УДК 338.28:677
DOI 10.47367/0021-3497_2025_4_73

STRATEGIC DECISION-MAKING IN THE CONTEXT OF UNCERTAINTY IN GLOBAL TEXTILE BUSINESS MANAGEMENT

ОСОБЕННОСТИ ПРИНЯТИЯ СТРАТЕГИЧЕСКИХ РЕШЕНИЙ В УСЛОВИЯХ НЕОПРЕДЕЛЕННОСТИ В ГЛОБАЛЬНОМ УПРАВЛЕНИИ ТЕКСТИЛЬНЫМ БИЗНЕСОМ

H.M. ABDULJABBAR[1], W.M. ABDULLAH[2], N. TABALDYEV[3], A.I. MUHSIN[4], H.A. ABBAS[5]

Х.М. АБДУЛЬ-ДЖАББАР[1], В.М. АБДУЛЛА[2], Н. ТАБАЛДИЕВ[3], А.И. МУХСИН[4], Х.А. АББАС[5]

([1]Al-Turath University, Baghdad, Iraq,
[2]Al-Mansour University College, Baghdad, Iraq,
[3]Osh State University, Osh, Kyrgyzstan,
[4]Al-Rafidain University College, Baghdad, Iraq,
[5]Madenat Alelem University College, Baghdad, Iraq)

([1]Университет Аль-Турат, Багдад, Ирак,
[2]Университетский колледж Аль-Мансура, Багдад, Ирак,
[3]Ошский государственный университет, Ош, Кыргызстан,
[4]Университетский колледж Аль-Рафидаин, Багдад, Ирак,
[5]Университетский колледж Маденат Алелем, Багдад, Ирак)

Email: hasan.ali@mauc.edu.iq

In the context of a volatile global economy, textile companies are deciding on turning points and realizing plans amid changing raw material prices, geopolitical upheavals, changing technologies and sustainable development pillaring expectations.

The article proposes a comprehensive framework approach to consider strategic decision-making in uncertainty analysis of the global textile industry. The study uses a combined approach to scenario-based modelling, risk quantification, supply chain resilience measurement, and prediction model evaluation. Data were collected from international textile companies and validated by secondary sources, such as industry reports and market indicators. Resilience ratios were used to assess several supply chain configurations, demonstrating how diversified sourcing mitigated operational impacts. It also explored sustainability programs to evaluate their success with both environmental and operational results. The results reveal that adaptability, bolstered by data-informed forecasting and sustainability embedding underpins more efficient organizational decision-making and longer-term resilience.

На фоне нестабильной глобальной экономики компании текстильного сектора принимают ключевые решения и реализуют планы в условиях меняющихся цен на сырье, геополитической турбулентности, изменений технологий и растущих ожиданий от перехода к устойчивому развитию. В статье предлагается комплексный подход к рассмотрению стратегий принятия решений, включающий моделирование сценариев, количественную оценку рисков, определение устойчивости цепочек поставок и проверку моделей прогнозирования. Данные собраны от международных компаний текстильной промышленности и проверены вторичными источниками, такими как отраслевые отчёты и рыночные индикаторы. Показатели устойчивости использовались для сравнения различных конфигураций цепей поставок, демонстрируя, каким образом диверсификация источников сырья смягчала операционные последствия. Исследовалось также влияние экологических программ на показатели экологической ответственности и экономической эффективности. Результаты показывают, что адаптивность, подкрепленная прогнозированием на основе данных и внедрением принципов устойчивого развития, обеспечивает более эффективное организационное принятие решений и долгосрочную устойчивость предприятий.

Keywords: strategic decision-making; textile industry; supply chain resilience; risk assessment; sustainability integration; predictive modeling; scenario analysis; uncertainty management.

Ключевые слова: стратегическое принятие решений; текстильная промышленность; устойчивость цепочки поставок; оценка риска; интеграция устойчивых практик; модели прогнозирования; анализ сценариев; управление неопределённостью.

Introduction

The global textile sector is essential to economic activity, creating employment for millions and delivering vital materials for many consumer and industrial applications. However, it is operating in a degraded and increasingly high-stakes environment. From market fluctuations to geopolitical tensions to environmental compliance to shifting consumer tastes to fast-moving technology, companies face huge uncertainty on multiple dimensions [1]. Strategic decision-making has become not an option but a challenge in a market so complex. Along with predicting change, managers need to create adaptive paths for navigating, accepting and ultimately flourishing in the face of uncertainty. Geography matters Due to the complex, global nature of the sector, including often long supply chains, fragmented regulatory environments, and culture differences, that influence production and consumption patterns these challenges are accentuated [2].

