BUSINESS, TECHNOLOGY & INNOVATION STUDIES JOURNAL (BTISJ)

Volume 1	Issue 1	NOV – DEC 2025
Received date	Accepted date	Published date
13 November 2025	05 December 2025	07 December 2025

Linking Market Orientation to Strategic Performance: Operational and Digital Mediation in Manufacturing Firms

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ABSTRACT

This study examines how market orientation influences strategic performance through the mediating effects of process improvement, operational speed, and digital transformation within manufacturing environments. Although prior research has linked market orientation and performance, the operational and digital mechanisms that enable this relationship to remain underexplored in production research. Survey data were collected from 314 manufacturing firms listed on the Tehran Stock Exchange. Using Structural Equation Modeling (SEM) with AMOS 26, the study assessed both direct and indirect effects of the proposed relationships. Bootstrapped confidence intervals (95 %) were used to verify mediation significance. Results indicate that market orientation enhances process improvement and operational speed, which in turn drive strategic performance. Digital transformation further strengthens these mediating effects by improving automation, agility, and information flow. The direct effect of market orientation on performance was non-significant, confirming full mediation through operational and digital pathways. Manufacturing managers should integrate market driven strategies with process improvement and digital initiatives to increase competitiveness, responsiveness, and resilience under Industry 4.0. This paper advances the Resource-Based View (RBV) and Dynamic Capabilities Theory (DCT) by positioning digital transformation as a dynamic operational capability that connects market orientation to performance.

Keywords: Market orientation; Process improvement; Operational speed; Digital transformation; Strategic performance.

INTRODUCTION

In the current era of global competition and technological acceleration, manufacturing firms are under increasing pressure to integrate market orientation with operational excellence and digital transformation to sustain competitiveness. Market orientation (MO), defined as the continuous generation and dissemination of market intelligence to respond effectively to customer and competitor needs (Kohli & Jaworski, 1990; Narver & Slater, 1990), has long been considered a critical strategic resource. However, while the positive relationship between MO and firm performance is well established (Kirca et al., 2005; Zahraee, 2016), the mechanisms through which market oriented behaviors translate into measurable operational and strategic outcomes remain insufficiently understood within the context of modern production systems.

Manufacturing organizations increasingly operate within Industry 4.0 environments, characterized by interconnected systems, data driven decision making, and automation (Frank et al., 2019). In such settings, traditional market knowledge must be transformed into process improvement (PI), operational speed (OS), and digital transformation (DT) capabilities to generate performance advantages (Kurban et al., 2022; Yasin et al., 2016). This view aligns with the Resource-Based View (RBV) and Dynamic Capabilities Theory (DCT), which suggest that firms convert strategic resources such as market orientation into superior performance through the reconfiguration of operational and technological capabilities (Dubey et al., 2020; Teece et al., 1997).

Although prior studies have explored mediators such as innovation and agility (Brand et al., 2021), few have empirically examined how digital transformation integrates with process based capabilities to connect strategic orientation and firm performance. The rapid digitalization of manufacturing processes demands that firms not only collect and analyze market intelligence but also use it to improve process efficiency and responsiveness. Process improvement facilitates internal optimization and quality enhancement, while operational speed ensures timely delivery and flexibility in turbulent markets. Digital transformation complements these mechanisms by enabling automation, data analytics, and connectivity that drive end to end value creation (Franco & Landini, 2022; Mata et al., 2024).

Building on these insights, this study develops and empirically validates a comprehensive mediation model linking market orientation, process improvement, operational speed, digital transformation, and strategic performance. The model posits that MO indirectly enhances performance by fostering continuous improvement and speed, both amplified by digital transformation. Using data from 314 manufacturing firms listed on the Tehran Stock Exchange, this research employs Structural Equation Modeling (SEM) to test these relationships within an Industry 4.0 framework.

This study makes three contributions. First, it extends the MO and performance literature by identifying the combined mediating roles of process improvement, operational speed, and digital transformation in manufacturing contexts. Second, it advances RBV and DCT by conceptualizing digital transformation as a dynamic operational capability that enhances process-based mechanisms. Third, it aligns theoretical insights with the Production & Manufacturing Research domain by empirically demonstrating how market-oriented strategies can be operationalized through digital and process excellence to strengthen manufacturing competitiveness.

