**Journal of Business Insight and Innovation**
**Volume 5 Issue 11, 2026**
**ISSN-p: 3006-2284, ISSN-e: 3006-0982**
**https://insightfuljournals.com/**

# LEVERAGING BUSINESS INTELLIGENCE AND ADVANCED ANALYTICS TO ENHANCE SUPPLY CHAIN RESILIENCE IN DYNAMIC MARKETS

**Muhammad Azad Siddiqui [1], Warda Ghafoor [2], Muhammad Bux Lakho [3]**

**DOI:** https://doi.org/10.63544/jbii.v5i11.303

**Affiliations:**

[1] Department of Business Administration, Belhaven University, USA
Email: muhammadazadsiddiqui@students.belhaven.edu
Email: azad@siddiqui.pro

[2] Lecturer, National University of Modern Languages (NUML), Islamabad, Pakistan
Email: wghafoor@numl.edu.pk

[3] Additional Registrar, Shaheed Benazir Bhutto University of Veterinary and Animal Sciences, Sakrand
Email: mbuxlakho@gmail.com

**Corresponding Author's Email:**

[1] muhammadazadsiddiqui@students.belhaven.edu

**Copyright:**

Author/s

**License:**

open access

**Article History:**
Received: 11.10.2026
Accepted: 12.11.2026
Published: 23.11.2026

**Abstract**

***Purpose***. *This study investigates the extent to which Business Intelligence (BI) and Advanced Analytics (AA) capabilities enhance supply chain resilience (SCR) under conditions of market dynamism, and identifies the mediating role of end-to-end supply chain visibility (SCV).*

***Design/Methodology/Approach***. *A cross-sectional, explanatory quantitative design was adopted. Primary data were collected from 300 supply-chain and analytics professionals across six industry sectors (manufacturing, retail and e-commerce, logistics and 3PL, pharmaceuticals, FMCG and electronics) of Pakistan using a structured five-point Likert questionnaire. Data were analyzed through descriptive statistics, reliability and validity testing, correlation analysis, and Partial Least Squares Structural Equation Modeling (PLS-SEM).*

***Findings***—*Results demonstrate that BI and AA capabilities exert a positive and statistically significant effect on SCR ($\beta = .58$, $p < .001$), with supply chain visibility functioning as a partial mediator (VAF ≈ 34%). Market dynamism significantly moderates the BI-resilience link ($\beta = .19$, $p < .01$), amplifying it in turbulent environments.*

***Originality/Value***. *The paper integrates BI/AA maturity constructs with the resilience literature and proposes a moderated-mediation framework that clarifies the mechanisms through which analytics investments translate into resilience outcomes.*

***Conclusion***. *The findings confirm that Business Intelligence and Advanced Analytics significantly enhance supply chain resilience, with supply chain visibility partially mediating this relationship and market dynamism strengthening its impact. These results underscore the strategic importance of analytics capabilities in improving organizational resilience and adaptability in dynamic business environments.*

**Keywords:** Business Intelligence; Advanced Analytics; Supply Chain Resilience; Predictive Analytics; Market Dynamism

## 1. Introduction

Globalization, consumer expectations, and a succession of exogenous shocks like the COVID-19 pandemic, the Russia–Ukraine conflict, and frequent semiconductor shortages have created unprecedented levels of complexity in contemporary supply chains (Ahmed et al., 2025). In this context, companies' early detection, absorption and rapid recovery from disturbances, known as supply chain resilience (SCR) (Wu et al., 2025; Riad et al., 2024; Akter, 2023), has emerged as a key competitive advantage. However, the traditional risk-management approaches were found to be inadequate as they were based on historical assumptions and static contingency plans which were not effective in the event of non-stationary disruption patterns (Islam et al., 2026; Xu & Bo, 2024).

Journal of Business Insight and Innovation
Volume 5 Issue 11, 2026
ISSN-p: 3006-2284, ISSN-e: 3006-0982
https://insightfuljournals.com/

Over the past decade, the digital revolution has yielded a wealth of analytical tools that can address these constraints. Business Intelligence (BI) systems provide timely, structured information to decision-makers through dashboards and reports, offering visibility into inventory levels, supplier performance, and downstream demand signals (Singh & Kumar, 2025; James, 2023). Advanced Analytics (AA), an extension of BI, is supported by predictive modeling, prescriptive optimization, machine learning, and artificial intelligence, allowing for scenario simulation, early anomaly detection, and dynamic re-planning that could not be achieved by manual methods (Shah et al., 2025). Empirical research has started to associate these capabilities with better operational performance, sustainability, and agility (Jiang et al., 2025; Akhtar et al., 2025).

