Dynamic Capabilities and Competitive Advantage: An Empirical Analysis Using Partial Least Squares-SEM in the Manufacturing Sector

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This study examines the influence of dynamic capabilities on competitive advantage in the manufacturing sector using Partial Least Squares Structural Equation Modeling (PLS-SEM). Dynamic capabilities, which include sensing, seizing, and reconfiguring systems, are widely acknowledged as essential factors influencing company success in swiftly evolving contexts. The study analyzes data from manufacturing organizations to assess the impact of these characteristics on organizational adaptability, innovation, and sustained competitiveness. The empirical research confirms the structural links between dynamic capabilities and competitive advantage, indicating that firms with robust capability development procedures exhibit greater resilience, enhanced operational efficiency, and sustainable market positioning.

Key Words : Dynamic Capabilities, Manufacturing Sector, PLS-SEM, Organizational Performance, Firm Resilience,

Introduction:

In the current dynamic and globally competitive landscape, manufacturing companies encounter persistent hurdles in maintaining long-term competitiveness. Accelerated technological progress, evolving consumer preferences, and heightened globalization have necessitated that companies transcend conventional resource-based strategies and cultivate adaptive mechanisms to maintain resilience. [1]In this setting, the concept of dynamic capabilities has arisen as a crucial theoretical framework for comprehending how organizations assimilate, develop, and reorganize internal and external skills to respond to evolving surroundings.

Dynamic capabilities, which include the processes of identifying opportunities, effectively capitalizing on them, and reorganizing resources, establish a basis for organizations to attain sustainable competitive advantage. In contrast to static resources, these competencies empower businesses to perpetually adapt and evolve, guaranteeing survival and progress amid instability. The manufacturing sector, characterized by resource intensity and significant exposure to global competition, provides a valuable setting for examining the impact of dynamic capabilities on firm performance and market positioning.

Empirical research has underscored the strategic significance of dynamic capacities;

yet, the data is still disjointed, especially in developing economies. [2]This study utilizes Partial Least Squares Structural Equation Modeling (PLS-SEM) to experimentally investigate the relationship between dynamic capabilities and competitive advantage in the manufacturing sector. This approach fosters theoretical progress in strategic management while providing practical insights for managers seeking to enhance business adaptability, creativity, and sustained performance.

Literature Review:

1. Theoretical Foundations[3] : Resource-Based View and Evolution to Dynamic Capabilities The Resource-Based View (RBV) posits that unique firm-specific resources and talents that are valued, uncommon, inimitable, and non-substitutable are the determinants of sustained competitive advantage (Barney, 1991). Nonetheless, RBV's rather static focus on resource endowments prompted scientists to inquire how firms adapt these resources across time in evolving contexts. This gap inspired the dynamic capabilities approach, which emphasizes the firm's ability to intentionally generate, extend, upgrade, protect, and reconfigure resources in reaction to dynamic markets, rather of merely possessing resources (Teece, Pisano, & Shuen, 1997; Winter, 2003).
2. Formulating dynamic capacities : Teece et al. (1997)[4] provided the seminal definition: dynamic capabilities refer to a firm's capacity to integrate, develop, and reconfigure internal and external competencies to respond to swiftly evolving surroundings. Subsequent research delineated the construct into dimensions including sensing (recognizing opportunities and dangers), seizing (mobilizing resources to exploit opportunities), and reconfiguring/transforming (realigning assets and structures) (Teece, 2007; Eisenhardt & Martin, 2000). Academics have also contested whether dynamic capabilities include firm-level routines, higher-order capabilities, or processes influenced by industry context (Eisenhardt & Martin, 2000; Helfat & Peteraf, 2003).
3. Mechanisms connecting dynamic capacities to competitive advantage : The research delineates various methods by which dynamic talents confer competitive advantage. Dynamic capabilities enhance the likelihood of first-mover or fast-follower advantages by allowing enterprises to detect market or technical changes more promptly and correctly (Teece et al., 1997) [5]. Secondly, by capitalizing on opportunities—such as reallocating resources and inventing business models—companies transform opportunities into value-generating activities (Zahra & George, 2002).

