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**Research Article**

# Impact of Technological and Resource Integration on Performance: Moderated Mediation Model

**[1]Fazle Akram | [2]Riaz Ahmed | [*2]Bilal Anwar**

[1]MS research Scholar, Bahria University, Islamabad, Pakistan
Email: 01-398232-027@student.bahria.edu.pk
[2,3]Professor, Department of Project Management & Supply Chain Management, Bahria University, Islamabad, Pakistan
Email: rahmed.buic@bahria.edu.pk

**Correspondence**
Professor Dr Bilal Anwar
Email: bilalanwar.buic@bahria.edu.pk

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## ABSTRACT

This study investigates the impact of integrating technology and flexible resource management on organizational performance, with a particular focus on strategic agility and dynamic capabilities. As firms transition from product-centric models to service-driven innovation platforms, they encounter several challenges, including resource alignment, enhancing agility, and fostering innovation. This research addresses a critical gap in the existing literature by exploring how established firms can cultivate dynamic capabilities to effectively navigate this transition. The research adopts a framework that demonstrates how technological integration and resource flexibility contribute to strengthening these dynamic capabilities, ultimately improving organizational adaptability and performance. Key findings highlight that strategic agility plays a pivotal role in further amplifying this effect, enabling firms to rapidly respond to market changes and manage collaborative partnerships. The study provides actionable insights for organizations undergoing a shift to service-based business models, emphasizing the importance of combining technology, resource flexibility, and agile decision-making. Additionally, the findings align with SDG 9 by advocating for innovation and resilient infrastructure as pillars for sustainable industrial development. In conclusion, this research offers a roadmap for achieving sustainable growth, maintaining a competitive advantage, and driving customer-centric innovation in the rapidly evolving platform economy.

## KEYWORDS

Strategic Agility, Dynamic Capabilities, Technological Integration, Resource Flexibility, Organizational Performance

## 1 | INTRODUCTION

The digital transformation of industries through platforms has brought both innovation and disruption to a variety of sectors. Platform-native companies, such as Uber, Airbnb, and Kickstarter, have revolutionized industries like transportation, hospitality, and finance by enabling seamless interactions and transactions without owning traditional physical assets (Kenney, Bearson, & Zysman, 2021). These platforms rely heavily on networked ecosystems, and their success has shifted the competitive dynamics within industries, forcing incumbents to adapt rapidly. As these platform-native firms continue to thrive, traditional enterprise software providers like Oracle and SAP are evolving to compete in the digital economy by transitioning from product-based offerings to innovation platforms (Schreieck, Wiesche, & Krcmar, 2022). The shift from traditional product platforms to service-oriented innovation platforms represents a significant challenge for established firms, particularly in the enterprise software industry. Historically, these firms operated on on-premises product platforms that required extensive customization and partner-led implementations (Haki, Blaschke et al., 2024). With the rise of cloud-based platforms, such as Salesforce and Workday, access to core platform functionalities has democratized, enabling third-party developers to innovate and build upon these platforms (Schreieck, Huang et al., 2024). This shift has ushered in new opportunities for innovation but also posed considerable challenges in aligning resources, managing partnerships, and enhancing organizational agility.

Existing literature predominantly focuses on platform-native startups, leaving a significant gap in understanding the dynamics and challenges faced by incumbent firms transitioning to service-oriented platforms (Schreieck, Wiesche, &

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Krcmar, 2022). The literature on dynamic capabilities—particularly in the context of platform-based ecosystems—remains underdeveloped. These capabilities, which include resource curation, ecosystem preservation, resource reconfiguration, and diversification (Haki, Blaschke et al., 2024), are crucial for navigating this transformation. However, there is a dearth of research that examines how established firms cultivate these capabilities and leverage their platform partners in the process. This study seeks to fill these gaps by exploring how incumbent firms develop the dynamic capabilities necessary for a successful transition from product-oriented to service-oriented business models. Through a quantitative approach, the research investigates how these firms build dynamic capabilities and adjust their governance structures to thrive in the evolving platform economy. The role of platform partners, particularly in terms of governance mechanisms, technological enablers, and resource integration, is central to this transformation but remains underexplored in the current literature (Staub, Haki et al., 2022).