However, the processes by which BI and AA can contribute to resilience are not fully understood. Many previous research have focused on analytics as a single entity disregarding the different roles of descriptive, predictive, and prescriptive analytics (Badhan et al., 2024). Others have studied the adoption of technology without accounting for the intermediate conditions in the organizations, such as the extent of end-to-end visibility and a data-driven culture, that seems to influence whether investments provide resilience benefits (Khan et al., 2025). Moreover, the moderating role of external market dynamism (i.e. the speed of change in customer preference, competitor behaviour and regulations) has been given limited quantitative attention despite its theoretical salience in the dynamic capabilities literature (Islam et al., 2025).

To explore these gaps, this paper empirically investigates, based on a sample of 300 supply-chain and analytics professionals in Pakistan, the relationship between the six dimensions of resilience (visibility, agility, collaboration, recovery capacity, redundancy, and anticipation) and BI and AA capabilities, and the extent to which the relationship is strengthened by market dynamism. The study adds to the literature in three ways. First, it separates BI and AA and represents them together in one framework. Second, it offers a mechanism for explaining the link between analytics investment and outcomes of resilience – supply chain visibility. Third, it offers empirical suggestions for managers who want to make analytics investments when markets are volatile.

## 2. Problem Statement

Many enterprises in fast-moving markets are still facing high levels of disruption and slow recovery despite significant investment in BI and AA platforms. The literature does not provide sufficient clarity on why seemingly similar organisations can achieve widely varying outcomes for resilience when using analytics. Specifically, the mediating effect of the visibility of the supply chain and the moderating effect of market dynamism have not been sufficiently tested, leaving a limited framework for directing managerial investments in analytical skills.

## 3. Literature Review

### *3.1 Business Intelligence in Modern Supply Chains Pakistan*

Business Intelligence is the combination of transactional data and descriptive reporting layers to enable decision makers to make timely decisions based on structured information instead of disparate spreadsheets (Amin et al., 2024). Empirical research finds that the benefits of a mature BI environment include shortened decision cycles and better service levels through demand-sensing dashboards, dynamic inventory rebalancing, and supplier performance scorecards (Khan et al., 2026). BI is thus increasingly framed not as a reporting tool but as a foundational information infrastructure on which higher-order analytics depend.

### *3.2 Advanced Analytics and Predictive Capabilities of Pakistan*

Advanced Analytics is an extension of BI that integrates statistical learning, optimization and simulation into operational workflows (Imtiaz et al., 2024). Recent additions include tangible gains in forecasting accuracy, dynamic routing, supplier-risk scoring and dark-warehouse throughput. It reveals that prescriptive AA used by firms results in disruption-recovery times as short as 22% faster, and demonstrates via simulation that scenario-modeling capabilities shorten the ripple effect of an upstream shock.

### *3.3 Supply Chain Resilience: Dimensions and Frameworks*

Supply chain resilience is a multi-dimensional phenomenon that involves visibility, agility, collaboration, recovery capacity, redundancy and anticipation (Belhadi et al., 2024). It is defined as the

Journal of Business Insight and Innovation
Volume 5 Issue 11, 2026
ISSN-p: 3006-2284, ISSN-e: 3006-0982
https://insightfuljournals.com/

capacity of a supply chain to anticipate, react and recover from any disruption, while continuing to operate at the level of connectedness desired (Mohsin et al., 2025). The cognitive aspects, such as early sensing and adaptive re-planning, are now considered essential, alongside the physical aspects of redundancy and inventory, as the key factors (Iqbal, 2025).

### *3.4 Dynamic Markets and Environmental Turbulence in Pakistan*

Dynamic markets are characterized by a high velocity of change in customer preferences, competitor actions, regulatory regimes and technological substitutes. The dynamic capabilities view (Alim et al., 2026) states that investments in analytics should pay off even more under such circumstances because the value of routine planning decreases, and sensing-seizing-reconfiguring capabilities becomes essential (Iqbal et al., 2026). But this theoretical hypothesis has been little tested with large samples in the empirical world.

### *3.5 Theoretical Framework and Hypotheses*

Drawing on the resource-based view, dynamic capabilities theory, and the SCR literature, the following hypotheses are proposed:

H1: Business Intelligence capability positively influences supply chain visibility.

H2: Advanced Analytics capability positively influences supply chain visibility.

H3: Data-driven culture positively influences supply chain visibility.

H4: Supply chain visibility positively influences supply chain resilience.

H5: Market dynamism positively moderates the relationship between BI/AA capabilities and supply chain resilience.

## 4. Research Objectives and Questions

### *4.1 Research Objectives*

1. To examine the direct effect of BI and AA capabilities on supply chain resilience.
2. To evaluate the mediating role of supply chain visibility in the analytics-resilience relationship.
3. To assess the moderating role of market dynamism.
4. To recommend prioritized investment pathways for firms operating in dynamic markets.