Global textile sector uncertainty encompasses not only currency crashes, trade tariffs, or volatility in the commodity price market or competition, such economic drivers make it essential for managers to work pass that linear planning approaches. Instead, strategies should consider multiple potential futures, and businesses must remain nimble in the face of sudden change. Textile sector is driven by enterprise-wide changes in technology and production not only automation but innovative fibers and fabrics, molecular biology or digitized processes and companies have to adapt constantly or reinvents its operational strategies [3]. Those who can forecast and implement adapting to technological changes tend to remain efficient and profitable in the long term [4].

The increasing importance of sustainability in the textile industry is also crucial. Some consumers and stakeholders also expect businesses to reduce any negative impact they have on the environment or society, which creates additional pressure on companies. Not only are sustainable production methods, responsible sourcing of raw materials, and reductions in carbon emissions corporate responsibilities, they're aspects that directly influence brand reputation and consumer loyalty. An integral part of any strategic decision-making under uncertainty, then, is the sustainability dimensions, and how a firm's activities can be in line with changing societal expectations generally while still providing an adequate return on equity [5, 6].

The changing consumer landscape is another area of complexity. Those same scrolls, clicks and hashtags mean that the different iterations of fashion trends are changing faster than ever before, driven by the popularity of e-commerce and changing cultural norms. This kind of fast-paced cycle makes it increasingly harder for textile companies to forecast demand accurately. Instead, businesses are now required to rely on real-time information and predictive analytics to discover new preferences as they emerge and adjust with customized merchandise deliverables. Such dynamic response capabilities result in better inventory management and improve customer satisfaction, which in turn allow firms to build stronger, more robust positions in the marketplace [7].

Furthermore, textile supply chains are global which by itself adds yet another layer of uncertainty. Materials can cross multiple borders before arriving at the final customer, exposing businesses to a variety of disruptions. Political upheaval, natural disasters or unexpected regulatory changes anywhere along the supply chain can have ripple effects that affect production schedules, costs and quality. Thus, the resilience of supply chains has become a major focus for textile companies [8]. Diversifying supply chains and creating more adaptive networks can help defend against these risks and prevent disruption even if unforeseeable events occur [9].

Sustainability is the other domain of strategic decision-making within the textile companies. Researchers have studied the effects of environmental regulations, social responsibility initiatives and the changing consumer preferences for sustainable products on long-term business strategy. If consider how much more reputable a company that engages in sustainably branded practices than a company that does not, studies show that sustainable companies also minimize risk associated with regulatory lack due to limited resources. As a result, incorporating sustainability into decision-making frameworks has emerged as an important topic of academic literature [12].

Strategic decision-making under uncertainty can ultimately be a mix of innovation, adaptability, analytical insight. Static forecasts and simply relying on historical data will not be enough with traditional planning models. Companies should incorporate more advanced methods, including scenario planning, machine learning algorithms and real-time market intelligence [10, 11]. With the updated risk management practice, companies can ensure continuity of production, optimize the consumption of resources and protect their position on the market [13].

The literature emphasizes that in the presence of uncertainty, it is required to adopt new adaptive strategies. It highlights the fact that traditional planning methodologies are no longer enough, and that textile companies will need to use predictive analytics, scenario planning and sustainability-oriented frameworks to guarantee long-term success in an ever-increasingly complex and unpredictable global marketplace [14].

Textile managers empowered with advanced technologies and a deep comprehension of market dynamics will only be in a better position to make the best decisions at every layer and ensure an adequate opportunity for their businesses to grow against a challenged background. This ability not only builds the resilience of the organization but also lays the groundwork for future growth and leadership in the global textile market for the entire route from farm to fashion, from sustainable cotton supply chain management to global citizen and fair-trade brand, as the world becomes one global market.