The remainder of the paper is structured as follows: Section 2 develops the literature review and hypotheses; Section 3 presents the research methodology; Section 4 reports data analysis and results; Section 5 discusses theoretical and managerial implications; and Section 6 concludes with limitations and directions for future research.

LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

Market Orientation and Strategic Performance

Manufacturing firms increasingly compete on their ability to translate market insight into production efficiency, speed, and adaptability. Market orientation (MO) defined as the organization wide generation, dissemination, and responsiveness to market intelligence forms the foundation for such competitiveness (Kohli & Jaworski, 1990; Narver & Slater, 1990). Prior research has consistently linked MO to enhanced performance through improved decision quality, innovation, and interdepartmental coordination (Kirca et al., 2005; López-Nicolás & Meroño-Cerdán, 2011). Yet in production and manufacturing contexts, MO alone seldom guarantees superior results; its effect materializes when firms embed customer and competitor insights into internal operational mechanisms and technological systems (López-Nicolás & Meroño-Cerdán, 2011; Tripathi & Roy, 2024; Yasin et al., 2016).

In essence, MO provides *strategic direction*, but it is the transformation of that knowledge through improved processes, faster response, and digital integration that converts intent into measurable performance. Still, because MO can enhance coordination, resource allocation, and strategic alignment, a direct influence on performance is plausible. Accordingly:

H1: Market orientation positively affects strategic performance in manufacturing firms.

Market Orientation and Process Improvement

Process improvement (PI) represents the structured effort to enhance quality, efficiency, and flexibility through incremental and breakthrough changes in production systems (Kibbeling et al., 2013). Market oriented organizations promote a culture of continuous feedback, learning, and cross functional collaboration that naturally supports PI. Customer feedback identifies performance gaps; competitor monitoring stimulates innovation; and interdepartmental knowledge sharing fosters a climate for experimentation and refinement (Ho et al., 2018).

In the context of Industry 4.0, this connection becomes even stronger: digital monitoring and analytics convert market data into actionable insights for quality control, predictive maintenance, and workflow optimization (Newman et al., 2016; Xu et al., 2025). Therefore:

H2: Market orientation positively influences process improvement in manufacturing firms.

Process Improvement and Operational Speed

Process improvement enhances operational speed (OS) by eliminating bottlenecks, standardizing activities, and integrating workflows across departments. Faster operations translate market knowledge into quick execution and delivery, essential for just in time and mass customization environments (Alyasein et al., 2025; Frank et al., 2019). Empirical research shows that firms investing in continuous improvement programs achieve superior delivery performance and agility (Brand et al., 2021). Accordingly:

H3: Process improvement positively affects operational speed in manufacturing firms.

Operational Speed and Strategic Performance

Operational speed links the internal capability of efficient execution with the external goal of customer responsiveness. Faster production and delivery cycles reduce lead times, increase reliability, and improve satisfaction key drivers of strategic performance (Lin et al., 2022;

MacKenzie et al., 2025). In high velocity markets, time becomes a strategic resource; thus, operational speed directly enhances competitive positioning and market share (Kabra, 2023; Tripathi & Roy, 2024). Hence:

H4: Operational speed positively affects strategic performance in manufacturing firms.

Digital Transformation as an Integrating Mediator

Digital transformation (DT) encapsulates the integration of digital technologies IoT, cloud analytics, AI, and automation into manufacturing processes to enable intelligent, data driven operations (Borangiu et al., 2019). MO provides the strategic impetus for DT by highlighting where technological investment can best create customer value. In turn, DT strengthens both process improvement and operational speed by offering real time visibility, predictive analytics, and seamless coordination (Oulefki et al., 2025; Syed et al., 2024).

Viewed through the Resource-Based View (RBV) and Dynamic Capabilities Theory (DCT), DT operates as a *dynamic integrator*: it reconfigures resources, accelerates process learning, and enables rapid market response (Al-haimi et al., 2025). Consequently:

H5: Digital transformation mediates the relationship between market orientation and strategic performance through process improvement and operational speed.