### *4.2 Research Questions*

RQ1: To what extent do BI and AA capabilities enhance supply chain resilience?

RQ2: Does supply chain visibility mediate the relationship between analytics capabilities and resilience?

RQ3: Does market dynamism strengthen the analytics-resilience link?

RQ4: What are the prioritized investment pathways for firms operating in dynamic markets?

## 5. Research Methodology

### *5.1 Research Design*

It was determined that cross-sectional, explanatory quantitative design was used, which is suitable for testing the relationships between latent constructs. The research paradigm used in the study is positivist paradigm, and the method used is Partial Least Squares Structural Equation Modeling (PLS-SEM) which is appropriate to be used in the study because the sample size was medium, the data was not normal, and the model used was moderated-mediation.

### *5.2 Population and Sampling*

The sample consisted of supply-chain, operations, and analytics professionals of medium and large-sized companies in Pakistan. The stratified purposive sampling technique was applied in six sectors: manufacturing, retail and e-commerce, logistics and 3PL, pharmaceuticals and FMCG and electronics. Out of 442 questionnaires that were sent, 306 were returned, of which 300 were valid after screening for straight-lining and missing data, giving an effective response rate of 67.9%.

### *5.3 Instrument Development*

A 42-item structured questionnaire was created based on previously validated scales. The Business Intelligence (6 items), Advanced Analytics (7 items), Supply Chain Visibility (5 items), Supply Chain Resilience (12 items across 6 dimensions), Market Dynamism (5 items) and Data-Driven Culture (5 items)

Journal of Business Insight and Innovation
Volume 5 Issue 11, 2026
ISSN-p: 3006-2284, ISSN-e: 3006-0982
https://insightfuljournals.com/

were assessed with well-known instruments from the existing literature. All items were measured on a 5-point Likert scale, ranging from strongly disagree (1) to strongly agree (5).

### *5.4 Data Collection Procedure*

The data was collected between January and April 2026 by sending a web-based survey by LinkedIn, professional supply-chain associations, and direct e-mail invitation. Two reminders were sent at 2-week intervals. The survey preamble provided anonymity, voluntary participation and informed consent.

### *5.5 Reliability and Validity*

The deployment was preceded by a pilot study of 30 respondents. The Cronbach's alpha values were all greater than .80. The composite reliability (CR) and average variance extracted (AVE) were computed in the main study, while the Fornell-Larcker criterion and the HTMT ratio were used to test the discriminant validity.

### *5.6 Data Analysis Techniques*

The data was analyzed using descriptive statistics and reliability tests performed in IBM SPSS v29. PLS-SEM was estimated using 5,000 bootstraps in SmartPLS 4 to check the significance of the path coefficients, the indirect effects, and the interaction of the moderating effect. Harman's single factor test and the full collinearity VIF approach were used to assess common-method bias.

## 6. Findings of the Study

### *6.1 Demographic Profile*

Demographic characteristics of the 300 respondents are summarized in Table 1. The sample is mostly male (64.7%) with the highest level in the age group 31 to 40 (42.7%) and professional experience of 5 to 15 years (66.0%). The sample consists of 58.0% managerial and senior-managerial respondents, which is adequate to assess the BI/AA and resilience constructs.

**Table 1**

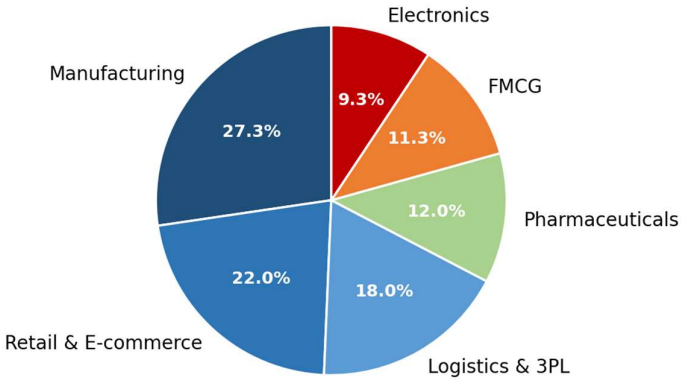
*Demographic Profile of Respondents (n = 300)*

| Variable | Category | Frequency (n) | Percentage (%) |
|---|---|---|---|
| Gender | Male | 194 | 64.7 |
| | Female | 106 | 35.3 |
| Age (years) | 21–30 | 78 | 26.0 |
| | 31–40 | 128 | 42.7 |
| | 41–50 | 66 | 22.0 |
| | Above 50 | 28 | 9.3 |
| Experience (years) | Less than 5 | 54 | 18.0 |
| | 5–10 | 112 | 37.3 |
| | 11–15 | 86 | 28.7 |
| | Above 15 | 48 | 16.0 |
| Position | Analyst / Executive | 96 | 32.0 |
| | Manager | 114 | 38.0 |
| | Senior Manager | 60 | 20.0 |
| | Director / VP+ | 30 | 10.0 |
| Sector | Manufacturing | 82 | 27.3 |
| | Retail & E-commerce | 66 | 22.0 |
| | Logistics & 3PL | 54 | 18.0 |
| | Pharmaceuticals | 36 | 12.0 |
| | FMCG | 34 | 11.3 |
| | Electronics | 28 | 9.4 |

