

American Journal of Economics and Business Management

Vol. 9 Issue 9 | **pp.** 1101-1109 | **ISSN:** 2576-5973

Available online @ https://www.globalresearchnetwork.us/index.php/ajebm

Article

AI-Based Mechanisms for Improving the Efficiency of Management Decision-Making in Private Enterprises: Andijan Region

Sobirova Munavvarxon Qaxramonjonovna

1. Teacher, Department of Agrobusiness and Marketing, Andijan Institute of Agriculture and Agrotechnologies, Uzbekistan

* Correspondence: oydinsobirova90@gmail.com

Abstract: This study develops an artificial intelligence (AI)-based mechanism for improving the efficiency of management decision-making in private enterprises, with particular attention to the institutional and business conditions of Andijan region. The research combines analysis of official regional business statistics, regulatory documents on AI development in Uzbekistan, and a structured review of literature on human-AI decision-making. The evidence shows that Andijan has a broad private-business base: as of 1 June 2025, 21,583 active commercial enterprises were recorded, including 1,773 private enterprises, while 21,442 entities were classified as small businesses. The regional small-business structure is concentrated in trade and industry, creating a demand for faster decisions on inventory, pricing, procurement, production scheduling, customer management and financial risk. Based on these conditions, the article proposes a five-stage mechanism: data preparation, AI-supported analysis and forecasting, generation of decision alternatives, managerial verification, and continuous monitoring and recalibration. A proposed Decision-Making Efficiency Index integrates decision quality, time, risk, cost, auditability and human oversight. The study argues that AI should not replace the manager; rather, it should strengthen managerial analytical capacity while preserving human responsibility for consequential decisions. The proposed model provides a practical framework for gradual AI adoption in private enterprises in Andijan and a basis for future empirical validation.

Keywords: Artificial intelligence, management decision-making, private enterprises, decision efficiency, predictive analytics, human-AI collaboration, Andijan region, Uzbekistan

Citation: Qaxramonjonovna, S. M. AI-Based Mechanisms for Improving the Efficiency of Management Decision-Making in Private Enterprises: Andijan Region. American Journal of Economics and Business Management 2026, 9(9), 1101-1109

Received: 13th Jun 2026
Revised: 28th Jul 2026
Accepted: 15th Aug 2026
Published: 28th Sep 2026

Copyright: © 2026 by the authors. Submitted for open access publication under the terms and conditions of the Creative Commons Attribution (CC BY) license (https://creativecommons.org/licenses/by/4.0/)

1. Introduction

Management decision-making in private enterprises is increasingly shaped by the speed, volume and heterogeneity of available information. A manager may have to decide simultaneously how much to purchase, which customers to prioritize, whether to expand capacity, how to price a product, where to allocate working capital and how to respond to a competitor. The classical decision process remains relevant, but the information environment has changed: enterprise resource planning systems, online sales channels, electronic payments, customer records and external market information generate datasets that are larger and more frequent than an individual manager can process manually. This creates a practical space for artificial intelligence (AI) to support managerial analysis, forecasting and scenario evaluation [1].

The relevance of the topic is reinforced by the policy environment in Uzbekistan. Presidential Resolution No. PQ-358 approved the national Strategy for the Development of Artificial Intelligence Technologies until 2030 and explicitly links AI deployment to the social sphere and sectors of the economy. The strategy establishes national targets for expanding AI-based products and services, research infrastructure and AI readiness [2]. In January 2026, Law No. O'RQ-1115 introduced a general legal framework for relations associated with AI use, while the Ethics Rules registered as No. 3787 in March 2026 and effective from June 2026 established principles and requirements for safe and responsible use of AI-based solutions. Importantly for managerial decision-making, the ethics rules state that AI-generated decisions should not be treated as final decisions and emphasize human rights, legality, responsibility and control [3]

The regional context is especially important. According to Andijan regional statistics, as of 1 June 2025 there were 21,583 active commercial enterprises excluding dehkan and farm enterprises, of which 1,773 were private enterprises; 21,442 entities were classified as small business entities[4] . By 1 October 2025, 20,654 active small business entities were distributed across trade, industry, construction, hospitality, agriculture, health and social services, transport, information and communication, and other activities [5]. This diversity means that a single generic AI solution is unlikely to produce optimal results. Instead, private enterprises need a decision-support mechanism that connects enterprise data with sector-specific decision problems and preserves managerial oversight [6].