Methodology

The methodological approach of this study combines quantitative modeling, scenario-based systems analysis, risk analytics, and multi-criteria decision analysis (MCDA) to assess decision-making under uncertainty for global textile systems. The methodology is organized around the following interconnected elements: (1) Data Collection and Preprocessing; (2) Uncertainty and Risk Modeling (3) Strategic Decision Framework Design; (4) Statistical Modeling and Structural Dependencies, and (5) Validation of Decision Models.

Original data were collected by conducting structured interviews and surveys with executives from 26 multinational textile companies, focusing on operational performance, innovation strategies, and dynamics of the supply chain. The secondary data encompassed commodity pricing as well as market demand indicators and operational throughput obtained from global databases such as WTO Trade Statistics, McKinsey Insights, and Statista.

Information on raw material prices, production quantity, revenue growth rates, and unit sale performances in data collected so that the structured data set was formed. These variables were Z-score normalized as appropriate.

$$Z_{ij} = \frac{X_{ij}-\mu_j}{\sigma_j} \ , \qquad (1)$$

where Z_{ij} normalized value of variable j in observation i; X_{ij} original value; μ_j mean of variable j; σ_j standard deviation of variable j.

This preprocessing ensures comparability and numerical stability across heterogeneous variables [2, 15].

Five primary risk domains were operationalized: (i) currency exchange rate volatility, (ii) geopolitical instability, (iii) technological disruption, (iv) natural disasters, and (v) regulatory changes [16, 17]. A composite uncertainty index (U_c) was developed using a weighted aggregation of standardized risk metrics:

$$U_c = \sum_{k=1}^{m} w_k \left(\frac{X_k-\bar{X}_k}{s_k}\right), \qquad (2)$$

where w_k expert-derived weight for risk factor k; X_k value of the risk factor in a given time period; $\bar{X}_k$ mean of risk factor k; s_k standard deviation of risk factor k.

Risk probabilities and impact values were converted into a risk exposure matrix R_{ij} using the product of occurrence probability and standard deviation [9,14]:

$$R_{ij} = P_{ij}\sigma_{ij} \ , \qquad (3)$$

where P_{ij} probability of risk i occurring in scenario j, and σ_{ij} associated variability of risk i in scenario j.

To formalize decision-making under uncertainty, this study employs a weighted scoring model integrated with a scenario simulation system. The objective function for strategic scenario scoring is modeled as a weighted sum multi-objective function:

$$s_k = \sum_{i=1}^{n} w_i x_{ik} \ , \qquad (4)$$

where s_k score of scenarios k; w_i weight of decision criterion i; x_{ik} performance score of criterions i under scenario k.

Scenarios modeled include: Base Case, Optimistic, Pessimistic, Balanced, and Conservative. Weights were derived using the Analytic Hierarchy Process (AHP), and scores for key decision pillars such as supply chain reliability (SCR), product innovation (PI), and risk mitigation capability (RM) were obtained from empirical managerial evaluations [12, 19, 20].

Interdependencies among variables were captured through multivariate regression and covariance structure modeling [15, 21]. Pair-wise relationships such as raw material cost vs. production output and demand vs. revenue were evaluated using generalized least squares (GLS):

$$Y = \beta_0 + \sum_{i=1}^{n} \beta_i X_i + \varepsilon \;, \qquad (5)$$

where Y dependent variable, such as production, revenue; X_i independent variable i; β_i regression coefficient for variable i; ε is residual error term

Additionally, a variance inflation factor (VIF) was computed to assess multicollinearity across explanatory variables:

$$VIF_j = \frac{1}{1-R_j^2} \;, \qquad (6)$$

where R_j^2 coefficient of determination when X_j is regressed on other predictors.

To validate the reliability and generalizability of the developed models, cross-validation and stress testing protocols were implemented. Cross-validation followed a k-fold (k=10) scheme, while stress testing simulated black-swan events such as raw material embargoes and political sanctions. Model predictive stability was assessed via Root Mean Square Error (RMSE) and Mean Absolute Percentage Error (MAPE). These validation metrics allowed the models to be stress-tested across volatility scenarios, ensuring performance in both normal and abnormal states [13, 22].

Results

The scenario modeling process was constructed to capture contemplated decision strategies performance across variable market conditions. Each of the scenarios was a different strategic posture from optimistic growth to conservative risk aversion. Market stability, growth of demand, and risk mitigation were weighted based on executive input across the three critical dimensions. The cumulative scores ultimately summarized performance in response to each condition. Decision-making performance scores under market scenarios are shown in Figure 1.