As firms pivot towards service-centric models, understanding the mechanisms that facilitate this transformation while preserving competitive advantage and performance is critical. Traditional organizational structures and resource management practices often fail to support the flexibility and responsiveness required in service-oriented contexts (Kindström, 2015). Thus, developing dynamic capabilities—particularly those that enable firms to sense, seize, and transform resources and strategies in response to market changes—is essential (Teece, 2007). This study also examines the critical role of strategic agility in enabling firms to integrate technology and adapt resources effectively. Despite its importance, the moderating role of strategic agility in enhancing dynamic capabilities remains underexplored (Kotkova, 2018). Moreover, this research contributes to the achievement of Sustainable Development Goal 9 (SDG 9), which advocates for resilient infrastructure, inclusive industrialization, and innovation. By focusing on the development of innovation platforms and dynamic capabilities, the study aims to provide actionable insights into fostering sustainable industrial growth through digital transformation. The findings will shed light on how incumbent firms can build and enhance innovation ecosystems, ultimately supporting SDG 9's call for sustainable and technology-driven economic progress.

## 2 | LITERATURE REVIEW

This section synthesizes key literature on the main variables central to the study: technology integration, resource flexibility, strategic agility, and organizational performance. These variables are examined separately to highlight their individual importance, and then the relationships between them are explored in the context of the transition from product-oriented to service-oriented business models.

### 2.1 | Technology Integration

Technology integration is critical in facilitating the transition to service-based business models. It refers to embedding digital tools and systems across various organizational functions to support seamless data flow, enhance decision-making, and improve overall flexibility (Teece, Pisano, & Shuen, 1997). Successful integration allows organizations to adapt quickly to changing customer needs, fostering greater responsiveness and operational efficiency. Key factors in technology integration include system interoperability, wide adoption across departments, and the focus on automation to streamline processes (Alavi & Leidner, 2001). The literature suggests that effective technology integration enhances an organization's ability to innovate, scale operations, and manage changes efficiently. Firms that leverage technology in their operations can react more swiftly to market demands, improving their competitive edge (Eisenhardt & Martin, 2010). This ability to adapt rapidly is crucial for organizations transitioning to service-based models, where speed and flexibility are critical.

### 2.2 | Resource Flexibility

Resource flexibility refers to an organization's ability to quickly reconfigure its resources—such as human, technological, and financial assets—based on shifting market conditions and customer demands (Martínez Sánchez & Pérez Pérez, 2005). This capability is particularly significant in service-driven business models where the ability to adapt quickly is essential for meeting customer needs. Research has shown that firms with high resource flexibility are better equipped to implement dynamic capabilities, such as sensing and seizing market opportunities and transforming resources to stay competitive (Teece, Pisano & Shuen, 1997). Flexible resource management allows organizations to quickly adjust to changing circumstances, making it a key determinant of organizational success in service-based environments (Sanchez, 1995). By enabling quick redeployment of resources, firms are more agile in responding to customer requirements, leading to better market performance.

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### 2.3 | Strategic Agility

Strategic agility is defined as the organization's ability to respond rapidly to market changes by adjusting strategies, reallocating resources, and leveraging new opportunities (Doz & Kosonen, 2008). It is an essential component for organizations making the shift to service-oriented business models. Strategic agility allows firms to manage customer demands, adjust service delivery, and fine-tune strategies in real-time, which is necessary in a highly competitive, fast-changing environment (Weill & Ross, 2009). Agility plays a moderating role in enhancing the effects of both technology integration and resource flexibility. Research indicates that organizations with high strategic agility can better align their resources with emerging service demands and technological innovations, thus improving performance (Kotkova, 2018). This study examines how strategic agility moderates the relationship between technology integration, resource flexibility, and organizational performance.

### 2.4 | Organizational Performance

Organizational performance is measured by both financial and non-financial metrics. Financial performance indicators like profitability, revenue growth, and operational efficiency are important, but non-financial metrics such as customer satisfaction, service responsiveness, and flexibility are equally significant in service-based business models (Venkatraman & Ramanujam, 1987). In service-oriented models, organizations must align resources, technology, and capabilities to meet customer needs efficiently. Studies show that firms with integrated technology and flexible resources perform better in terms of customer satisfaction and service quality, which are crucial for service-driven success (Anand, Sahay, & Saha, 2005). The ability to meet customer demands quickly and efficiently while maintaining high performance is a key objective for organizations transitioning to service-based models.