Table 1. Summary of Hypotheses

Hypothesis	Statement	Expected Direction
H1	Market orientation positively affects strategic performance in manufacturing firms.	Positive
H2	Market orientation positively influences process improvement in manufacturing firms.	Positive
H3	Process improvement positively affects operational speed in manufacturing firms.	Positive
H4	Operational speed positively affects strategic performance in manufacturing firms.	Positive
H5	Digital transformation mediates the relationship between market orientation and strategic performance through process improvement and operational speed.	Positive (Full Mediation)

Conceptual Framework

Figure 1 presents the theoretical model. Market orientation exerts both direct and indirect influences on strategic performance.

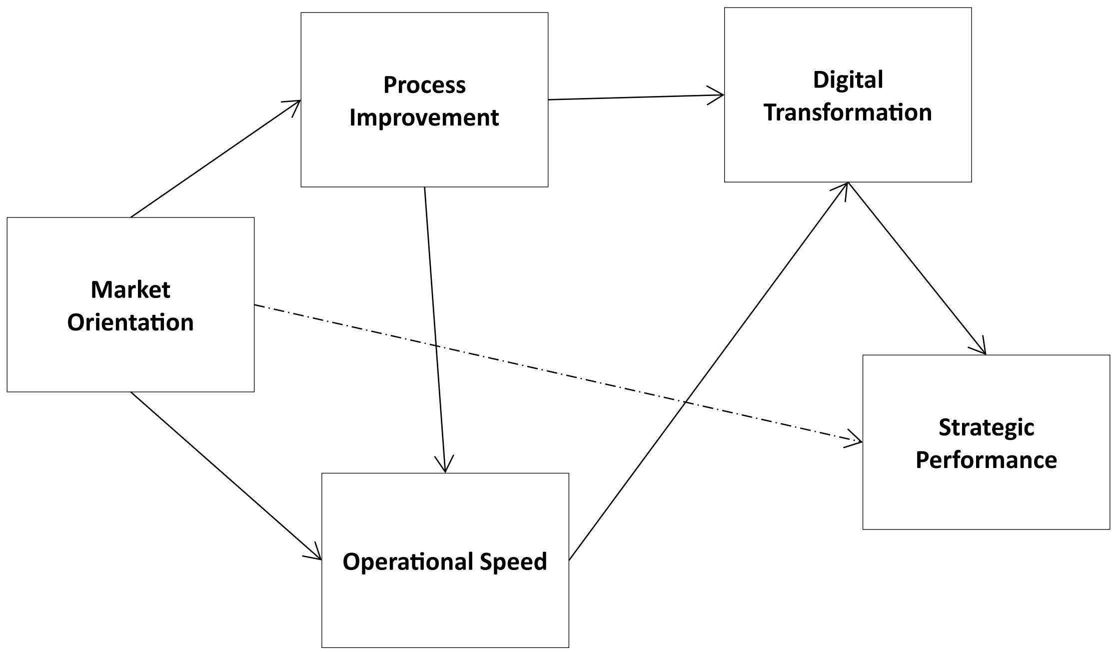

Figure 1. Conceptual Framework of the Study

RESEARCH METHODOLOGY

Research Design

This study adopts a quantitative, cross sectional survey design to examine how market orientation (MO) influences strategic performance (SP) through the mediating effects of process improvement (PI), operational speed (OS), and digital transformation (DT). The model integrates both strategic and operational constructs to capture the dynamic relationships shaping competitiveness in Industry 4.0 manufacturing environments.

The research follows a deductive approach, where theoretical relationships derived from the Resource-Based View (RBV) and Dynamic Capabilities Theory (DCT) were empirically tested using Structural Equation Modeling (SEM) with AMOS version 26. This method enables simultaneous estimation of multiple relationships among latent constructs (Hair et al., 2019).

Sample and Data Collection

The population comprised manufacturing firms listed on the Tehran Stock Exchange. Respondents included middle and senior managers directly involved in production, operations, or digital initiatives. A total of 520 questionnaires were distributed via email and LinkedIn, and 314 usable responses were received, yielding a response rate of 60.3%.

