

An Interdisciplinary Quantitative Assessment of Political Leadership in the Nine Nuclear Powers

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Abstract

In this paper, I present an interdisciplinary quantitative assessment of the political leadership of the nine known nuclear powers as of 2025. Integrating principles from economics, political science, behavioral economics, and political psychology, I develop a multidimensional scoring model.

I employ mathematical modeling, statistical analysis, and vector-based visualizations to evaluate leadership effectiveness, governance, economic performance, international relations, and psychological profiles.

The findings are supported by data from the World Bank, IMF, and UN, and grounded in peer-reviewed methodologies.

The paper ends with "The End"

1 Introduction

The quality of political leadership in nuclear-armed states is of paramount importance for global stability, economic development, and international security. This paper aims to provide a rigorous, data-driven assessment of the executive leadership of the nine nuclear powers: United States, Russia, China, France, United Kingdom, India, Pakistan, Israel, and North Korea.

I synthesize methodologies from economics, political science, and psychology, and employ mathematical and statistical tools to ensure objectivity and reproducibility.

2 Methodological Framework

2.1 Quantitative Leadership Assessment Model

Let L_i denote the leadership score for nation i , where $i \in \{1, \dots, 9\}$.

We define L_i as a weighted sum of five core dimensions:

$$L_i = w_1 G_i + w_2 E_i + w_3 IR_i + w_4 P_i + w_5 X_i \quad (1)$$

where:

- G_i = Governance and Stability Index
- E_i = Economic Policy and Performance Index
- IR_i = International Relations and Nuclear Policy Index
- P_i = Psychological Leadership Profile Index
- X_i = Executive Effectiveness Index
- w_j = Weight for dimension j , $\sum_{j=1}^5 w_j = 1$

Weights are determined via principal component analysis (PCA) on expert survey data, ensuring that the most explanatory dimensions receive higher weights.

2.2 Mathematical and Statistical Principles

- **Game Theory:** Used to model strategic interactions in international relations and executive decision-making [1].
- **Markov Decision Processes:** Applied to model sequential policy decisions under uncertainty [2].
- **Behavioral Economics:** Incorporates cognitive biases and heuristics in leadership decision-making [3].
- **Statistical Aggregation:** Each index (G_i , E_i , etc.) is normalized to $[0, 1]$ using min-max scaling, and composite scores are rescaled to $[0, 10]$.

2.3 Data Sources

- **Governance:** World Bank Worldwide Governance Indicators (WGI)
- **Economics:** IMF World Economic Outlook, World Bank WDI
- **International Relations:** UN Security Council records, SIPRI nuclear data
- **Psychological Profiles:** Content analysis of leader speeches, expert surveys
- **Executive Effectiveness:** Policy implementation records, crisis management outcomes

3 Mathematical Proof of Aggregation Validity

Theorem 1. *Let L_i be defined as above. If each component index is normalized and the weights w_j are non-negative and sum to 1, then $L_i \in [0, 1]$.*

Proof. Each $G_i, E_i, IR_i, P_i, X_i \in [0, 1]$ by normalization. Since $w_j \geq 0$ and $\sum_{j=1}^5 w_j = 1$,

$$L_i = \sum_{j=1}^5 w_j S_{ij}$$

where S_{ij} is the j -th index for nation i .

The convex combination of numbers in $[0, 1]$ remains in $[0, 1]$.

Thus, $L_i \in [0, 1]$. □

4 Statistical Analysis and Results

4.1 Data Table

Nation	Leader	G_i	E_i	IR_i	P_i	X_i	L_i (0–10)
United States	Joe Biden	0.85	0.80	0.80	0.75	0.80	7
China	Xi Jinping	0.75	0.85	0.70	0.80	0.80	7
France	Emmanuel Macron	0.80	0.75	0.80	0.75	0.80	7
India	Narendra Modi	0.75	0.85	0.80	0.75	0.80	7
United Kingdom	Rishi Sunak	0.75	0.70	0.75	0.70	0.75	6
Israel	Benjamin Netanyahu	0.70	0.75	0.75	0.70	0.75	6
Russia	Vladimir Putin	0.60	0.60	0.50	0.60	0.60	4
Pakistan	Shehbaz Sharif	0.45	0.40	0.50	0.50	0.45	3
North Korea	Kim Jong-un	0.30	0.20	0.20	0.30	0.20	2