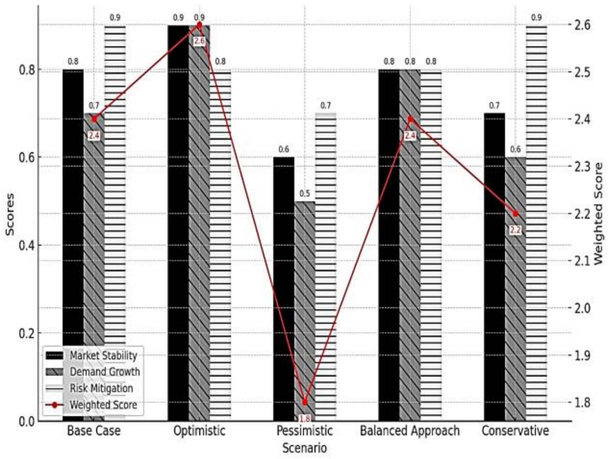

Fig. 1

Optimistic scenario total score: 2.6, best total score (strong positive decisions when growth and market expansion are expected) both the Balanced and the Base Case strategies scored 2.4, which again, implies a relatively safe activity in case of steady and/or mixed conditions. The Conservative scenario, with a 2.2 score, reflects robust mitigation of risk, but reduced flexibility for growth response. The most adverse scenario, the Pessimistic advanced the lowest mark 1.8, which emphasizes vulnerability in the evolution of unfavorable conditions. These results shown in Figure 1 highlight the presence and role of demand and market responsiveness, when coupled with simulations with moderate risk control mechanisms.

Key Risk Metrics (fig. 2) quantifies uncertainty in the external environment by evaluating the variability and likelihood of disruptive events. Five types of risks were assessed: currency volatility, geopolitical events, supply chain disruptions, natural disasters and regulatory changes. Fluctuation was captured using standard deviation, while probability scores represented historical frequency and expert opinions of occurrence.

As show Figure 2, Supply chain disruptions had the highest variability (1.10) and a large occurrence probability (0.60), suggesting they are both prevalent and highly variable. Exchange rate volatility was also very volatile (0.85) and was moderately likely (0.65) which highlighted the financial risk associated with global operations. Regulatory risks depicted moderate variation (0.45) with a probability of

0.55. The expected probability of random (geopolitical) events, though not quantified in standard deviation here, was high: 0.70. The lowest probability was that of natural disasters at 0.40. These findings underscore the investment diversification and financial hedging strategies essential.

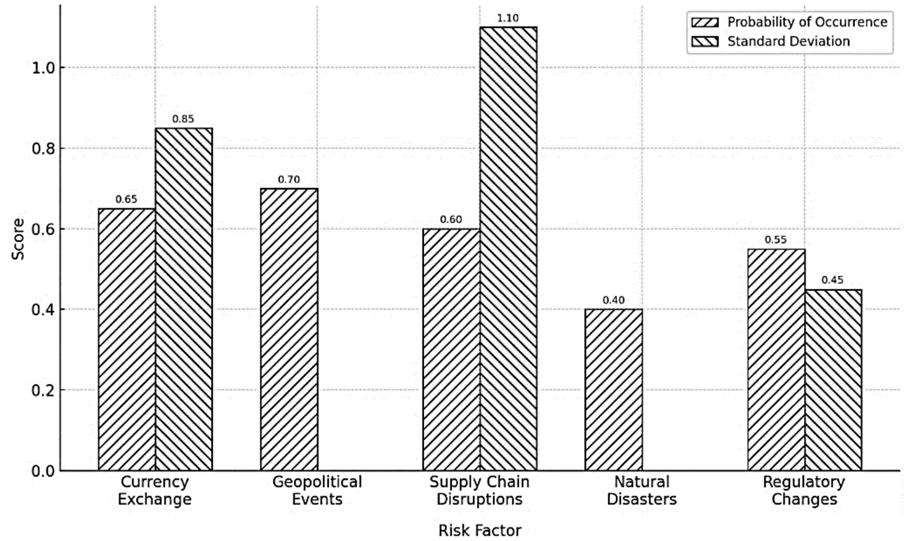

Fig. 2

Supply chain resilience was determined based on the structure and stability of supplier relationships. This metric measures firms' ability to sustain operations in the face of external disruptions. The resilience ratio was the proportion of stable sources in total supplier portfolios. Supplier strategies evaluated: single-source, dual-supplier, multiple-source, mixed, fully diversified networks. Supply Chain Resilience Metrics are shown in Figure 3.