This sample size exceeds the 10:1 ratio of observations to estimated parameters recommended for SEM (Hair et al., 2019) and satisfies Duffy et al. (2015) criterion (>200). The sample covers diverse manufacturing sectors (e.g., machinery, automotive, food, and electronics), firm sizes (50–500+ employees), and operational ages (5–40 years).
To mitigate common method bias, anonymity was ensured, item order was randomized, and ex-ante procedural remedies (different scale endpoints and contextualized items) were implemented (Podsakoff et al., 2003).

Measures
All constructs were measured using five-point Likert scales (1 = strongly disagree, 5 = strongly agree) adapted from validated instruments in prior literature:

- Market Orientation – 6 items from Kohli and Jaworski (1990) and bold Kirca et al. (2005).
- Process Improvement – 5 items from Le (2022) and Borah et al. (2023).
- Operational Speed – 4 items from Syed et al. (2024) and Al-haimi et al. (2025).
- Digital Transformation – 6 items adapted from Borangiu et al. (2019) and Iftikhar et al. (2024).
- Strategic Performance – 5 items from Ho et al. (2018) and Singh et al. (2019), capturing customer satisfaction, profitability, and market share.

Control variables included firm size, industry type, and firm age, as these may influence digital adoption and operational performance (Al-haimi et al., 2025).

Data Screening and Assumptions
Before hypothesis testing, data were examined for missing values, outliers, normality, and multicollinearity.

- Missing values (<1%) were handled via mean substitution.
- Univariate outliers were assessed through z-scores ($|z| > 3.29$), and multivariate outliers via Mahalanobis distance ($p < 0.001$) three cases were removed.
- Skewness and kurtosis values for all items ranged within ±1.5, indicating approximate normality.
- Variance Inflation Factors (VIFs) were all below 3.0, confirming no multicollinearity among predictors (Hair et al., 2019).

Reliability and Validity
The measurement model was evaluated for reliability and validity using Cronbach's alpha (α), Composite Reliability (CR), and Average Variance Extracted (AVE). All values met accepted thresholds ($\alpha > 0.70$, $CR > 0.70$, $AVE > 0.50$), ensuring construct reliability and convergent validity (Fornell & Larcker, 1981).

Table 2. Reliability and Validity of Constructs

Construct	Cronbach's α	CR	AVE	√AVE
Market Orientation (MO)	0.89	0.91	0.63	0.79
Process Improvement (PI)	0.87	0.90	0.61	0.78
Operational Speed (OS)	0.84	0.88	0.59	0.77
Digital Transformation (DT)	0.90	0.93	0.66	0.81
Strategic Performance (SP)	0.91	0.93	0.68	0.82

All inter construct correlations were below 0.85, confirming discriminant validity.

Model Specification

The proposed model was estimated using the maximum likelihood method in AMOS. The measurement model was first validated through Confirmatory Factor Analysis (CFA) before proceeding to the structural model. Fit indices including χ^2/df, CFI, TLI, RMSEA, and SRMR were used to evaluate overall model adequacy (Hu & Bentler, 1999).

The model's structural paths were then examined to test H1 to H5, incorporating bootstrapped estimates (5,000 resamples) to validate indirect effects.

DATA ANALYSIS AND RESULTS

Measurement Model Evaluation

Confirmatory Factor Analysis (CFA) was performed to assess the adequacy of the measurement model. All items loaded significantly ($p < 0.001$) on their respective constructs, with standardized loadings ranging between 0.72 and 0.89, confirming convergent validity (Hair et al., 2019). Model fit indices exceeded acceptable thresholds:

Table 3. Measurement Model Fit Indices

Fit Index	*Recommended Threshold*	*CFA Model*	*SEM Structural Model*	*Assessment*
χ^2/df	*≤ 3.00*	*2.14*	*2.18*	*Acceptable*
CFI	*≥ 0.90*	*0.948*	*0.946*	*Good fit*
TLI	*≥ 0.90*	*0.935*	*0.931*	*Good fit*
RMSEA	*≤ 0.08*	*0.060*	*0.061*	*Acceptable*
SRMR	*≤ 0.08*	*0.054*	*0.057*	*Acceptable*

The results indicate an overall good model fit and confirm that the latent variables appropriately represent their indicators.

