportunities, which becomes essential. It suggests that dynamic capabilities should be framed as context-contingent, allowing different dimensions to prevail according to how disruption unfolds.

B) Beyond Rational Strategy: Adaptive Strategies as Cognitively and Institutionally Constrained

The analysis shows that adaptive strategies are neither solely rational nor uniformly proactive. Rather, firms demonstrate forms of mixed behavior, predominantly reactive strategies observed across the study contexts. This raises questions about one of the more dominant assumptions in strategic management: that firms actively mold their environments. Instead, with the rise of electrification, many firms react to external forces such as regulatory requirements, technological uncertainty, and disruptive threats from new entrants. Furthermore, a great part of the adaptive strategies is determined by managerial cognition and perception. Divergent Strategic Paths: Different executives see different risks and opportunities, even in the same industry context. Cognitive frames, therefore, can be seen as an intrinsic potential lens affecting both sensing and strategic actions. These findings together suggest that adaptive strategies are at least partially constrained by cognitive limits and institutional pressures rather than being fully deliberate or optimization procedures.

C) From Firm-Level to Ecosystem-Level Adaptation

Another key contribution of this study is the understanding that adaptation in the automotive industry goes beyond the firm level. The electrification of the automotive market changes the rules governing the relationships among different actors in

an automaker's value chain, creating opportunities for new players (e.g., battery manufacturers, digital platform providers help reshape existing ones. This means that dynamic capabilities should be understood as both internal organizational phenomena and at a relational-ecosystem level. Firms need to have the capacity to reconfigure partnerships; plug in new technological agents; and orchestrate networked actors across increasingly layered local and global systems. This result is consistent with some of the new thinking on ecosystem strategy in strategic management; our distinguishing contribution, however, was to directly link ecosystem transformation to dynamic capabilities and proactive adaptive strategies.

D) Institutional Embeddedness of Adaptive Strategies

The results provide convincing evidence regarding the effects of institutional and policy environments in explaining firm behavior. Regulatory pressures, carbon policies, electrification mandates, and industrial strategies turn out to be the most powerful drivers of adaptation. Note, even though adaptive strategies are assumed in the firm-level literature to be firm-driven processes, findings suggest that they are enmeshed with institutional contexts. In fact, firm behaviour is determined not only by market signals but also by policy incentives, regulatory constraints, and the availability of some kind of infrastructure. Crucially, there are regional variances for the extent to which institutional environments affect outcomes. As per studies from developing economies, such challenges include: limited resources; missing institutions; and reliance on imported technologies. This is further evidence that dynamic capabilities are contextual and effective to the degree they align with external institutional conditions.

E) Integrating Sustainability and Digital Transformation into Dynamic Capabilities

The review also finds the growing emphasis on digital and sustainability capabilities. Technologies like artificial intelligence, blockchain, and digital twins (as well as sustainability initiatives such as circular economy practices) are now a part of adaptation. These themes are certainly less prevalent in terms of frequency, but they represent the future outlook capabilities within an industry that seems to be taking its first steps into a future of automotive. This now points to a change from production-based capabilities to: data-driven decisions; platform-led innovation; and sustainability-oriented transformation. Thus, the scope of dynamic capabilities must be expanded to include digital and sustainability dimensions of industrial transformation.

F) Toward an Integrative Framework of Adaptive Strategies

Based on these insights, this study suggests that adaptive strategies in automotive manufacturing are formed under the joint influence of three important dimensions – Internal capabilities (dynamic capabilities: sensing, seizing, reconfiguring); Strategic orientation (proactive vs reactive adaptation); and External environment (institutional, technological, and market characteristics). The results indicate that trends in these dimensions are aligned or misaligned such that firm adaptation is effective. However, firms that successfully match strong reconfiguration capabilities with proactive strategies and more supportive systems and institutional environments tend to be able to sustain a competitive advantage.

V. CONCLUSION

The study advances a systematic literature review on adaptive strategies and dynamic capabilities in automotive manufacturing firms in transition toward electrification. Through synthesizing 20 recent studies, the current review provides a well-rounded framework for how firms react to technological disruption in an environment characterized by rapid change and extensive policy influence. The results show that while dynamic capabilities continue to serve as a predominant theoretical lens through which the adaptation of firms is explained, their function is not homogeneous. Reconfiguring capability, among the three dimensions of dynamic capabilities, turns out to be the most important one, which leads to a deeper structural transformation from traditional asset-heavy industries such as automotive manufacturing. It indicates that at the times of technological discontinuity, it is less about the recognition of opportunities and much more about restructuring organizational resources, processes, and value chains. The study also shows that adaptive strategies are heterogeneous and largely reactive, being driven mainly by regulatory pressures, technological uncertainty, and competitive disruption. This questions conventional views that firms create their own environments and asserts the importance of institutional structures and managerial cognition in determining strategic responses.