The objective of this study is to develop and substantiate an AI-based mechanism for improving the efficiency of management decision-making in private enterprises, taking Andijan region as the territorial case. The contribution is threefold. First, the article connects AI adoption to the institutional and sectoral structure of the regional private-business environment. Second, it proposes a staged human-AI decision mechanism rather than a full-automation model. Third, it introduces a pilot Decision-Making Efficiency Index that can be used by firms to monitor whether AI implementation actually improves decision quality, speed, risk control and accountability [7].

The theory of organizational decision-making emphasizes bounded rationality: managers operate with limited information, limited cognitive capacity and limited time. Simon's administrative behavior perspective therefore treats organizations as systems in which decision processes are designed to search for satisfactory rather than perfectly optimal alternatives [8]. AI changes this boundary by increasing computational capacity, but it does not remove uncertainty or institutional constraints.

Jarrahi argues that organizational decision-making is well suited to a human-AI symbiosis because AI is strong in analytical processing and pattern recognition, whereas people retain advantages in contextual judgment, intuition and dealing with ambiguity [9]. This logic is consistent with Shrestha, Ben-Menahem and von Krogh, who distinguish different ways of combining human and algorithmic decisions, including full delegation, sequential hybrid decision-making and aggregated human-AI decision-making [10]. For private enterprises, a sequential hybrid structure is particularly practical: AI identifies patterns and alternatives, while the manager validates the choice against business constraints and responsibilities.

Raisch and Krakowski develop the automation-augmentation paradox and show why organizations should not interpret AI only as a replacement technology. Automation and augmentation can coexist, and their interaction creates both performance opportunities and organizational risks [11]. Davenport and Ronanki similarly show that business AI projects often create value when they begin with focused, practical problems rather than overly ambitious attempts to automate an entire function [12]. These findings support a gradual implementation strategy for smaller private enterprises, where financial and technical resources are limited.

The literature also highlights a key managerial problem: AI can produce fast recommendations without guaranteeing validity, transparency or accountability. Hence, data quality, explainability, governance and human oversight are not secondary issues; they are part of the decision mechanism itself. The present article extends this perspective

to the regional context of Andijan by combining official business statistics with a practical mechanism that can be adapted to trade, industry and service enterprises [13].

2. Materials and Methods

The study uses a mixed conceptual-analytical design. The empirical base consists of official statistics from the National Statistics Committee of the Republic of Uzbekistan and the Andijan Regional Statistics Department, supplemented by national legal acts regulating AI development and use. Secondary statistical indicators are used to characterize the scale and structure of the business environment rather than to estimate AI adoption itself. The study therefore does not claim a measured regional AI-adoption rate where official evidence is not available.

The research applies descriptive statistical analysis, comparative analysis and mechanism design. Descriptive analysis is used to summarize the number and structure of enterprises. Comparative analysis is used to identify decision areas with high data intensity and rapid response requirements. Mechanism design is used to connect these decision areas to AI functions such as demand forecasting, anomaly detection, customer segmentation, cash-flow prediction, procurement optimization and scenario comparison.

A five-stage decision mechanism is specified: (1) data preparation and validation; (2) AI-supported analysis and forecasting; (3) generation and ranking of alternatives; (4) managerial verification and authorization; and (5) implementation, monitoring and recalibration. For each stage, decision rights remain explicit. AI may rank or recommend, but the manager remains accountable for the final action in accordance with the national ethics rules.

To assess implementation outcomes, a pilot Decision-Making Efficiency Index (DEI) is proposed. Let each component be normalized to a 0-100 scale. The index is defined as $DEI = 0.25Q + 0.20T + 0.20R + 0.15C + 0.10A + 0.10H$, where Q is decision quality, T is decision-time improvement, R is risk-control improvement, C is cost efficiency, A is auditability and explainability, and H is the quality of human oversight. The weights are author-proposed for pilot use and are not presented as statistically validated coefficients. Their purpose is to create a balanced dashboard in which speed cannot dominate quality and accountability. Table 1.