### 2.5 | Theoretical Framework

The theoretical framework integrates technology integration, resource flexibility, strategic agility, and organizational performance into a unified model. It proposes that these variables work together to enhance an organization's dynamic capabilities, which are critical for the successful transition from product-oriented to service-oriented models. Strategic agility moderates the relationship between technology integration and resource flexibility, amplifying their effects on organizational performance. The framework suggests that organizations with high strategic agility are more likely to successfully adapt their technologies and resources to meet changing market demands, leading to better organizational performance.

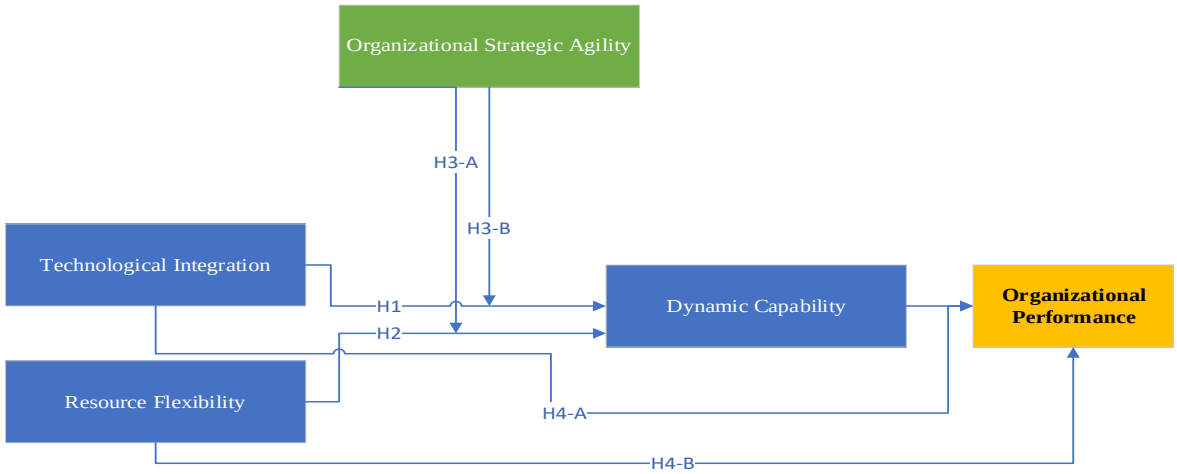


**Figure 1:** Theoretical Research Model

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# 3 | METHODS

## 3.1 | Research Approach

This study adopts a deductive research approach, grounded in dynamic capabilities and platform ecosystem theories. The approach begins by formulating hypotheses derived from theoretical predictions from the existing literature, focusing on platform transitions and dynamic capabilities (Martin, 2010). The study investigates how technological integration and organizational restructuring impact an incumbent firm's transition to an innovative platform ecosystem. The deductive approach is particularly suited for testing-controlled variables such as technological integration and organizational structure on the transition process, enabling hypothesis validation and the potential generalization of findings in similar platform ecosystems.

## 3.2 | Research Design

The research follows a quantitative research strategy, designed to measure the relationships between independent variables (technology integration, resource flexibility, and strategic agility) and the dependent variable (organizational performance). This design ensures the study addresses its core objective of understanding how these variables contribute to an organization's transition from product-oriented to service-oriented models. The population for this study consists of employees and managers from firms in the process of transitioning to platform ecosystems. Non-probability purposive sampling was used to select participants with relevant experience and knowledge of the organizational changes under study. The sample size was targeted at 450 respondents, based on statistical power calculations to ensure sufficient data for robust analysis. Data was collected via structured surveys, using closed-ended questions that focused on technology integration, resource flexibility, and strategic agility. The collected survey data was analyzed using SPSS, where descriptive statistics, reliability analysis, and hypothesis testing were performed to examine the relationships between the variables.

## 3.3 | Population

The population for this study consisted of telecom companies in the technology sector listed with the Securities and Exchange Commission of Pakistan (SECP). These companies were selected due to their ongoing transition from traditional product-oriented business models to service-oriented platform models, providing an ideal context for examining the effects of technology and resource integration.