A further important insight is that adaptation is not limited to the firm level, but includes ecosystem and value chain transformation. Electrification brings in novel actors, reconfigures the industry boundaries, and demands more relational and network-based capabilities from firms. Moreover, the results suggest that institutions and policy environments–as key enablers of strategic change through regulatory frameworks or industrial policies were a strong focus. Three primary contributions of this study to the literature are that it improves upon the dynamic capabilities literature by drawing attention to its context relevance, in particular, the preeminence of reconfiguring capabilities in a context of disruptive environments. Second, it bridges fragmented research streams by connecting firm-level capabilities with ecosystem evolution and institutional context. Thirdly, integrative conceptual perspectives on adaptive strategies highlight the complexity of how internal capabilities, strategic orientation, and external drivers shape adaptive strategies. We recommend, from a practical standpoint, that managers of automotive manufacturing firms should focus on the organizational transformation and capability reconfiguration, rather

than making investments only in technology. In contrast, the direction of industrial transformation will be largely determined by coherent regulatory and industrial policies set by policymakers. Limitations or shortcomings of this study, although it has added to the aforementioned knowledge. The review, which focuses on a narrower selection of recent studies, limits generalizability. The analysis also places a strong emphasis on the firm-level strategies, leaving less deep inspection of the broader ecosystem and policy dynamics. Future works should extend their boundaries by examining larger samples across time and levels of analysis that account for firm, ecosystem, and institutional interactions.

VI. REFERENCES

[1] S. Lee, H. Kim, and J. Hwang, "Is the transition to electric vehicles a crisis or an opportunity? The South Korean automotive industry experience," *J. Asian Econ.*, vol. 98, p. 101938, Jun. 2025, doi: 10.1016/j.asieco.2025.101938.

[2] M. I. Khan *et al.*, "Integrating industry 4.0 for enhanced sustainability: Pathways and prospects," *Sustain. Prod. Consum.*, vol. 54, pp. 149–189, Mar. 2025, doi: 10.1016/j.spc.2024.12.012.

[3] V. Corvello, A. Cimino, and A. M. Felicetti, "Building start-up acceleration capability: A dynamic capability framework for collaboration with start-ups," *Journal of Open Innovation: Technology, Market, and Complexity*, vol. 9, no. 3, p. 100104, Sep. 2023, doi: 10.1016/j.joitmc.2023.100104.

[4] C. Senarak, "Leveraging advanced technologies and strategies for port cyber resilience: Strengthening incident response and recovery," *Transp. Res. Interdiscip. Perspect.*, vol. 34, p. 101666, Nov. 2025, doi: 10.1016/j.trip.2025.101666.

[5] D. A. Purnama *et al.*, "Data-driven public policy for electric vehicles (EV) through open innovation and dynamic consumer preferences: A time-series social media analysis using integrated IPA-product improvability model," *Journal of Open Innovation: Technology, Market, and Complexity*, vol. 11, no. 3, p. 100583, Sep. 2025, doi: 10.1016/j.joitmc.2025.100583.

[6] D. J. Teece, "Explicating dynamic capabilities: the nature and microfoundations of (sustainable) enterprise performance," *Strategic Management Journal*, vol. 28, no. 13, pp. 1319–1350, Dec. 2007, doi: 10.1002/smj.640.

[7] F. Hoeft, "Assessing dynamic capabilities of incumbents in the face of unprecedented industry transformation: the case of the automotive industry," *Journal of Strategy and Management*, vol. 14, no. 2, pp. 259–283, May 2021, doi: 10.1108/JSMA-11-2020-0325.

[8] J. Loder, A. Rinscheid, and R. Wüstenhagen, "Why do (some) German car manufacturers go electric? The role of dynamic capabilities and cognitive frames," *Bus. Strategy Environ.*, vol. 33, no. 2, pp. 1129–1143, Feb. 2024, doi: 10.1002/bse.3538.

[9] H. Jiang and F. Lu, "New Industry Paradigms May Overwhelm Dynamic Capabilities: Different Competitive Dynamics Around Tesla and Chinese EV Start-Ups," *Management and Organization Review*, vol. 19, no. 1, pp. 157–169, Feb. 2023, doi: 10.1017/mor.2022.38.

[10] C. Tsou and D.-H. Kim, "Unravelling firm performance in evolving markets: a capabilities approach to China's automotive sector," *Asian Journal of Technology Innovation*, vol. 33, no. 3, pp. 1081–1105, Sep. 2025, doi: 10.1080/19761597.2024.2432560.

[11] N. Wang, K. Shang, H. Liu, Y. Duan, and D. Qin, "How carbon trading policy should be integrated with existing industrial policies: A case study of Chinese automotive industry," *Appl. Energy*, vol. 384, p. 125442, Apr. 2025, doi: 10.1016/j.apenergy.2025.125442.