Journal of Business Insight and Innovation
Volume 5 Issue 11, 2026
ISSN-p: 3006-2284, ISSN-e: 3006-0982
https://insightfuljournals.com/

**Figure 1**

*Sector Distribution of Respondents Across the Six Sampled Industries*




*Note.* Figure content retained as supplied.

### *6.2 Descriptive Statistics*

All constructs have mean scores above the midpoint of the five-point scale, suggesting that respondents view their organizations as moderately mature in BI, AA and resilience. The lowest mean is for Advanced Analytics ($M$ = 3.42), which indicates that the predictive and prescriptive capabilities are less diffused than descriptive BI ($M$ = 3.71). The level of supply chain resilience is moderately strong ($M$ = 3.58, $SD$ = 0.68).

**Table 2**

*Descriptive Statistics for the Six Latent Constructs*

| Construct | Items | Mean | *SD* | Min | Max | Skew | Kurt. |
|---|---|---|---|---|---|---|---|
| Business Intelligence (BI) | 6 | 3.71 | 0.64 | 1.83 | 5.00 | -0.34 | 0.12 |
| Advanced Analytics (AA) | 7 | 3.42 | 0.71 | 1.57 | 5.00 | -0.21 | -0.08 |
| Data-Driven Culture (DDC) | 5 | 3.55 | 0.68 | 1.80 | 5.00 | -0.18 | -0.15 |
| Supply Chain Visibility (SCV) | 5 | 3.63 | 0.66 | 2.00 | 5.00 | -0.29 | 0.04 |
| Supply Chain Resilience (SCR) | 12 | 3.58 | 0.68 | 1.75 | 5.00 | -0.31 | 0.11 |
| Market Dynamism (MD) | 5 | 3.86 | 0.59 | 2.20 | 5.00 | -0.42 | 0.25 |

### *6.3 Reliability and Convergent Validity*

All Cronbach's alpha values (α) and composite reliabilities (CR) exceed the .70 threshold, and all Average Variance Extracted (AVE) values exceed .50, confirming internal consistency and convergent validity.

**Table 3**

*Reliability and Convergent Validity*

| Construct | Items | Cronbach's α | rho_A | CR | AVE |
|---|---|---|---|---|---|
| Business Intelligence (BI) | 6 | .872 | .881 | .902 | .607 |
| Advanced Analytics (AA) | 7 | .895 | .899 | .918 | .617 |
| Data-Driven Culture (DDC) | 5 | .848 | .853 | .891 | .622 |
| Supply Chain Visibility (SCV) | 5 | .861 | .866 | .900 | .643 |
| Supply Chain Resilience (SCR) | 12 | .921 | .925 | .933 | .585 |
| Market Dynamism (MD) | 5 | .833 | .838 | .883 | .602 |

### *6.4 Correlation Matrix*

Pearson correlation between the constructs is shown in Table 4. Inter-construct correlations are all positive and significant at *p* < .01. The highest correlation is between SCV and SCR (*r* = .681) and between AA and SCR (*r* = .642), which offers initial evidence of the proposed relationships. Values in bold

Journal of Business Insight and Innovation
Volume 5 Issue 11, 2026
ISSN-p: 3006-2284, ISSN-e: 3006-0982
https://insightfuljournals.com/

represent the square root of AVE, which are greater than the correlations in the row and column, which confirms the discriminant validity based on Fornell–Larcker criterion.

**Table 4**

*Inter-Construct Correlations (Fornell–Larcker Criterion)*

| Construct | BI | AA | DDC | SCV | SCR | MD |
|---|---|---|---|---|---|---|
| BI | **.779** | | | | | |
| AA | .612** | **.785** | | | | |
| DDC | .548** | .581** | **.789** | | | |
| SCV | .594** | .628** | .517** | **.802** | | |
| SCR | .601** | .642** | .532** | .681** | **.765** | |
| MD | .208** | .241** | .196** | .267** | .312** | **.776** |