## 3.4 | Sample Size

The sample size for this study was determined using Cochran's formula (1977), which ensures statistical significance based on the number of departments or industries transitioning from product to service platforms. This approach ensures that the study includes a sufficient number of respondents to obtain reliable and valid results regarding the research questions.

## 3.5 | Sampling Technique

A non-probability convenience sampling technique was used to select participants for the survey. This approach was chosen due to its practical nature in accessing the target population and ensuring that respondents were familiar with the organizational changes associated with the transition to service platforms.

### 3.5.1 | Statistical Techniques

To ensure the reliability and validity of the data, the following statistical techniques were used:

- **Cronbach's Coefficient α** (Cronbach, 1951; Nunnally, 1978): This measure was used to assess the internal consistency of the study's variables, including Technological Integration, Resource Flexibility, and Organizational Performance. It ensured that the survey instrument produced reliable results.
- **Confirmatory Factor Analysis** (Byrne, 2010; Kline, 2015): CFA was conducted to confirm that the data structure was suitable for the target population, ensuring that the variables aligned well with the theoretical constructs being measured.

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- Data Analysis Techniques: The data was analyzed using SPSS software, with the following methods employed:
- Mean and Standard Deviation: These were used to summarize the central tendency and dispersion of the data.
- Correlation Analysis: This technique was used to measure the strength and direction of relationships between key variables.
- Multiple Linear Regression Analysis: This was conducted to examine the impact of independent variables (e.g., technological integration, resource flexibility) on the dependent variable (organizational performance).

## 4.1 | DATA ANALYSIS

This section presents the detailed statistical analysis conducted on the data collected from 43 respondents across various telecom industries. The primary goal of the analysis was to examine the relationships between Technological Integration, Resource Flexibility, Organizational Strategic Agility, Dynamic Capabilities, and Organizational Performance. Several statistical techniques, including reliability analysis, correlation analysis, and regression analysis, were used to test the hypotheses and extract meaningful insights in line with the existing literature and proposed theoretical framework.

### 4.2 | Reliability Analysis

Cronbach's Alpha was employed to assess the internal consistency and reliability of the scales used in the study. Cronbach's Alpha helps measure how closely related the items within each construct are, indicating the reliability of the measurement instruments.

**Table 1**
*Overall Statistics*

| Item | Scale means if item deleted | Scale variance if item deleted | Corrected item-total correlation | Cronbach's alpha if item deleted |
|---|---|---|---|---|
| TI & RF | 12.1118 | 4.522 | 0.867` | 0.934 |
| OSA | 12.0219 | 4.391 | 0.906 | 0.922 |
| DC | 12.0878 | 4.193 | 0.922 | 0.936 |
| OP | 12.0768 | 4.461 | 0.906 | 0.934 |

The corrected item-total correlations for all items are above 0.85, indicating a strong relationship between each item and its respective scale. Additionally, the high Cronbach's Alpha values, even with item deletion, confirm that all items contribute significantly to the reliability of the scale.

**Table 2**
*Scale Statistics*

| Mean | Variance | Standard deviation | Number of items |
|---|---|---|---|
| 16.0995 | 7.674 | 2.77020 | 4 |

- The overall mean score of **16.0995** reflects positive responses across the four items.
- The variance (7.674) and standard deviation (2.77020) indicate that responses were moderately dispersed, supporting the scale's consistency.

In-Depth Analysis of Reliability Components: The exceptional Cronbach's Alpha value of 0.948 demonstrates excellent reliability. The corrected item-total correlations further confirm that each item aligns strongly with the overall construct. Specifically, the MEAN_DC item, with the highest item-total correlation of 0.906, is a strong contributor to internal consistency. The stability of Cronbach's Alpha values across item deletions also enhances confidence in the robustness of the instrument.

### 4.3 | Correlation Analysis

Pearson correlation analysis was performed to evaluate the strength and direction of the linear relationships between the study's key variables, including Technological Integration & Resource Flexibility (TI & RF), Organizational Strategic Agility (OSA), Dynamic Capabilities (DC), and Organizational Performance (OP). The correlation coefficients range from -1 to +1, where values closer to +1 indicate a strong positive relationship and values closer to -1 indicate a strong negative relationship.