Indicator	Operational meaning	Possible measurement
Q – Decision quality	Accuracy and fit of the chosen decision	Forecast error; target attainment; rejection/rework rate
T – Decision time	Change in time from problem identification to authorized decision	Median decision hours/days before and after AI
R – Risk control	Ability to identify and reduce material risks	Late-payment rate; stock-out rate; anomaly detection
C – Cost efficiency	Resources used to produce and implement the decision	Decision cost; procurement savings; working-capital use
A – Auditability	Traceability of data, model output and managerial approval	Decision log completeness; explanation availability
H – Human oversight	Quality of managerial verification and responsibility	Exception-review rate; override quality; sign-off compliance

Source: Author's proposed Decision-Making Efficiency Index.

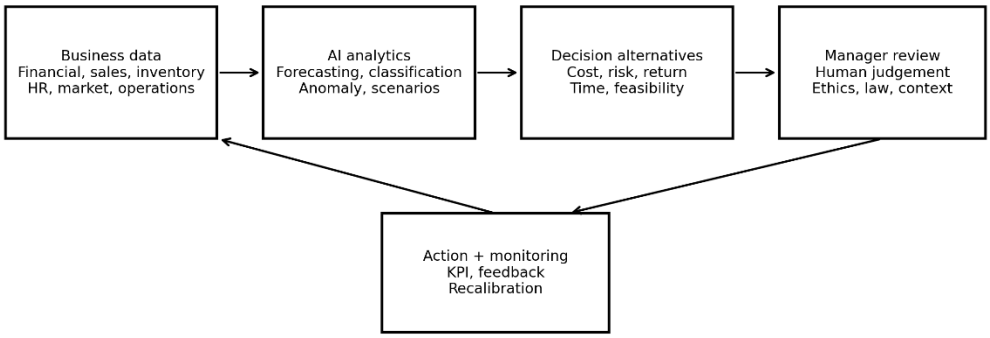


Figure 1. Proposed AI-based management decision mechanism for private enterprises
Source: Author.

3. Results

The first result concerns the scale of the target organizational environment. Andijan had 26,890 operating enterprises and organizations, excluding dehkan and farm enterprises, on 1 June 2025. Of these, 21,583 were active commercial enterprises; 21,442, or 79.7%, were small business entities. Private enterprises accounted for 1,773 organizations among the active commercial enterprises, or approximately 8.2% . These figures do not measure AI use, but they demonstrate that the potential user base for practical AI-based decision support is significant. Table 2.

Indicator	Value	Date	Analytical implication
Active enterprises and organizations (excluding dehkan/farms)	26,890	1 Jun 2025	Large addressable business base
Active commercial enterprises	21,583	1 Jun 2025	Core formal-business population
Small business entities	21,442 (79.7%)	1 Jun 2025	AI solutions should be affordable and simple
Private enterprises	1,773 (8.2% of active commercial enterprises)	1 Jun 2025	Specific organizational form targeted by the study
Registered small-business entities	48,785	1 Jul 2025	Substantial formalized entrepreneurial pool
Active small-business entities	21,890 (44.9% of registered)	1 Jul 2025	Need for productivity-focused decision support

Source: Andijan Regional Statistics Department [5] and [6].

The second result is the sectoral concentration of small business activity. On 1 October 2025, 20,654 active small business entities were distributed across nine broad activity groups. Trade accounted for 7,754 entities (37.5%) and industry for 4,352 (21.1%). Construction represented 7.8%, accommodation and food services 6.1%, agriculture, forestry and fisheries 5.5%, health and social services 4.4%, transport and storage 3.4%, information and communication 2.0%, and other activities 12.2%. Table 3.

Activity	Entities	Share, %	High-value AI decision cases
Trade	7,754	37.5	Demand forecasting, replenishment, pricing, customer segmentation
Industry	4,352	21.1	Production planning, quality anomalies, maintenance, procurement
Construction	1,604	7.8	Project scheduling, material needs, cost risk
Accommodation and food	1,270	6.1	Demand, staffing, procurement, service feedback
Agriculture, forestry and fisheries	1,135	5.5	Yield/price forecasting, resource allocation, logistics
Health and social services	919	4.4	Scheduling, demand, resource and service planning
Transport and storage	697	3.4	Routing, load planning, delivery risk
Information and communication	408	2.0	Customer analytics, service capacity, churn prediction
Other activities	2,515	12.2	Sector-specific cases
Total	20,654	100.0	—

Source: Andijan Regional Statistics Department, 24 October 2025 [6]. Shares calculated by the author.