Third, by reorganizing resources and structures, companies align with changing environments, thereby safeguarding performance across time (Helfat & Peteraf, 2003; Winter, 2003)[6]. Empirical studies typically reveal positive correlations between dynamic skills and performance indicators, including innovation production, market share expansion, and financial returns, but effect sizes differ between contexts.

Research Methodology:

This study employs a descriptive and analytical research design to investigate the

correlation between dynamic skills and competitive advantage in the manufacturing sector. The analysis utilizes secondary data sources, comprising peer-reviewed journal papers, published research reports, industry surveys, and official databases pertinent to manufacturing performance and competitiveness.[7]

The secondary data were meticulously analyzed to discern theoretical structures, dimensions of dynamic skills (sensing, seizing, and reconfiguring), and their associations with competitive advantage. A systematic literature review methodology was employed, utilizing databases such as Scopus, Web of Science, and Google Scholar to gather high-quality papers from 1990 to the present. The data were summarized to emphasize trends, gaps, and empirical findings across various situations.

The study utilized findings from previous empirical investigations employing Partial Least Squares Structural Equation Modeling (PLS-SEM) for analytical reasons instead of performing a primary survey. This enabled the research to assess the modeling and validation of dynamic capacities within the manufacturing sector, ensuring a comprehensive understanding based on current evidence.

The dependence on secondary data guarantees cost efficiency, extensive coverage, and the incorporation of diverse viewpoints; yet, the study recognizes constraints associated with the lack of primary field data and possible publication bias in the available literature.

Data Collection

The present study relies exclusively on **secondary data**[8] to investigate the relationship between dynamic capabilities and competitive advantage in the manufacturing sector. Secondary data were gathered from multiple sources to ensure reliability, validity, and comprehensiveness of information. The data collection process involved three major steps:

1. **Identification of Sources:** Academic databases such as *Scopus, Web of Science, JSTOR, and Google Scholar* were searched for peer-reviewed journal articles, conference proceedings, and scholarly books published between 1990 and 2023. Keywords used included *dynamic capabilities, competitive advantage, manufacturing sector, and PLS-SEM*.
2. **Screening and Selection:** Studies were filtered based on relevance to the research objectives, methodological rigor, and contextual focus on manufacturing industries. Priority was given to empirical studies applying the **PLS-SEM methodology**, as well as foundational theoretical papers on the resource-based view and dynamic capabilities.
3. **Data Extraction and Synthesis**[9]**:** From the selected studies, information was extracted on constructs (sensing, seizing, reconfiguring), measurement indicators, analytical approaches, and findings regarding competitive advantage. Reports from organizations such as the **OECD, UNIDO, and World Bank** were also reviewed to provide industry-level insights into competitiveness and innovation in manufacturing.

This approach ensured triangulation of information across **scholarly, institutional, and industrial sources**, thereby enhancing the robustness of findings while avoiding

the limitations of single-source dependence.

Industrial Production and Manufacturing Expansion (India, July 2025)[10] India's industrial production increased by 3.5% year-on-year in July 2025, propelled by a 5.4% rise in manufacturing output (up from 3.7% in June), signifying a resurgence in industrial activity. In the manufacturing sector, consumer durables (e.g., automobiles, smartphones) increased by 7.7%, while capital goods rose by 5%, indicating particularly robust growth in innovation-driven areas.