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**Table 3**
*Correlation Matrix*

| VARIABLES | TI & RF | OSA | DC | OP |
|---|---|---|---|---|
| TI & RF | 1 | 0.742 | 0.785 | 0.681 |
| OSA | 0.742 | 1 | 0.769 | 0.714 |
| DC | 0.785 | 0.769 | 1 | 0.812 |
| OP | 0.681 | 0.714 | 0.812 | 1 |

The correlation analysis reveals significant positive correlations across all variables, indicating strong interrelationships between Technological Integration, Resource Flexibility, Strategic Agility, Dynamic Capabilities, and Organizational Performance. The strongest correlation was observed between DC and OP (0.812), emphasizing the critical role of Dynamic Capabilities in enhancing Organizational Performance.

### 4.4 | Regression Analysis

To test the hypotheses and evaluate the direct and moderating effects of the variables, multiple regression analysis was performed using SPSS and the PROCESS macro for moderation and mediation analysis (Hayes, 2013). The analysis aimed to assess the role of Organizational Strategic Agility (OSA) as a moderator in the relationship between Technological Integration (TI), Resource Flexibility (RF), and Dynamic Capabilities (DC).

**Table 4**
*Model Summary*

| Model | R | $R^2$ | Adjusted $R^2$ | Std. Error of the Estimate |
|---|---|---|---|---|
| 1 | 0.908 | 0.824 | 0.822 | 0.32751 |

The $R^2$ value of 0.824 indicates that the model explains 82.4% of the variance in the dependent variable, demonstrating a strong model fit.

**Table 5**
*Anova*

| Model | Sum of squares | Df | Mean square | F | Sig. |
|---|---|---|---|---|---|
| Regression | 120.136 | 1 | 40.045 | 373.329 | 0.000 |
| Residual | 25.636 | 239 | 0.107 | | |
| Total | 145.773 | 240 | | | |

The ANOVA table indicates that the regression model is statistically significant (**$p < 0.001$**), confirming that the independent variables have a significant effect on the dependent variable.

### 4.5 | Exploration of Data Moderator and Mediator Relationships through Graphical Analysis

The statistical analysis for this study was conducted using SPSS syntax to process the data, followed by graphical representation through scatter plots. These visualizations, based on the conceptual model by Hayes (2013), provide insights into the relationship between Technological Integration (TI & RF), Organizational Strategic Agility (OSA), and Dynamic Capabilities (DC), examining the moderated mediation effects in three distinct ways.

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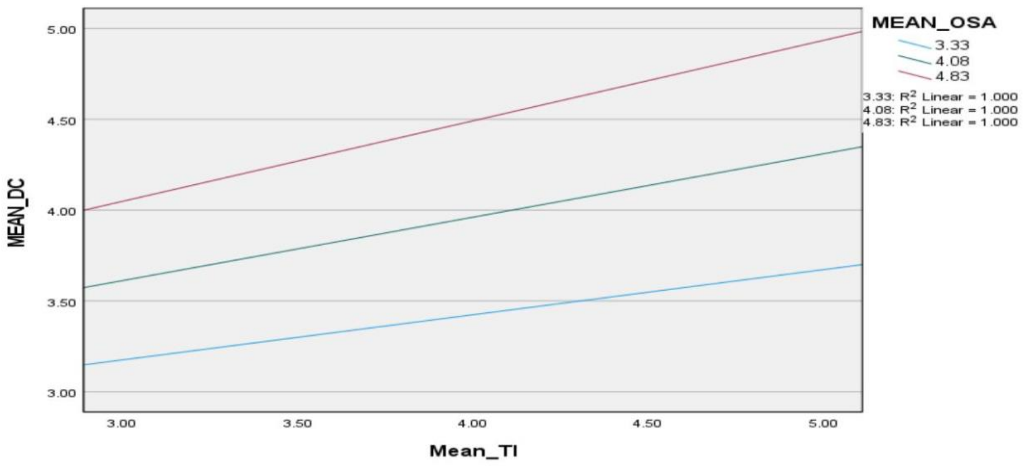


**Figure 2:** Graphical Representation and Interpretation Technological Integration (TI) and Dynamic Capabilities (DC)

The scatter plot illustrates the relationship between Technological Integration (TI) and Dynamic Capabilities (DC), with three regression lines representing different levels of Organizational Strategic Agility (OSA) (3.33, 4.08, and 4.83). As Technological Integration increases, Dynamic Capabilities also increase, demonstrating a positive linear relationship. Notably, the relationship is strengthened as the values of OSA rise, indicating that Strategic Agility plays a crucial moderating role in enhancing the impact of Technological Integration on Dynamic Capabilities. The regression lines show a near-perfect linear fit with an $R^2$ value of 1.000, confirming the robustness of the relationship and supporting the hypothesis that Strategic Agility enhances the effect of Technological Integration on Dynamic Capabilities.