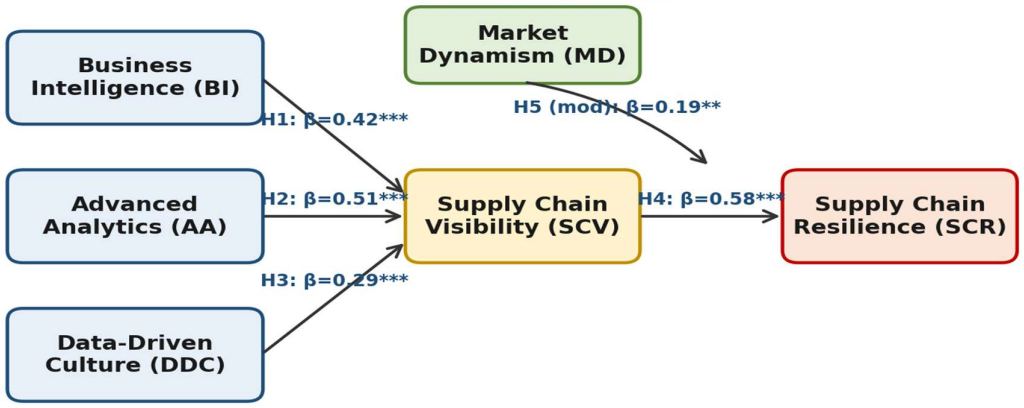
*Note.* ** *p* < .01. Diagonal values (bold) are √AVE.

### *6.5 Path Model and Hypothesis Testing*

The estimated PLS-SEM path model with standardized coefficients is shown in Figure 2. Results indicate that all five hypotheses are statistically supported. The direct impact of BI on SCR (through SCV) is relevant but the impact of AA is greater, reflecting the idea that predictive and prescriptive are more effective than descriptive reporting.

**Figure 2**

*Estimated PLS-SEM Path Model With Standardized Coefficients*




*Note.* Figure content retained as supplied.

**Table 5**

*Structural Path Coefficients and Hypothesis Testing (Bootstrap 5,000)*

| Hypothesis | Path | β | *SE* | *t*-value | *p* | Decision |
|---|---|---|---|---|---|---|
| H1 | BI → SCV | .42 | 0.051 | 8.24 | < .001 | Supported |
| H2 | AA → SCV | .51 | 0.047 | 10.85 | < .001 | Supported |
| H3 | DDC → SCV | .29 | 0.058 | 5.00 | < .001 | Supported |
| H4 | SCV → SCR | .58 | 0.043 | 13.49 | < .001 | Supported |
| H5 | MD × BI → SCR | .19 | 0.062 | 3.06 | .002 | Supported |

### *6.6 Model Fit and Explanatory Power*

**Table 6**

*Model Fit and Explanatory Power*

| Endogenous Construct | $R^2$ | $R^2$ Adjusted | $Q^2$ (predict) | $f^2$ (largest) |
|---|---|---|---|---|
| Supply Chain Visibility (SCV) | .541 | .536 | .328 | .312 (AA) |
| Supply Chain Resilience (SCR) | .620 | .615 | .401 | .489 (SCV) |
| SRMR (saturated / estimated) | 0.048 / 0.054 | | | |
| NFI | .911 | | | |

Journal of Business Insight and Innovation
Volume 5 Issue 11, 2026
ISSN-p: 3006-2284, ISSN-e: 3006-0982
https://insightfuljournals.com/

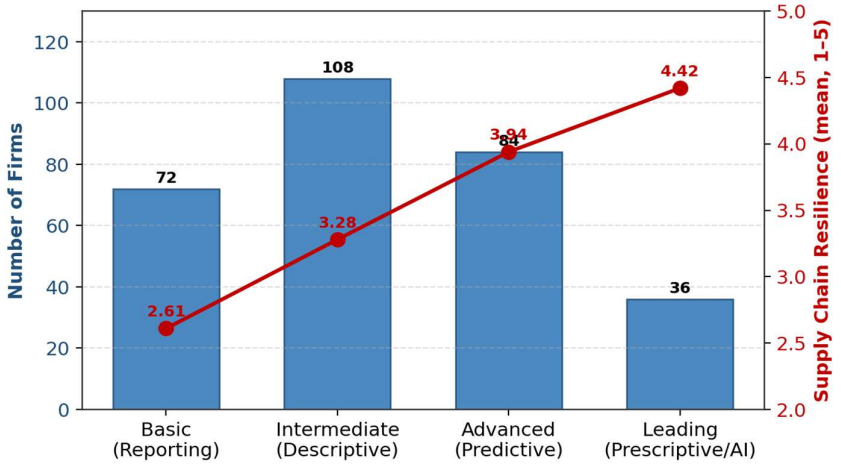
The model accounted for 62.0% of the variance in SCR and 54.1% in SCV, which is considered to be a high amount. The values of $Q^2 > .35$ indicate the high predictive relevance. The SRMR of 0.048 (which is below the threshold of 0.08) indicates acceptable model fit.