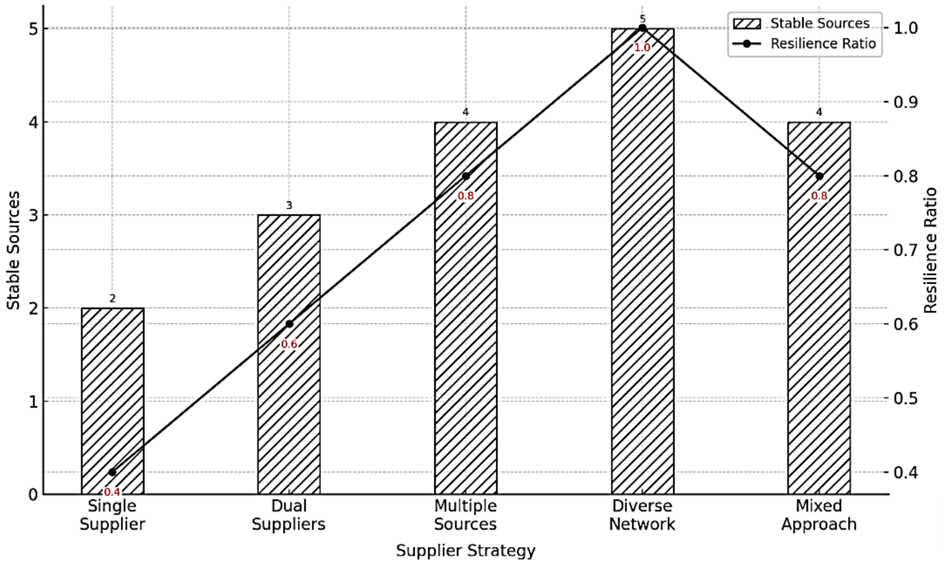

Fig. 3

During this task, Diverse Network method demonstrated the highest resilience ratio to reach 1.0, validating its capability of sustaining full supply. Multiple Sources and Mixed Approaches both received a score of 0.8, both of which also emphasize strong redundancy and flexibility. The Dual Suppliers strategy yielded a mid-level resilience of 0.6, while Single Supplier fared poorly at 0.4, leaving companies vulnerable to focused operational risk. Sourcing structures should however be diversified and investment in multi-tier supplier relationships need to be made, particularly for companies who operate within geopolitically or economically unstable areas which is a strong argument settled in Figure 3.

Predictive Model Accuracy Scores analysis (fig. 4) outlines the performance of various forecasting models employed to estimate behavior, such as market feedback mechanisms as well as supply disruptions and overall operational efficiency, in conditions of uncertainty. The evaluated models spanned a range, includeing statistical regressions, machine learning algorithms, hybrid approaches, heuristic rules, and scenario-based logic systems. Reliability of the model was evaluated by contrasting actual and predicted outputs, with correctness reflecting the fraction of total forecasts.