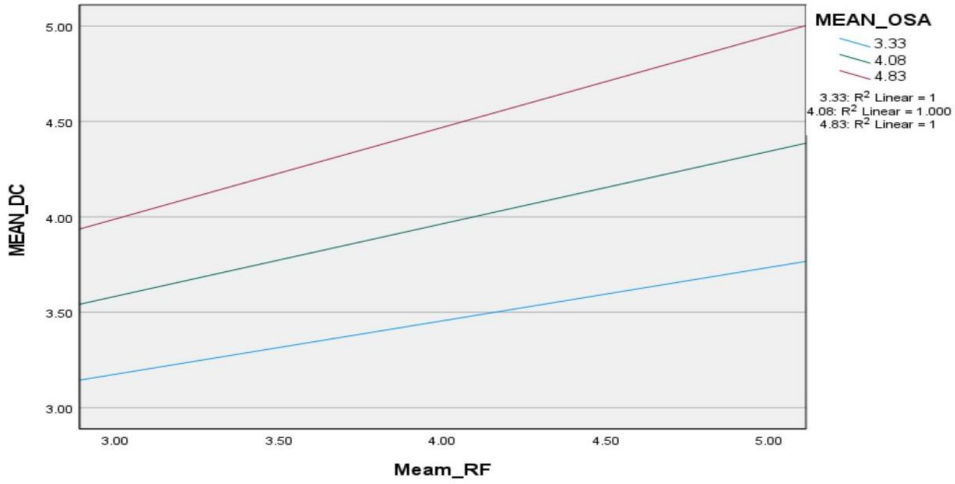


**Figure 3:** Resource Flexibility (RF) and Dynamic Capabilities (DC)

A similar positive linear relationship is observed between Resource Flexibility (RF) and Dynamic Capabilities (DC). The scatter plot shows that as Resource Flexibility increases, so does the development of Dynamic Capabilities. Furthermore, as OSA increases, the effect of Resource Flexibility on Dynamic Capabilities becomes more pronounced. This emphasizes the role of Strategic Agility in strengthening the relationship between Resource Flexibility and Dynamic Capabilities. The $R^2$ value of 1.000 for all regression lines confirms the consistency and strength of the relationship, supporting the hypothesis that Strategic Agility positively moderates the effect of Resource Flexibility on Dynamic Capabilities.

## 5.1 | DISCUSSION OF THE RESULTS

The analysis provides strong empirical support for all hypotheses in the study, showcasing the significant influence of

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Technological Integration and Resource Flexibility (TI & RF) on Dynamic Capabilities (DC) and Organizational Performance (OP). Additionally, Organizational Strategic Agility (OSA) plays a critical mediating and moderating role in these relationships.

- Hypothesis 1: Technological Integration and Resource Flexibility (TI & RF) positively affect Dynamic Capabilities (DC), indicating that organizations capable of adapting their resources perform better in dynamic environments ($\beta = 0.652$, $p < 0.001$).
- Hypothesis 2: TI & RF enhances Organizational Strategic Agility (OSA), as greater resource flexibility allows better alignment of strategies with market shifts ($\beta = 0.624$, $p < 0.001$).
- Hypothesis 3: TI & RF improves Organizational Performance (OP), with resource flexibility contributing to enhanced operational processes, customer satisfaction, and financial outcomes ($\beta = 0.681$, $p < 0.001$).
- Hypothesis 4: Dynamic Capabilities lead to improved Organizational Performance, as adaptable organizations can better handle market volatility ($\beta = 0.781$, $p < 0.001$).
- Hypothesis 5: Organizational Strategic Agility moderates the relationship between TI & RF and DC, amplifying the positive impact of resource flexibility on dynamic capabilities ($\beta = 0.145$, $p < 0.05$).