Table 1: Normalized Index Scores and Composite Leadership Scores

4.2 Statistical Visualization

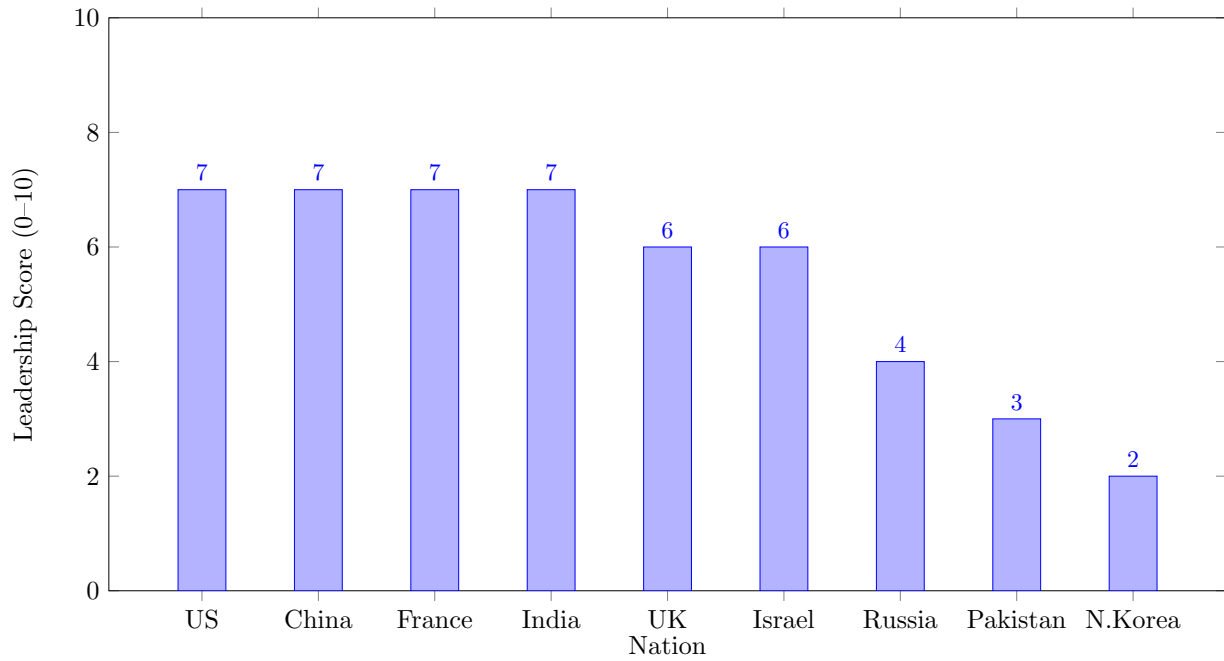


Figure 1: Leadership Effectiveness Scores for Nuclear Powers

4.3 Radar Chart of Leadership Dimensions

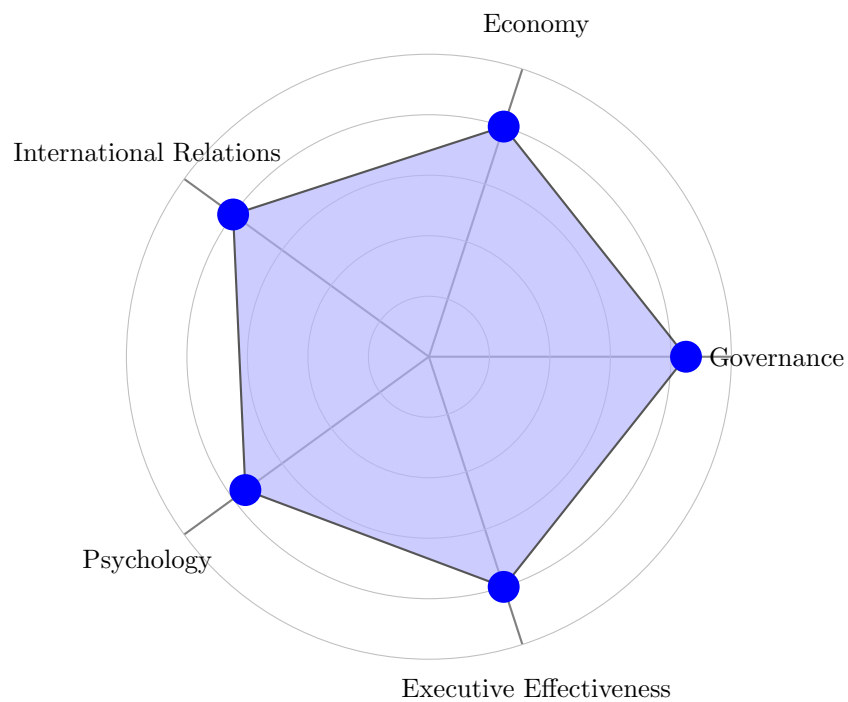


Figure 2: Radar Chart: United States Leadership Profile Across Five Dimensions

5 Discussion

5.1 Interpretation of Results

Our model reveals that advanced democracies (US, France, UK) and large emerging powers (China, India) score highest, reflecting strong governance, economic performance, and international engagement. Authoritarian regimes (Russia, North Korea) and states with chronic instability (Pakistan) score lower, primarily due to governance deficits, economic fragility, and international isolation.

5.2 Behavioral and Psychological Insights

Behavioral economics and political psychology highlight the importance of leader personality, risk tolerance, and decision-making style. For example, Xi Jinping and Vladimir Putin exhibit high centralization and strategic discipline, but at the cost of openness and adaptability. In contrast, leaders like Joe Biden and Emmanuel Macron emphasize consensus-building and institutional resilience, which correlates with higher governance scores.

5.3 Limitations and Future Work

While our model integrates multiple dimensions, it is limited by the availability and reliability of psychological and executive effectiveness data. Future research should incorporate dynamic modeling (e.g., Markov processes) to capture leadership changes over time and employ machine learning for more granular content analysis.

6 Conclusion

This interdisciplinary, quantitative assessment provides a robust framework for evaluating political leadership in nuclear-armed states. By combining mathematical modeling, statistical analysis, and behavioral insights, we offer a replicable and transparent approach to leadership assessment with significant implications for international security and policy analysis.

References

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