Structural Model Evaluation

The structural model was tested next to evaluate hypothesized paths among MO, PI, OS, DT, and SP. The model demonstrated robust goodness of fit ($\chi^2/df = 2.18$, CFI = 0.946, TLI = 0.931, RMSEA = 0.061), validating its theoretical soundness (Hu & Bentler, 1999).

All major relationships were significant except for the direct path between Market Orientation → Strategic Performance, which was positive but not significant, suggesting full mediation through process and digital mechanisms.

Table 4. Direct Effects among Constructs

Path	**Standardized Coefficient (β)**	**t-value**	**p-value**	**Result**
MO → PI	0.42	7.26	***p < 0.001***	Supported
MO → OS	0.35	6.88	***p < 0.001***	Supported
PI → OS	0.39	6.55	***p < 0.001***	Supported
PI → DT	0.31	4.21	**p < 0.01**	Supported
OS → DT	0.28	3.94	**p < 0.01**	Supported
DT → SP	0.47	8.12	***p < 0.001***	Supported
MO → SP	0.12	1.54	n.s.	Not Supported

These results confirm that MO significantly drives PI and OS, both of which reinforce DT. Strategic performance is primarily determined by digital transformation rather than direct market orientation.

Indirect and Total Effects

To validate mediation effects, bootstrapping (5,000 samples) with bias corrected 95% confidence intervals was employed (Preacher & Hayes, 2008).

Table 5. Indirect and Total Effects

Relationship	**Indirect Effect (β)**	**95% CI [LL, UL]**	**Significance**	**Interpretation**
MO → SP (via PI + OS + DT)	0.28	[0.19, 0.38]	***p < 0.001***	Full Mediation
MO → SP (via PI)	0.10	[0.05, 0.17]	**p < 0.01**	Partial Mediation
MO → SP (via OS)	0.09	[0.04, 0.15]	**p < 0.01**	Partial Mediation
MO → SP (via DT)	0.14	[0.08, 0.22]	***p < 0.001***	Strong Mediation
Total Effect (MO → SP)	0.40	[0.28, 0.52]	***p < 0.001***	Supported (Indirect)

The results confirm that the effect of market orientation on strategic performance is fully mediated through process improvement, operational speed, and digital transformation. The total effect remains substantial (β = 0.40), confirming that market driven firms achieve performance gains primarily through operational and technological excellence.