The sector pattern indicates that early AI implementation should focus on decisions with repeatable data and measurable outcomes. In trade, for example, demand forecasts can support replenishment and pricing; in industry, AI can prioritize maintenance alerts or identify deviations in production data; in agriculture-related enterprises, AI can combine historical yields, prices and operational records for planning. The point is not to install a general chatbot in every department. Rather, AI should be attached to a defined decision bottleneck where the quality or speed of managerial judgement can be observed [14]. Table 4.

Decision area	AI-supported task	Human responsibility	Primary KPI
Procurement	Supplier comparison; reorder recommendations	Approve supplier, terms and exceptions	Procurement cycle time; purchase variance
Inventory	Demand forecast; stock-out/anomaly alerts	Set service level; validate exceptional demand	Stock-out rate; inventory turnover

Decision area	AI-supported task	Human responsibility	Primary KPI
Pricing	Scenario simulation; price elasticity estimation	Set strategic price boundaries	Margin; revenue per unit
Finance	Cash-flow forecasting; anomaly detection	Approve financing and risk actions	Cash conversion; late-payment rate
Production	Schedule optimization; quality anomaly detection	Confirm operational feasibility	On-time completion; defect rate
Customers	Segmentation; churn or complaint signals	Select retention actions	Retention; complaint resolution time

Source: Author's mechanism design based on literature and regional business structure.

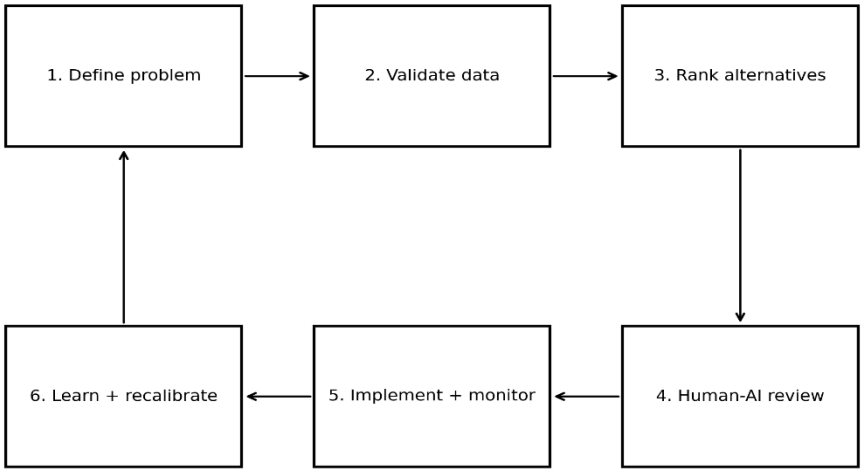


Figure 2. Continuous decision-learning cycle with human oversight
Source: Author.

A third result is the identification of a governance gap that may undermine AI efficiency if implementation is treated only as a technical investment. The national ethics rules require participants in AI-based solutions to follow principles including legality, protection of interests, responsibility and control, and explicitly state that decisions produced by AI systems should not be accepted as final decisions. Therefore, enterprise-level mechanisms should contain an approval threshold: routine low-risk recommendations may be automated or semi-automated, whereas strategic, financial, personnel and legally sensitive decisions require documented human authorization. Table 5.

Decision class	Typical examples	Recommended AI role	Approval rule
Routine / low risk	Reorder, schedule suggestion, standard customer response	Automated recommendation	Manager may approve by exception

Decision class	Typical examples	Recommended AI role	Approval rule
Operational / medium risk	Supplier choice, pricing change, staff allocation	Rank alternatives + explanation	Manager sign-off required
Strategic / high risk	Investment, major borrowing, workforce restructuring	Scenario analysis only	Formal human decision and documented rationale
Legally or privacy sensitive	Personal-data-intensive or regulated decisions	Risk flagging and control	Human/legal review mandatory

Source: Author's proposed governance classification, aligned with [2] and [3].