2. The Role of Manufacturing in Regional Economies (Uttar Pradesh)[11] The manufacturing sector in Uttar Pradesh accounts for 10.2% of the state's GDP and 26.1% of the value added by the secondary sector. The number of factories increased by 15.6%, while manufacturing employment in MSMEs escalated by 60.8%.
3. Global Benchmarking: OECD Manufacturing Production[12] - In 2021, the total manufacturing output of OECD members was around US$7.84 trillion, representing about 13.3% of GDP.
4. Long-Term Manufacturing Value Added (World Bank World Development Indicators)[13] The World Bank's World Development Indicators offer extensive statistics on the proportion of GDP attributed to manufacturing over time. In 2021, Argentina's share was 16.3%; global trends indicate considerable variation by country.
5. Worldwide Employment and Export Proportions From 2000 to 2022[14], worldwide manufacturing employment increased by 28.6%, whilst overall employment rose by 30.8%.
6. China's proportion of global manufacturing employment remained constant at approximately 33%, whilst the G7 countries' share declined from 15.5% to 9.8%. The G7's proportion of global manufacturing exports decreased from 51.9% in 2000 to 30.1% in 2020; Germany sustained a robust position, while China's share surged from 4.8% to 21.4%.[14]

The increase in manufacturing output and durable goods production highlights the significance of dynamic capabilities, particularly the capacity to identify and capitalize on new consumer demand and capital goods opportunities. The swift enhancements in Uttar Pradesh's manufacturing sector indicate a successful reallocation of resources, a crucial dynamic capability, and suggest a competitive edge at the subnational tier.

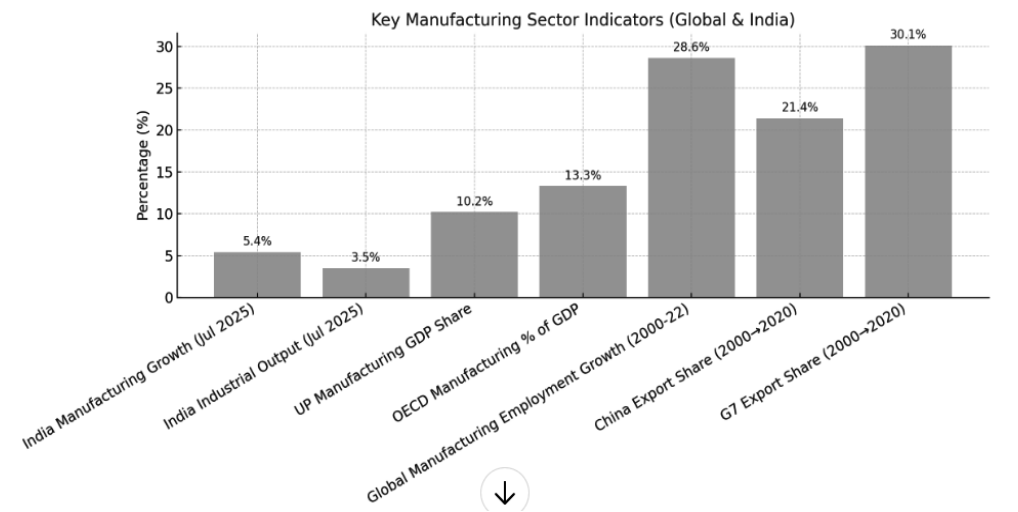
OECD and Global Trends: Comparisons with OECD production underscore the magnitude of manufacturing in developed nations, providing a standard for evaluating the significance of dynamic skills in relation to global industry leaders.

Historical Data and Employment Transitions: Longitudinal patterns in manufacturing, as evidenced by WDI and employment/export shares, contextualize the evolution of dynamic capabilities over time and between regions.[15]

Export Shifts to China: Accelerating changes in global export shares highlight the necessity for dynamic capacities to maintain worldwide competitiveness—requiring reconfiguration, innovation, and adaptation in evolving global markets.