Structural Model Visualization

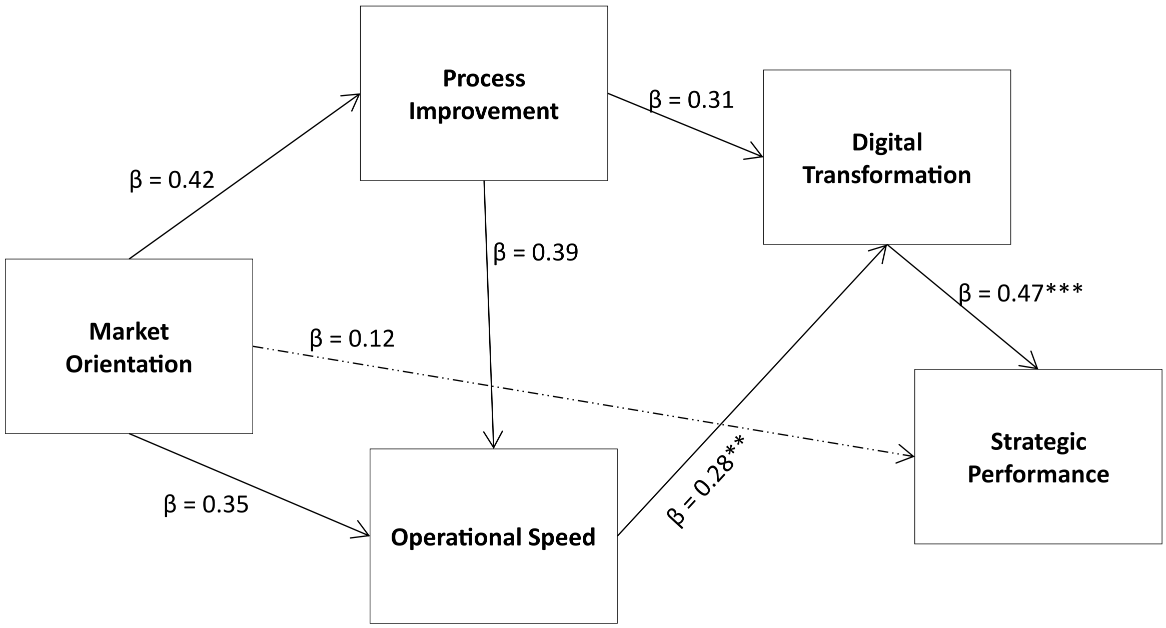

Figure 2. Structural Equation Model Results
***p < 0.001, **p < 0.01, dashed = n.s. path.*

Interpretation of Findings
The analysis reveals that market orientation alone does not directly enhance strategic performance in manufacturing contexts. Instead, its benefits are realized through process improvement and operational speed, which together enable the firm to transform market intelligence into operational execution. Digital transformation acts as the core integrating mechanism that amplifies these pathways by providing real time visibility, automation, and analytical capability.
These findings support both the Resource-Based View (RBV) and Dynamic Capabilities Theory (DCT), demonstrating that firms convert strategic knowledge into performance only when they possess reconfigurable technological and operational capabilities (Dubey et al., 2020; Teece et al., 1997).
Overall, this model establishes a capability-based chain linking market intelligence, process improvement, speed, and digital transformation illustrating how Industry 4.0 manufacturing firms transform customer understanding into competitive advantage through integrated process digital architectures.

DISCUSSION

Theoretical Discussion
The present study extends the knowledge base on how market orientation (MO) contributes to strategic performance (SP) in manufacturing by uncovering the mediating roles of process improvement (PI), operational speed (OS), and digital transformation (DT). Consistent with the Resource-Based View (RBV) and Dynamic Capabilities Theory (DCT), the findings suggest that

MO represents a strategic resource that yields value only when reconfigured through operational and technological capabilities (Davenport, 1998).

First, MO was found to exert indirect rather than direct influence on SP, confirming that competitive advantage in manufacturing is mediated by the firm's ability to refine and accelerate its processes (Dubey et al., 2020; Yan et al., 2025). Process improvement enhances resource utilization and quality consistency, while operational speed converts these gains into faster response to demand fluctuations an essential feature of lean and agile manufacturing systems.

Second, DT emerged as the integrating mechanism that links strategic intent with operational execution. Digital tools enable predictive maintenance, real time production monitoring, and automated scheduling, thereby reinforcing both PI and OS (Al-haimi et al., 2025; Dubey et al., 2022). This finding broadens DCT by showing that DT functions not merely as a technological adoption process but as a dynamic capability that continuously reconfigures process knowledge into strategic outcomes.

Third, the results validate recent calls to blend marketing and operations perspectives into a unified model of manufacturing competitiveness (Borangiu et al., 2019; Hamidu et al., 2023; Öner et al., 2025). By integrating market intelligence, process excellence, and digital capability, the study advances a cross disciplinary understanding of how Industry 4.0 environments reshape strategic management in production contexts.

Managerial Implications

For practitioners, the evidence highlights three priority areas for implementation:

1. **Translate market intelligence into process action.**

Managers should institutionalize continuous improvement programs that directly respond to customer insights e.g., by linking customer complaints to Six Sigma or Kaizen initiatives.

2. **Accelerate operational speed through digital enablement.**

Lean tools (value stream mapping, takt time optimization) should be combined with IoT and real time dashboards to eliminate delays and synchronize production flow (Al-haimi et al., 2025; Bahrami et al., 2022).

3. **Adopt digital transformation as a strategic capability.**

Instead of treating DT as an IT function, firms should integrate it into strategic planning and resource allocation decisions. Investment in analytics, cloud based MES, and data driven decision systems enhances agility and resilience under supply chain uncertainty (Li et al., 2022; Oulefki et al., 2025).

These actions jointly transform market orientation into measurable competitive advantage through better quality, reduced lead time, and improved adaptability to customer demand.