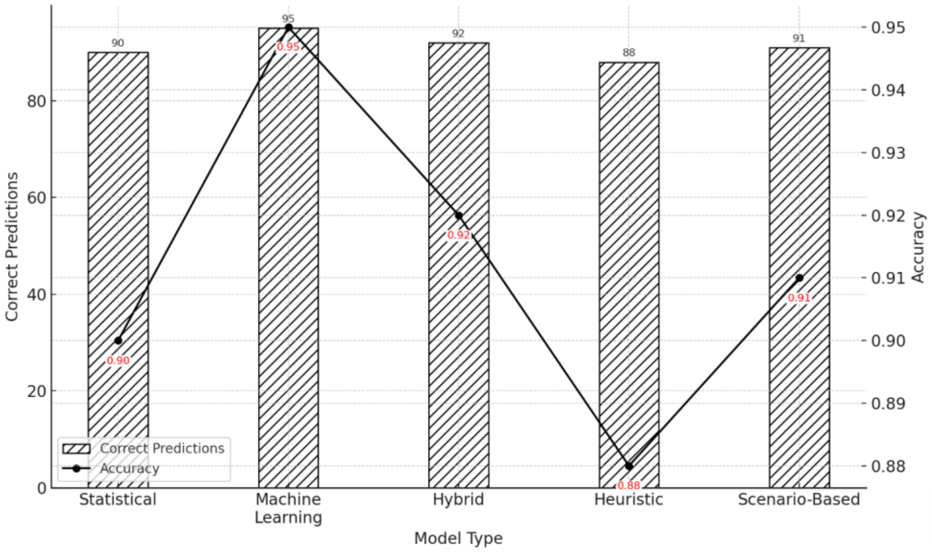

Fig. 4

Machine learning models scored the highest with an accuracy score of 0.95, followed by two or a hybrid model at 0.92 and the scenario-based forecasts at 0.91 (see Figure 4). At 0.90, statistical methods held strong, but heuristic models, though less sophisticated, still managed to net an impressive 0.88. Scenario-based models also provide practical value in operational planning through the flexibility of their simulated extreme conditions.

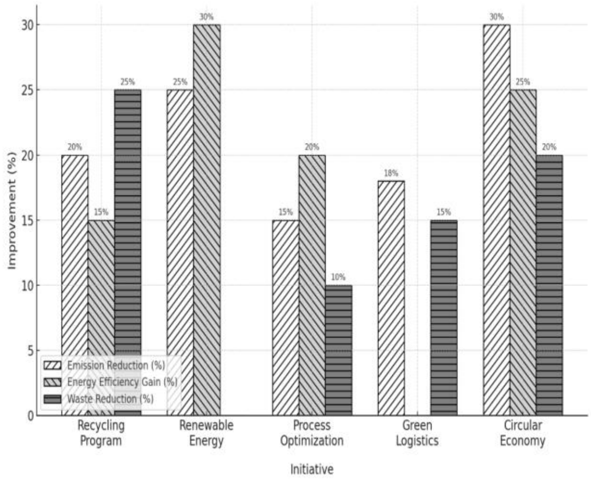

Fig. 5

Sustainability Performance Metrics (fig. 5) was analyzed by assessing the effectiveness of sustainability initiatives in reducing emissions, minimizing waste, and improving energy efficiency. Each initiative was evaluated indepependently, with data representing relative performance improvements as percentages.

The Circular Economy model delivered the highest overall impact, achieving 30% in emission reduction, 25% in energy efficiency, and 20% in waste reduction. Renewable energy also showed a strong dual performance in emissions and efficiency gains. Recycling programs delivered significant waste reduction (25%), while Green Logistics showed balanced though moderate returns. Process Optimization achieved uniform improvements across all dimensions, though at lower levels. These data reinforce the operational and environmental value of circular strategies and energy transitions, suggesting their strategic priority in textile production under global sustainability mandates.

Complex Visualization of Strategic Decision-Making Insights is shown in Figure 6.

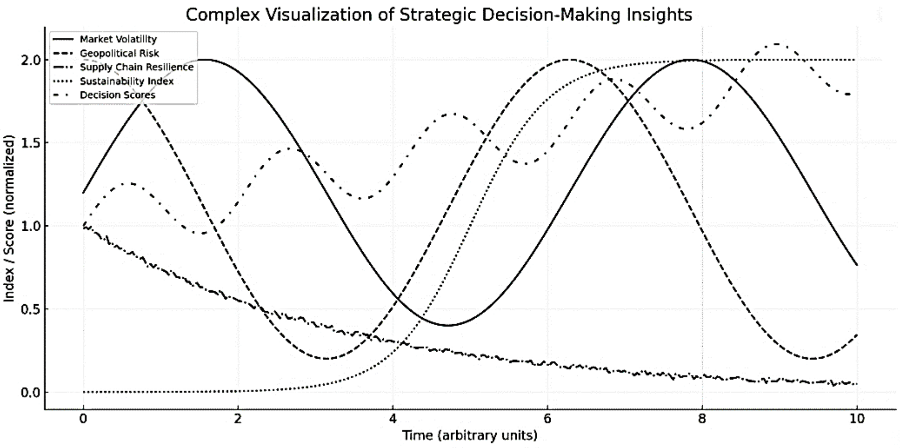

Fig. 6

Discussion

These findings suggest that decision-making effectiveness is significantly dependent on the integration of helpful forecasting, supplier network diversification, and sustainability-focused strategies. This comparative scenario analysis showed that although optimistic strategies have a much higher growth potential, balanced and conservative ways provide more resilience in stressful conditions.