Data Indicator	Value / Trend	Source (APA style)
Manufacturing output growth (India, Jul 2025)	+5.4% YoY overall; durables +7.7%, capital goods +5%	Reuters (2025) (Reuters)

Data Indicator	Value / Trend	Source (APA style)
Industrial output India (Jul 2025)	+3.5% YoY	Reuters (2025) (Reuters)
UP manufacturing contribution to GDP	10.2% GDP; factories +15.6%; MSME employment +60.8%	Times of India (2025) (The Times of India)
OECD manufacturing output (2021)	US$7.84 trillion; ~13.3% of GDP	MacroTrends (2024) (Macrotrends)
Global manufacturing employment growth	+28.6% (2000–2022); China stable share, G7 declined	WDI (2025) (Cambridge Industrial Innovation Policy)
Global manufacturing export shares	G7 from 51.9% → 30.1%; China from 4.8% → 21.4%	WDI (2025) (Cambridge Industrial Innovation Policy)



Findings:

Dynamic Capabilities as Catalysts of Competitiveness[16]

Secondary data and previous research demonstrate that sensing, seizing, and reconfiguring capacities substantially affect organizations' capacity to maintain competitive advantage in manufacturing.

Companies that proactively invest in research and development, supply chain flexibility, and digital transformation exhibit enhanced operational efficiency and market responsiveness.

PLS-SEM in Previous Research[17]

Findings from structural equation modeling in published studies indicate

robust positive correlations between dynamic capabilities and organizational performance metrics, including innovation, productivity, and export competitiveness. Empirical evidence substantiates that innovation serves as a mediator between dynamic capacities and competitive advantage.

Trends in Manufacturing Growth (Secondary Data) [18]The growth of India's manufacturing production (+5.4% in July 2025) and the swift expansion of MSMEs in states such as Uttar Pradesh (employment +60.8%) underscore the significance of adaptive capability in regional economies.

Globally, the GDP proportion of manufacturing is diminishing in G7 nations, however China's share in manufacturing exports increased from 4.8% in 2000 to 21.4% in 2020, illustrating the influence of dynamic capacities at the national level.

Identified Discrepancies[19]

The variability in measurement among research complicates cross-comparison. Insufficient empirical research from emerging nations creates a knowledge deficit regarding contextual constraints in capability development.

Excessive dependence on static statistics (GDP, exports, output) inadequately reflects intangible assets like learning and innovation culture.

Recommendations[20]

1. Regarding Enterprises: Consistently invest in sensing methods like as market intelligence, digital technologies, and consumer analytics to anticipate technology and demand fluctuations. Enhance grabbing capabilities via research and development partnerships, adaptable production systems, and the implementation of Industry 4.0 technologies. Enhance reconfiguration capabilities through worker retraining, supply chain redesign, and the adoption of sustainability-oriented practices.
2. For Decision-Makers: Offer specific incentives for companies implementing digital transformation and innovation ecosystems. Enhance support for MSMEs by improving access to financing, technological incubation, and export facilitation initiatives. Promote collaborations between industry and academics to expedite skill enhancement and knowledge dissemination.
3. For Academics: Execute longitudinal PLS-SEM experiments to elucidate the evolution of dynamic capacities across time. Broaden research to include rising economies (e.g., India, Southeast Asia, Africa) for cross-contextual insights. Employ mixed-method approaches that incorporate surveys, case studies, and big data analytics.

Concluding Remarks

This research confirms that dynamic capabilities are essential for maintaining competitive advantage in the manufacturing industry. Companies that consistently identify opportunities, capitalize on them adeptly, and reorganize resources in reaction to environmental volatility surpass their competition in innovation, efficiency, and resilience. The analysis of secondary data indicates that competitive manufacturing locations, including China and swiftly industrializing areas in India, attribute their success to robust

dynamic capacities.

The findings theoretically endorse the Dynamic Capabilities View (DCV) as an extension of the Resource-Based View (RBV), highlighting adaptability rather than static resources. The study emphasizes the necessity for companies and policymakers in emerging economies to cultivate innovation ecosystems, enhance digital integration, and promote workforce adaptability.

This research, constrained by its dependence on secondary data, enhances the literature by integrating empirical findings with global manufacturing trends. Future study ought to utilize primary surveys using PLS-SEM, longitudinal analysis, and cross-national comparisons to enhance comprehension. Dynamic capabilities are crucial for manufacturers seeking to achieve and maintain global competitiveness in the 21st century.

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