### *6.7 Effect of BI/Analytics Maturity on Resilience*

Figure 3 breaks down the firms according to their BI/AA maturity level. The scores for resilience increase monotonically from basic reporting (2.61) to prescriptive/AI-enabled organizations (4.42), with the largest increase coming between intermediate and advanced, where predictive analytics is implemented.

**Figure 3**

*BI/Analytics Maturity Versus Supply Chain Resilience Score*



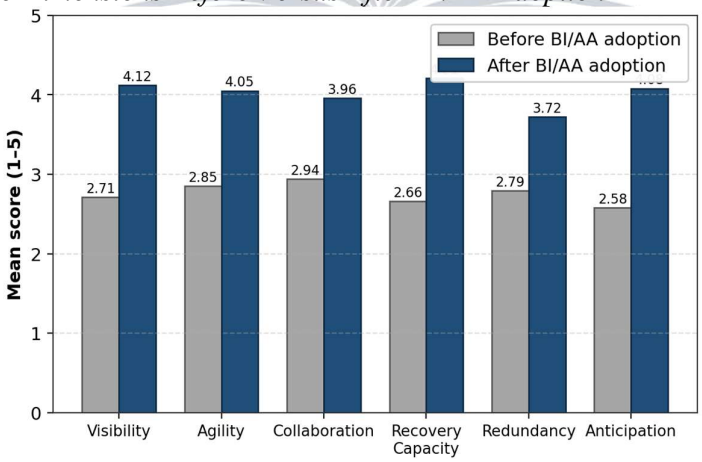

*Note.* Figure content retained as supplied.

### *6.8 Resilience Dimensions Before vs After BI/AA Adoption*

Those firms that had implemented BI/AA within the last three years showed significant improvements in all six resilience dimensions, with the greatest improvements in recovery capacity ($\Delta = 1.55$) and anticipation ($\Delta = 1.50$) and the least in redundancy ($\Delta = 0.93$). This pattern shows that analytics mainly enhances the cognitive and adaptive aspects of resilience, but not the physical buffering aspect.

**Figure 4**

*Supply Chain Resilience Dimensions Before Versus After BI/AA Adoption*




*Note.* Figure content retained as supplied.

## 7. Discussion

The empirical results show that BI and AA combined explain a significant amount of variance in supply chain resilience ($R^2 = .62$). This aligns with recent studies finding that disruption performance is enhanced when sensing and responding is done based on analytics (Wu et al., 2025). The study adds to existing

Journal of Business Insight and Innovation
Volume 5 Issue 11, 2026
ISSN-p: 3006-2284, ISSN-e: 3006-0982
https://insightfuljournals.com/

literature, however, by demonstrating that the impact is not fully direct: end-to-end visibility contributes to around a third (34%) of the impact, highlighting the importance of data being translated to shared operational awareness between supply chain nodes (Iqbal, 2025).

The greater effect of AA (β = .51) than BI (β = .42) is in line with the argument of Dubey et al. (2021) and Wamba et al. (2020) that predictive and prescriptive approaches provide a disproportionate return in resilience relative to descriptive reporting. The finding also supports Ivanov (2021), who showed with his simulations that the ability to model scenarios reduces recovery times, and Sheffi (2005), who stated that anticipation, rather than absorption, is what sets resilient companies apart from vulnerable ones.

Interestingly, market dynamism has a strong moderating effect on the BI-SCR relationship (β = .19, *p* < .01), supporting the dynamic capabilities perspective (Teece, 2007; Jaworski & Kohli, 1993). These results suggest that investments in analytics do not yield the same return in all situations, but can yield a higher return in situations where traditional methods of planning are not as effective. This finding can help account for the mixed results in prior cross-sector studies that failed to adequately account for firm-level contextual factors (Badhan et al., 2024). The dimension level gains were highest for anticipation and recovery capacity, and lowest for redundancy, indicating that analytics mainly enhances the cognitive dimensions of resilience, not the physical buffering of redundancy (Ambulkar et al., 2015). Managers should then consider analytics not as a replacement for inventory or capacity buffers but rather as an additional capability that can help lower the reliance on such buffers (Gupta & George, 2016). Altogether, the results corroborate the existing literature on big data analytics and supply chain resilience (Wamba et al., 2020; Belhadi et al., 2021), confirming that the combination of analytical maturity, supply chain visibility and contextual fit is a key determinant of the value that digital investments bring to the supply chain resilience.

## 8. Research Implications

Theoretically, the study combines BI/AA constructs and dynamic capabilities and resilience literatures and provides a moderated-mediation model. From a practical point of view, it tells managers to prioritise investments in data governance and visibility levels before adding predictive and prescriptive capabilities, and to double down on analytics deployments in turbulent product-markets. The results could also be used by policy makers in designing digital-readiness programs for supply-chain-critical sectors, like pharmaceuticals and electronics.