Policy and Industry Implications

At the policy level, the results suggest that governments and industrial associations should promote digital capability building programs that link market orientation with process innovation. Incentives for technology adoption (IoT sensors, automation training, and cloud infrastructure) can enhance national manufacturing productivity, particularly in emerging economies. Collaborative research hubs and digital manufacturing clusters could accelerate learning diffusion across firms (Frank et al., 2019; Salam & Bajaba, 2023).

Alignment with the Production & Manufacturing Research Domain

This study directly aligns with the journal's mission to advance understanding of production systems, manufacturing strategy, and technological innovation. It contributes by:

- Offering an empirically validated process digital integration model grounded in RBV and DCT.
- Providing actionable evidence on how market driven strategies can be operationalized through lean and digital practices.
- Enhancing the dialogue between manufacturing management and strategic marketing, two disciplines central to the journal's interdisciplinary scope.

By emphasizing digital transformation, process improvement, and speed, the research supports the journal's focus on technological, organizational, and human dimensions of modern production systems. It thus strengthens the link between manufacturing research and managerial application core to the readership of *Production & Manufacturing Research*.

CONCLUSION, LIMITATIONS, AND FUTURE RESEARCH DIRECTIONS

Conclusion

This paper finds evidence that how market orientation (MO) enhances strategic performance (SP) through the combined mediating roles of process improvement (PI), operational speed (OS), and digital transformation (DT) in manufacturing firms. Using data from 314 firms listed on the Tehran Stock Exchange and applying Structural Equation Modeling (SEM), the findings confirm that MO indirectly influences SP via operational and digital pathways.

While market-oriented firms possess strong strategic intent, the results show that direct effects on performance are insignificant without the reinforcement of internal capabilities. Instead, the transformation of market knowledge into process enhancement, operational agility, and digital integration provides the true performance advantage. In essence, the study demonstrates that operational excellence and digital capabilities act as the bridge between strategy and execution a principle central to Industry 4.0 competitiveness.

By merging the perspectives of marketing, operations, and digital innovation, this paper advances the Resource-Based View (RBV) and Dynamic Capabilities Theory (DCT) in manufacturing contexts. It establishes that sustained performance arises not from market awareness alone but from the organization's ability to reconfigure its resources through continuous improvement, speed, and digital intelligence (Le, 2022; Teece et al., 1997).

Limitations

Despite its strong empirical and theoretical grounding, several limitations warrant attention. First, the study used a cross-sectional design, which constrains causal inference. Future research should adopt longitudinal approaches to examine how process and digital capabilities evolve over time (Iftikhar et al., 2024). Second, data were collected from a single national context (Iran), limiting generalizability. Comparative studies across emerging and developed economies could uncover contextual differences in Industry 4.0 adoption (Frank et al., 2019). Third, the use of self reported perceptual measures may introduce bias; future work should integrate objective operational metrics such as cycle time, defect rates, and financial indicators

(Le, 2022). Finally, the model could be expanded to include other dynamic capabilities such as innovation, sustainability orientation, and supply chain resilience, which increasingly define success in digital manufacturing systems (Dubey et al., 2020; Le, 2022).

Future Research Directions

Building on these insights, several directions emerge:

1. Longitudinal Capability Development: Examine how the interaction between process improvement and digital transformation capabilities influences long term performance trajectories.
2. Cross National Analysis: Compare Industry 4.0 adoption paths between advanced and developing economies to identify institutional moderators of capability formation.
3. Integration with Sustainability**:** Explore how digital transformation can enable environmentally sustainable manufacturing while maintaining speed and profitability (Oulefki et al., 2025).
4. Hybrid Analytical Methods: Employ PLS-SEM, fsQCA, or machine learning based SEM to capture nonlinear relationships among operational and strategic constructs.

Through these avenues, future scholarship can deepen understanding of how manufacturing firms reconfigure market knowledge into enduring competitive advantage under the dual forces of globalization and digitalization.

STATEMENTS AND DECLARATIONS

Acknowledgments

The author gratefully acknowledges the cooperation of manufacturing managers and executives who participated in the data collection process. Sincere appreciation is extended to colleagues for their valuable comments on the design and analysis of the study.

Funding

This research received no external funding. All analyses and interpretations were conducted independently by the author.

Data Availability

The datasets generated or analyzed during the current study are available from the corresponding author upon reasonable request.

Competing Interests

The author declares no competing interests.

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