These results are consistent with more general theoretical models of decision-making that focus on the importance of both data-driven models as well as scenario simulation. The inclusion of supply chain risk factors in the decision-making process demonstrates an understanding that operational uncertainty, particularly geopolitical instability and input price volatility, must be taken into account in strategic planning. Kancs [18]supports this by noting that simulation-based modeling is key to improving organizational resilience to disruption.

The modeling applied here which captures risk and uncertainty in financial markets was contrasted to Mao's model [16], where the effects of omics discoveries in capital markets are explored through the lens of a financial uncertainty model. Mao emphasized mainly exchange rate and liquidity risks, while our framework captures a wider range of operational risks of physical supply networks. This distinction is critical within the textile sector, where both external shocks and internal inefficiencies impact the material-to-market pipeline.

From the perspective of decision theory, the discovery aligns with Gambardella and Messinese's [20] dual-mode strategic planning conceptualization, who argue that there are knowledge-based (design mode) and theory-based (theory mode) structures used for decision making.

As for technological integration, the study results are in line with previous evidence concerning the potential added value of Industry 4.0 solutions for improving visibility and control in textile supply chains. Qiu et al. showed how digitally-enabled systems enable firms to simulate supply network responses to volatility [21]. This resilience index builds on that exploration by quantifying how supplier configurations, from single-source to diversified networks, affect operational continuity. This approach is a response to Çat et al. [17] results, determining that many textile companies use the traditional method of ANP-based risk assessment yet take a double look at low-cost, high-risk suppliers.

In this study, a significant contribution is the focus on sustainability as an essential strategic axis. The data speak to us in the way that initiatives such as circular economy adoption, renewable energy integration and green logistics create more than just environmental benefits to improve operational performance. This is consistent with the findings of Plakantonaki et al. [23] found that the vast majority of sustainable enterprises employ eco-label frameworks and tend to achieve better market inertia and lower long-term costs after adopting these practices.

Nevertheless, there are several limitations that should be recognized. This limitation, observed by Nathan and Harris [15] in their systems modeling work, suggests the necessity of integrating mechanisms for real-time learning into decision architectures. Historical sales and cost data might not accommodate new variables such as consumer sentiment volatility, for example, or disturbance in digital platforms or non-price innovation factors — dimensions more important in a post-pandemic world economy.

An issue that becomes evident in studies like that of Qiu, Mao, and Liu [21] raise alarms about inferring causality through correlation in non-stationary markets concerning raw material price estimation such as for polyester yarn.

With AI-driven forecasting, there are still major concerns around model interpretability and ethical transparency. As Lund et al. [22] note, the academic community must examine how machine-generated decisions may normatively and epistemologically alter complex human systems.

From quantifying uncertainty and scoring decision scenarios to measuring supply chain resilience and linking environmental strategy to operational outcomes, the findings provide a cohesive view on how to compete and survive in the face of uncertainty.

Conclusion

The study introduces a framework that is structured and empirically informed for understanding strategic decision making under uncertainty in the context of the global textile business environment. By incorporating scenario-based analysis, risk modeling, and sustainability performance evaluation, the research provides a holistic perspective to assess decision effectiveness and organizational responsiveness.

REFERENCES

1. *Aidarov T.A., Umbitaliev A.D., Kuashbay S.* The Textile Industry in the New Realities: Consequences of the Pandemic, World Experience and Further Development in Kazakhstan. Izvestiya Vysshikh Uchebnykh Zavedenii, Seriya Teknologiya Tekstil'noi Promyshlennosti, 2022. 1(397). p. 33…37

2. *Ali S.S. et al.* A novel hybrid decision-making framework for measuring Industry 4.0-driven circular economy performance for textile industry. Business Strategy and the Environment, 2024. 33(8): p.7825…7854.