The proposed Decision-Making Efficiency Index can be deployed as a management dashboard. The model is deliberately multidimensional. An enterprise may become faster after adopting AI while becoming less accurate, less transparent or more exposed to risk. A balanced index discourages such one-sided optimization. For pilot implementation, a firm can calculate each indicator on a monthly basis and compare the pre-AI baseline with the post-AI period. The index should be interpreted alongside the raw component values because a composite score can hide offsetting movements. Table 5.

Dimension	Weight	Suggested baseline	Target direction
Decision quality (Q)	0.25	Current error/rework/target attainment	Improve
Decision time (T)	0.20	Median hours or days per decision	Reduce time
Risk control (R)	0.20	Incidents, anomalies, delays, losses	Reduce exposure
Cost efficiency (C)	0.15	Decision-related and process costs	Reduce cost / improve return
Auditability (A)	0.10	Completeness of decision logs	Improve traceability
Human oversight (H)	0.10	Approval and exception-review quality	Improve control

Source: Author's proposed weighting structure. Empirical calibration is required before use as a validated performance index.

4. Discussion

The results indicate that the most suitable AI strategy for private enterprises in Andijan is not wholesale automation but selective augmentation of management work. This conclusion is consistent with Jarrahi's argument that AI and humans possess complementary strengths in organizational decision-making . It is also consistent with Shrestha et al., who emphasize that organizational decision structures should be designed around the characteristics of the decision search space, interpretability, alternative set, speed and replicability [15] .

The Andijan business structure adds a practical dimension to this literature. Because trade and industry together represent more than half of active small business entities,

many enterprises face decisions that are repetitive enough for algorithmic assistance but still dependent on local context. For example, a demand forecast can identify an expected sales peak, but the manager must consider local events, supplier reliability, seasonal disruptions or cash constraints. The value of AI therefore lies in narrowing the search space and making relevant alternatives visible, not in removing the manager from the process.

Another implication concerns organizational capability. AI adoption can fail even when the technology itself performs well if the enterprise lacks clean data, defined decision rights or staff skills. This is why the mechanism begins with data preparation and ends with recalibration. In smaller firms, the first implementation target should be a process with relatively clear inputs and outputs, such as inventory replenishment, cash-flow forecasting or procurement comparison. Once reliable decision logs accumulate, the enterprise can move to more complex applications.

The national regulatory framework reinforces this gradual approach. PQ-358 frames AI as an economic and social development priority, while O'RQ-1115 and the 2026 ethics rules establish legal and ethical requirements. For private enterprises, these rules imply that data governance, privacy protection, explainability and human accountability should be built into AI projects from the beginning rather than added after deployment.

The proposed mechanism also addresses the automation-augmentation paradox identified by Raisch and Krakowski . If a firm automates routine decisions without building monitoring and exception-handling capacity, errors may scale faster than managerial control. Conversely, if AI is used only as a passive information source, much of its analytical value is lost. The optimal structure is therefore selective automation within explicit boundaries and human augmentation for ambiguous, strategic or high-consequence decisions.

The study has limitations. First, publicly available regional statistics describe the size and structure of enterprises but do not provide a standardized indicator of AI adoption among private enterprises. Second, the Decision-Making Efficiency Index is a proposed managerial instrument rather than a validated econometric scale. Third, the sector composition used in the article refers to active small business entities as a broad regional proxy and should not be interpreted as a complete sector breakdown of the 1,773 private enterprises. Future research should collect enterprise-level panel or survey data, estimate the relationship between AI use and decision outcomes, and calibrate the proposed index using observed performance changes.

5. Conclusion

The study establishes that the introduction of AI into private-enterprise management should be organized as a decision mechanism rather than as an isolated technology purchase. Andijan provides a relevant setting because of its large small-business base and the high concentration of activity in trade and industry. The proposed mechanism connects enterprise data, AI analysis, alternative generation, managerial verification and continuous monitoring. This structure is aligned with the national policy direction for AI development and with the 2026 ethical requirement that AI-generated decisions should not be treated as final decisions [1-3].