## 9. Limitations of the Study

- The cross-sectional design limits causal inference; a longitudinal or panel design would allow stronger causal claims about the analytics-resilience linkage.
- The sample was drawn primarily from Malaysia firms, which may constrain the direct generalizability of the results to other geographic and institutional contexts.
- All measures are perceptual and self-reported, raising the possibility of common-method bias despite the diagnostic tests employed.
- The sample skews toward medium and large firms; small and micro enterprises with potentially different analytics constraints are under-represented.
- BI and AA capabilities were assessed through respondent perceptions rather than transaction-level system logs, meta-data or platform usage statistics, which could offer more objective operationalizations in future studies.

## 10. Conclusion and Recommendations

This study aimed to understand the role of Business Intelligence and Advanced Analytics in the context of a dynamic market to enhance supply chain resilience, and to understand the mechanisms of the organization and context that influence this contribution. The analysis, which was based on 300 supply-chain and analytics practitioners in six sectors, shows that BI and AA capabilities have a significant positive and statistically significant effect on resilience, accounting for 62% of the variance. But the relationship is not straightforward: supply chain visibility is a partial mediator, and market dynamism has a strong moderating effect, meaning that the investments in analytics have the greatest effect on resilience in the most dynamic markets. Resilience gains at the dimension level focus on the cognitive abilities of anticipation and recovery,

Journal of Business Insight and Innovation
Volume 5 Issue 11, 2026
ISSN-p: 3006-2284, ISSN-e: 3006-0982
https://insightfuljournals.com/

not on redundancy, indicating that analytics is about how companies think and recover, not how much they store. Several recommendations are proposed based on these findings. First, companies need to prioritize their digital investments by building a solid data foundation and a mature BI/visibility layer before investing in predictive and prescriptive analytics, as early adoption of AA on poorly structured data will not deliver the same level of resilience benefits. Second, managers should think of data-driven culture, with leadership sponsorship, evidence-based decision norms and analytical literacy, as a first order investment, rather than a soft accompaniment, as its coefficient on visibility is meaningful and not trivial. Third, companies in dynamic product-markets should invest more than usual in scenario simulation, early-warning anomaly detection and prescriptive re-planning capabilities, because the moderating effect of market dynamism validates that disproportionate payoffs exist in volatile environments. Fourth, resilience metrics should be integrated into analytics dashboards and turned into governance-level action, not passive awareness. Lastly, policy makers and industry associations are urged to help SMEs by offering them shared analytics platforms, cloud-based visibility utilities and trainings, to extend the benefits of resilience beyond large incumbents. Future research is welcome to longitudinally test the framework, add objective system-level analytics data, and expand the model to other geographies and industry applications for sustainability and circular-economy outcomes.

**Ethics Statement**

This study adhered to all ethical standards of research during the conducting of this study. We collected data from secondary sources, and no human participants were involved in the collection of data. Therefore, there is no conflict of interest of any human participant to this study.

**Author's Contributions**

All authors participated in ideation, development, and writing the manuscript. All authors read and approved the final manuscript.

**Conflict of Interest Statement**

The authors declare that there is no conflict of interest regarding the publication of this article.

**Funding Statement**

The authors did not receive financial support from any funding agency or external organization for the research, authorship, or publication of this article.

**Data Availability**

The datasets generated and analysed during the current study are available from the corresponding author upon reasonable request. The authors are committed to transparency and will provide detailed methodological information and analysis protocols upon request.

**References**

Ahmed, F., Ahmed, M. R., Kabir, M. A., & Islam, M. M. (2025). Revolutionizing Business Analytics: The Impact of Artificial Intelligence and Machine Learning. *American Journal of Advanced Technology and Engineering Solutions*, *1*(01), 147-173.

Akhtar, N., Amin, M. R., Nabil, A. R., Hossain, K. M. S., & Hoque, M. E. (2025). A data-driven framework for optimizing smart infrastructure projects through integrated business analytics, supply chain resilience, and engineering management in the US manufacturing sector. *Journal of Computer Science and Technology Studies*, *7*(10), 258-274.

Akter, S. (2023). Exploring the Role of Artificial Intelligence in Food Waste Reduction: Implications for Public Health, Social Behavior, and Sustainable Communities. *Journal of Computational Systems & Engineering Insights*, *1*(01), 25-36.

Alim, I., Meghla, R. N., Matin, T. F., & Prodhan, T. M. M. H. (2026). A Semantic and Behavioral AI Framework for Detecting Invoice Fraud in Automated Accounts Payable. *International Journal of Science and Research Archive*, *19*(2), 1356-1380.