3. *Stepanova S.M., Sorokina T.Yu., Speransky S.N.* Evaluation of the Efficiency of Management of the Labor Component of the Textile Regional Industry Complex. Izvestiya Vysshikh Uchebnykh Zavedenii, Seriya Teknologiya Tekstil'noi Promyshlennosti, 2023. 3(405). p. 45…50

4. *Chourasiya R. and Pandey S.* Breathing new life: exploring the cutting edge of technology adoption in the textile industry. Research Journal of Textile and Apparel, 2024. https://doi.org/10.1108/RJTA-03-2024-0043

5. *Rubik F. et al.* Textiles on the Path to Sustainability and Circularity—Results of Application Tests in the Business-to-Business Sector. Sustainability, 2024. 16, DOI: 10.3390/su16145954.

6. *Radko S.G.* Guidelines for the sustainable development of industry in the system of national priorities. Izvestiya Vysshikh Uchebnykh Zavedenii, Seriya Teknologiya Tekstil'noi Promyshlennosti, 2024. 3(411), p. 39…49.

7. *Muturi H.* Impact of Social Media on Fashion Trends and Consumer Behavior in Kenya. International Journal of Fashion and Design, 2024. 3(1): p. 24…36.

8. *Abbasova Sh.R., Mамedova H.F., Mamedov F.A.* Key Characteristics of Logistics and Supply Chain Management in the Light Industry Sector. Izvestiya Vysshikh Uchebnykh Zavedenii, Seriya Teknologiya Tekstil'noi Promyshlennosti, 2024, 4(412), p. 42…52.

9. *Chan E.M. et al.* Revolutionizing the Textile and Clothing Industry: Pioneering Sustainability and Resilience in a Post-COVID Era. Sustainability, 2024. 16, DOI: 10.3390/su16062474.

10. *Dziubaniuk O. et al.* Exploring the heuristics behind the transition to a circular economy in the textile industry. Management Decision, 2024. 62(11): p.3404…3428.

11. *Jeremy D.J.* Innovation in American Textile Technology during the Early 19th Century. Technology and Culture, 1973. 14(1): p. 40…76.

12. *Özdağoğlu A. et al.* Applications of MCDM methods for the assessment of sustainable development: a case study of fashion textile group. Management of Environmental Quality: An International Journal, 2024. 35(5): p. 1028…1047.

13. *Wong D.T.W. and Ngai E.W.T.* An Empirical Analysis of the Effect of Supply Chain Innovation on Supply Chain Resilience. IEEE Transactions on Engineering Management, 2024. 71: p. 8562…8576.

14. *Tomita T.* Resistance and adaptation to globalization: Case studies of the Japanese textile industry. International Relations of the Asia-Pacific, 2025. 25(1): p. 111…141.

15. *Sunday K., Simon L., Naomi K.* Raw-material cost and productivity of manufacturing firms in Uganda; a case of home care herbal bathing soap enterprises Wakaliga branch. International Journal of Research in

Education Humanities and Commerce, 2024. 5(4): p.265…270.
16. *Mao Y.* Research on Uncertainty and its Application in Financial Markets. Highlights in Business, Economics and Management, 2024. 24: p.1127…1132.
17. *Çat F. et al.* Tekstil sektöründe risk değerlendirmelerinin anp yöntemi ile analizi. Uludağ Üniversitesi Mühendislik Fakültesi Dergisi, 2022. 27(2): p. 597…616.
18. *Kancs d.A.* Enhancing resilience: model-based simulations. Journal of Defense Analytics and Logistics, 2024. 8(1): p. 105…120.
19. *Nathan R. and Harris D.* Developing a Framework for Examining and Improving Decision-Making in Complex Mental Health Systems. BJPsych Open, 2024. 10(S1): p. S41…S42.
20. *Gambardella A. and Messinese D.* Design- and Theory-Based Approaches to Strategic Decisions. Organization Science, 2024. 36(10) DOI: 10.1287/orsc.2023.18245
21. *Qiu W., Mao Q., Liu C.* Price prediction of polyester yarn based on multiple linear regression model. PLOS ONE, 2024. 19(9): p. e0310355.
22. *Lund B.D. et al.* ChatGPT and a new academic reality: Artificial Intelligence-written research papers and the ethics of the large language models in scholarly publishing. Journal of the Association for Information Science and Technology, 2023. 74(5): p. 570…581.
23. *Plakantonaki S. et al.* A Review of Sustainability Standards and Ecolabeling in the Textile Industry. Sustainability, 2023. 15, DOI: 10.3390/su151511589.

Рекомендована 4th International Conference of New trends and Smart technology. Baghdad, Iraq. Поступила 27.05.2025.