The main scientific-practical contribution is the proposed human-centered mechanism and the Decision-Making Efficiency Index. Together they create a framework by which private enterprises can evaluate whether AI actually improves the quality, speed, risk control, cost efficiency and accountability of management decisions. The priority for Andijan enterprises should be phased deployment beginning with data-rich, repeatable and measurable decisions; establishment of clear human approval thresholds; staff training in AI-supported analysis; and continuous evaluation through transparent performance indicators.

Acknowledgement. The author gratefully acknowledges the National Statistics Committee of the Republic of Uzbekistan and the Andijan Regional Statistics Department for publicly available statistical information used in this study.

Conflict of Interest. The author declares no conflict of interest.

REFERENCES

[1] Republic of Uzbekistan. Presidential Resolution No. PQ-358 of 14 October 2024, On Approval of the Strategy for the Development of Artificial Intelligence Technologies until 2030. Lex.uz; 2024. https://lex.uz/uz/acts/-7158604.

[2] Republic of Uzbekistan. Law No. O'RQ-1115 of 21 January 2026, On Amendments and Additions to Certain Legislative Acts in Connection with Regulation of Relations Arising from the Use of Artificial Intelligence. Lex.uz; 2026. https://lex.uz/uz/acts/-8008401.

[3] Ministry of Digital Technologies of the Republic of Uzbekistan. Ethics Rules for the Creation, Implementation and Use of AI-Based Solutions, registration No. 3787; effective 17 June 2026. Lex.uz; 2026. https://lex.uz/docs/8083233.

[4] National Statistics Committee of the Republic of Uzbekistan. Main Indicators of Small Business Entities in the Republic of Uzbekistan. Press release, 24 October 2025. https://stat.uz/img/press-relizlar/kb_eng_p74274.pdf.

[5] Andijan Regional Statistics Department. Distribution of Business Entities by Organizational and Legal Form. 13 June 2025. https://andstat.uz/uz/matbuot-markazi/qo-mita-yangiliklar/13150-tadbirkorlik-subyektlarining-tashkiliy-huquqiy-shakli-bo-yicha-taqsimlanishi.

[6] Andijan Regional Statistics Department. Sector Composition of Active Small Business Entities. 24 October 2025. https://andstat.uz/uz/matbuot-markazi/qo-mita-yangiliklar/13490-eng-ko-p-kichik-biznes-subyekti-qaysi-sohada-faoliyat-yuritmoqda.

[7] National Statistics Committee of the Republic of Uzbekistan. Number of Registered Private Enterprises (Annually), SIAT indicator 1.09.01.0113. Updated 16 January 2026. https://siat.stat.uz/data/3517/?lang=en.

[8] Simon HA. Administrative Behavior: A Study of Decision-Making Processes in Administrative Organization. 3rd ed. Free Press; 1976.

[9] Jarrahi MH. Artificial intelligence and the future of work: human-AI symbiosis in organizational decision making. Business Horizons. 2018;61(4):577-586. doi:10.1016/j.bushor.2018.03.007.

[10] Shrestha YR, Ben-Menahem SM, von Krogh G. Organizational decision-making structures in the age of artificial intelligence. California Management Review. 2019;61(4):66-83. doi:10.1177/0008125619862257.

[11] Raisch S, Krakowski S. Artificial intelligence and management: the automation-augmentation paradox. Academy of Management Review. 2021;46(1):192-210. doi:10.5465/amr.2018.0072.

[12] Davenport TH, Ronanki R. Artificial intelligence for the real world. Harvard Business Review. 2018;96(1):108-116.

[13] Organisation for Economic Co-operation and Development. Recommendation of the Council on Artificial Intelligence. OECD/LEGAL/0449. OECD; 2019, updated 2024. https://legalinstruments.oecd.org/en/instruments/OECD-LEGAL-0449.

[14] Raisch S, Krakowski S. Artificial intelligence and management: the automation-augmentation paradox. *Academy of Management Review*. 2021;46(1):192-210. doi:10.5465/amr.2018.0072.

[15] Ministry of Digital Technologies of the Republic of Uzbekistan. Ethics Rules for the Creation, Implementation and Use of AI-Based Solutions, registration No. 3787; effective 17 June 2026. Lex.uz; 2026. https://lex.uz/docs/8083233.