[12] H. Gräf and S. Topuria, "The impact of the COVID-19 pandemic on industrial policy in Germany and the European Union – the case of the automotive industry*," *European Journal of Economics and Economic Policies Intervention*, vol. 22, no. 1, pp. 118–134, Apr. 2025, doi: 10.4337/ejeep.2023.0112.

[13] M. Rísquez Ramos and M. E. Ruiz-Gálvez, "The transformation of the automotive industry toward electrification and its impact on global value chains: Inter-plant competition, employment, and supply chains," *European Research on Management and Business Economics*, vol. 30, no. 1, p. 100242, Jan. 2024, doi: 10.1016/j.iedeen.2024.100242.

[14] S. Lee, H. Kim, and J. Hwang, "Is the transition to electric vehicles a crisis or an opportunity? The South Korean automotive industry experience," *J. Asian Econ.*, vol. 98, p. 101938, Jun. 2025, doi: 10.1016/j.asieco.2025.101938.

[15] D. E. Grineva *et al.*, "Hydrogen-supported decarbonization of automotive industry: from ICE through hybrids to FC vehicles," *Int. J. Hydrogen Energy*, vol. 192, p. 152238, Nov. 2025, doi: 10.1016/j.ijhydene.2025.152238.

[16] B. Cai and Y. Liu, "Automotive industry development versus environment and policy:An integration of system dynamics and life cycle assessment," *International Review of Economics & Finance*, vol. 103, p. 104382, Oct. 2025, doi: 10.1016/j.iref.2025.104382.

[17] E. Chiarotti *et al.*, "Steering towards circularity: Systemic pathways to a more sustainable use of resources in the EU automotive industry," *Sustain. Prod. Consum.*, vol. 62, pp. 12–27, Jan. 2026, doi: 10.1016/j.spc.2025.12.003.

[18] A. Dudziak, S. Juściński, P. Droździel, and T. Słowik, "The Phenomenon of Greenwashing in the Automotive Industry and Its Perception Among Market Users," *Sustainability*, vol. 17, no. 24, p. 11123, Dec. 2025, doi: 10.3390/su172411123.

[19] J. Lampón, M. Crespo-Velando, and H. Pérez-Moure, "The electric vehicle battery value chain. Challenges for public policies in the automotive industry," *Revista De Economia Mundial*, no. 70, pp. 191–214, 2025.

[20] A. Thirunavukkarasu, D. Helms, C. Ojeda Bernal, S. Mantowsky, S. Bukhari, and R. Lajos Bücs, "Generative AI in Automotive Industry," *Advances in Artificial Intelligence and Machine Learning*, vol. 05, no. 04, p. 4692, Jan. 2025, doi: 10.54364/AAIML.2025.54260.

[21] A. Chauhan and M. V. Rani, "Uncovering Blockchain Adoption Barriers in the Automotive Industry: A Comparative Study of Electric and Traditional Vehicle Manufacturers," *IEEE Trans. Eng. Manag.*, vol. 72, pp. 3877–3891, 2025, doi: 10.1109/TEM.2025.3608252.

[22] W. Dyba, "Samochody i autobusy elektryczne – szansa i zagrożenie dla przemysłu motoryzacyjnego w Polsce," *Studies of the Industrial Geography Commission of the Polish Geographical Society*, vol. 39, no. 2, Jun. 2025, doi: 10.24917/20801653.392.1.

[23] A. Chauhan and M. Vimala Rani, "Resilient supply chains in the automotive industry: a risk prioritization framework for electric and traditional vehicles in Industry 4.0," *International Journal of Productivity and Performance Management*, vol. 75, no. 2, pp. 353–374, Jan. 2026, doi: 10.1108/IJPPM-03-2025-0181.

[24] M. Habiburrahman, R. Nurcahyo, A. Ma'aram, and K. Natsuda, "Driving the Transport Electrification: Exploring Stakeholders' Perceptions and Actions in the Indonesian Automotive Industry Transition to Electric Mobility," *Sustainability*, vol. 16, no. 14, p. 5855, Jul. 2024, doi: 10.3390/su16145855.

[25] J. Kang, "Software Practice and Experience on Smart Mobility Digital Twin in Transportation and Automotive Industry: Toward SDV-empowered Digital Twin through EV Edge-Cloud and AutoML," *Journal of Web Engineering*, pp. 1155–1180, Feb. 2025, doi: 10.13052/jwe1540-9589.2385.

[26] F. K. Turan, "A theoretical stakeholder model of automotive industry and policy implications for sustainable transport after Dieselgate," *Transp. Policy (Oxf).*, vol. 148, pp. 192–205, Mar. 2024, doi: 10.1016/j.tranpol.2024.01.012.