## 5.2 | THEORETICAL IMPLICATIONS

This study significantly contributes to the Dynamic Capabilities (DC) framework by exploring the interplay between Technological Integration, Resource Flexibility, and Organizational Strategic Agility in driving Organizational Performance. It underscores that organizations must develop both technological readiness and strategic agility to effectively adapt to market changes (Teece, 2007).

The research also extends the Dynamic Capabilities framework by highlighting those dynamic capabilities are not only about maintaining existing capabilities but also about enhancing and reconfiguring them to stay ahead of emerging technological trends (Teece et al., 1997). It emphasizes the importance of strategic flexibility and technological capabilities in fostering innovation and sustaining competitive advantage.

Further, the study examines the crucial roles of leadership and organizational culture in facilitating the integration of TI & RF and OSA. Effective leadership and communication across departments are critical for aligning technology and strategy, driving improved performance (Barney, 1991). The findings advocate for increased cross-functional collaboration and knowledge sharing to enhance dynamic capabilities and overall organizational success.

## 5.3 | PRACTICAL IMPLICATIONS

The findings provide several key strategies for organizations looking to improve their performance and sustain a competitive edge in a fast-paced, constantly evolving environment.

1. Investing in Advanced Technologies: Technology is central to business efficiency, and embracing tools such as AI, machine learning, and big data can significantly improve operations and decision-making. However, successful integration of these technologies requires aligning them with existing resources, such as human capital and processes (Helfat & Peteraf, 2009).
2. Fostering Strategic Agility: Organizations must create a culture that embraces change and encourages innovation. Leaders should prioritize continuous learning and empower employees to adapt quickly to shifting market demands, ensuring the organization remains flexible and competitive (Sambamurthy et al., 2003).
3. Building Dynamic Capabilities: Organizations should focus on continually reconfiguring their resources and strategies to meet new challenges. This involves developing systems that support knowledge sharing, promoting cross-departmental collaboration, and fostering a culture of learning. Partnerships with external stakeholders, such as technology providers and research institutions, can further enhance organizational capabilities and innovation.

## 5.4 | LIMITATIONS & FUTURE DIRECTIONS

Future research could address two primary limitations identified in this study:

1. Longitudinal Study Design: A longitudinal approach would allow for a deeper understanding of how the relationships between technological integration, resource flexibility, strategic agility, and organizational performance evolve over time. This would provide insights into whether these dynamics lead to sustained performance improvements or are merely temporary associations.
2. Broader Industry and Geographic Scope: Expanding the research to encompass a wider range of industries

and geographic regions would offer a more comprehensive understanding of how these dynamics play out across different sectors. Comparative analyses across industries like healthcare, education, and manufacturing would allow for the development of more tailored strategies applicable to diverse environments.

## 5.5 | CONCLUSION

The investigation into the "Impact of Technological and Resource Integration on Organizational Performance: Moderated Mediation through Organizational Strategic Agility and Dynamic Capabilities" underscores the critical relationship between technology, resource flexibility, strategic agility, and dynamic capabilities in driving organizational success. This study reveals that by integrating advanced technological solutions and fostering resource adaptability, organizations can significantly enhance their ability to sense, seize, and transform opportunities, ultimately improving performance outcomes (Teece, 2007). Additionally, strategic agility is identified as a key moderator, enabling firms to swiftly respond to environmental changes and align internal processes with strategic goals (Doz & Kosonen, 2008). The research emphasizes the transformative potential of combining technological integration with resource flexibility to build dynamic capabilities, which are vital for organizational adaptability and innovation (Sanchez, 1995). However, the study recognizes several limitations, including the cross-sectional nature of the design, which restricts causal inferences, and the limited generalizability of findings across different industries (Helfat & Maritan, 2024). Future research should address these limitations by adopting longitudinal approaches to capture temporal dynamics and exploring additional moderating factors, such as leadership and organizational culture, to provide a deeper understanding of these relationships (Gupta & Sharma, 2017). In conclusion, this study contributes to advancing the theoretical framework of dynamic capabilities and offers actionable insights for organizations aiming to thrive in a competitive, rapidly changing business environment. By exploring the interplay between technology, resource flexibility, and strategic agility, future research can refine strategies to optimize organizational performance in an increasingly volatile marketplace.

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**Data Availability Statement:** The data supporting the findings of this study are available from the corresponding author upon reasonable request.
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