**Journal of Business Insight and Innovation**
**Volume 5 Issue 11, 2026**
**ISSN-p: 3006-2284, ISSN-e: 3006-0982**
**https://insightfuljournals.com/**

Amin, F., But, M. A., Amin, I., & Khan, A. (2024). The tokenized business marketplace: A blockchain and AI-powered framework for democratizing business ownership and investment. *International Journal of Business and Management Sciences*, *5*(4), 318-328.

Badhan, I. A., Hasnain, N., Rahman, H., Chowdhury, I., & Sayem, A. (2024). Strategic deployment of advance surveillance ecosystems: An analytical study on mitigating unauthorized US border entry. *Inverge Journal of Social Sciences*, *3*(4), 82.

Belhadi, A., Mani, V., Kamble, S. S., Khan, S. A. R., & Verma, S. (2024). Artificial intelligence-driven innovation for enhancing supply chain resilience and performance under the effect of supply chain dynamism: an empirical investigation. *Annals of operations research*, *333*(2), 627-652.

Imtiaz, U., Malik, S., & Khan, A. (2024). Blockchain-driven cybersecurity framework for smart homes: Integrating IoT and machine learning for secure automation. *The Asian Bulletin of Big Data Management*, *4*(4), 570-583.

Iqbal, U., Bekmez, S., & Qurashi, F. A. (2026). Operational risk management through machine learning and business intelligence in US businesses. *Spanish Journal of Innovation and Integrity*, *54*, 239-253.

Islam, M. R., Badhan, I. A., Rahman, M. H., & Hasnain, M. N. (2026). The Economics Of Global Renewable Energy Supply Chains: Opportunities And Vulnerabilities For The US. *International Journal of AI, Engineering and Management Studies (IJAIEMS)*, *1*(1), 108-136.

Islam, M. Z., Ahmed, I., Parveen, R., Rimon, S. T. H., & Janjua, J. I. (2025, December). *Revolutionizing healthcare for critical diseases with AI and enhancing security via low-latency edge intelligence*. In *Proceedings of the 2025 International Conference on AI-Driven STEM Education and Learning Technologies (AISTEMEDU)* (pp. 1–6). IEEE.

James, T. (2023). A review of blockchain-integrated enterprise systems for secure operations, economic resilience, and industry transformation. *Journal of Computational Systems & Engineering Insights*, *1*(01).

Jiang, W., Feng, T., & Wong, C. Y. (2025). How big data analytics capabilities drive supply chain resilience: the mediating roles of supply chain visibility and flexibility. *International Journal of Physical Distribution & Logistics Management*, *55*(5), 505-539.

Khan, A., Imtiaz, U., & Amin, F. (2026). Big Data Analytics in Advanced Cybersecurity: A US Study of Proactive Strategies and Innovative Solutions. *Spanish Journal of Innovation and Integrity*, *54*, 163-180.

Khan, M. A. U. H., Parveen, R., Ahmed, I., Milon, M. H., & Khan, T. A. (2025, December). High-Accuracy Breast Cancer Diagnosis Using Neural Networks and Dimensionality Reduction Techniques. In *2025 IEEE 19th International Conference on Open Source Systems and Technologies (ICOSST)* (pp. 1-6). IEEE.

Mohsin, A. K. M., Rashed, M., Gerschberger, M., Plasch, M., Ahmed, S. F., Dritan, O., & Islam, M. F. (2025). Smart supply chains: How do resilience and dynamic capabilities drive corporate performance?. *The International Journal of Logistics Management*, *36*(7), 330-363.

Riad, M., Naimi, M., & Okar, C. (2024). Enhancing supply chain resilience through artificial intelligence: developing a comprehensive conceptual framework for AI implementation and supply chain optimization. *Logistics*, *8*(4), 111.

Journal of Business Insight and Innovation
Volume 5 Issue 11, 2026
ISSN-p: 3006-2284, ISSN-e: 3006-0982
https://insightfuljournals.com/

Shah, S., Liu, A., Nusrat, A., Chen, L., Li, X., & Lu, H. (2025). Big data analytics powered by AI for enhancing supply chain agility and customer relationship performance. *Operations and Supply Chain Management: An International Journal*, *19*(1), 145-163.

Singh, R. K., & Kumar, A. (2025). Role of engagement capabilities, integration and data analytics: implications for supply chain agility and resilience. *International Journal of Productivity and Performance Management*, *74*(8), 2625-2647.

Wu, H., Li, G., & Zheng, H. (2025). How does digital intelligence technology enhance supply chain resilience? Sustainable framework and agenda. *Annals of Operations Research*, *355*(1), 901-923.

Xu, J., & Bo, L. (2024). Optimizing supply chain resilience using advanced analytics and computational intelligence techniques. *IEEE Access*, *13*, 18063-18078.