

THE FUTURE OF US ALLIANCES AND PARTNERSHIPS: A DATA SCIENCE APPROACH

In the era of strategic competition, the U.S. government is intensely focused on building stronger alliances and partnerships around the world. And in the new era of data science, governments and industry are gaining competitive advantages by employing big data and machine learning techniques to identify, measure, and predict patterns.

But until now, no research organization has harnessed the tools of data science for the purpose of building stronger U.S. alliances and partnerships. CNA experts in **data science and in national security strategy have come together to develop a more rigorous and quantified approach to U.S. alliances and partnerships**. The result is a statistical index that identifies countries with the strongest and weakest alignment with the United States. Such an index might highlight cracks in relationships that are being taken for granted. Machine learning can also signal opportunities for stronger alliances and partnerships and predict conditions that could strengthen or weaken alliances.

WHAT DATA SCIENCE BRINGS TO ALLIANCE MANAGEMENT

Past efforts to quantify alliance strength have chosen individual measures, such as numbers of treaties. Some have merged multiple measures, subjectively deciding how much to weight each factor. CNA took a data science approach, developing a machine learning algorithm to analyze 150 nations on a dataset of nine variables signifying engagement or hostility:

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- [1] International agreements with U.S.
 - [2] Defense agreement with U.S.
 - [3] U.S. diplomatic representation abroad
 - [4] U.S. arms exports
 - [5] Foreign assistance
 - [6] Militarized interstate disputes, same side as U.S.
 - [7] Militarized interstate disputes, different side
 - [8] U.S. sanctions
 - [9] Cyberattacks against the U.S.

With no other information about which countries are considered friend or foe, and no guidance on weighting, the algorithm found the correlations among these variables. It assigned them weights according to how close those correlations are. And it came up with an index value for each country's alignment with the United States.

Note that while this kind of "unsupervised" machine learning algorithm independently decides how to weight and correlate each variable, the human decision of which variables to include is a subjective one that can influence the results.



ALIGNMENT INDEX FINDINGS

- Canada, Mexico, Japan, United Kingdom and Germany were the **most aligned** with the U.S.
- China, Russia, and Iran were the **least aligned** with the U.S.
- The top 20 most aligned countries are all in an **alliance treaty** with the U.S.
- No African or Middle Eastern country is in the top 20.
- Four of the five U.S. treaty allies in the Indo-Pacific are in the top 20.
- Few countries in the Americas and Europe are listed in the bottom 20.

ADDING THE PREDICTIVE LAYER

The study also developed a machine learning algorithm to predict the level of a country's alignment with the U.S. We chose a set of political and economic factors we believed likely to **contribute to strength of relationships** between the U.S. and foreign countries. CNA trained 17 of these economic and political metrics against the alignment index results for a wide range of countries. The model correlated and weighted those metrics to roughly predict the degree to which a country would be aligned with the United States one to five years from any point in time, given a set of political and economic indicators.

Such a model can inform policymakers about potential opportunities or risks to diplomatic relationships in the wake of changes in political and economic circumstances. Perhaps more important, outliers may suggest current opportunities. Five countries stood out in the results as having lower alignment indexes than would be expected given their political and economic conditions: Singapore, United Arab Emirates, Benin, Namibia, and Lesotho. Of

the five, Singapore and the U.A.E. provide important military access for the U.S. That their alignment scores are low relative to their political development and trade connections may invite further examination of these critical relationships.

FUTURE POTENTIAL

Due to the need to understand the role of alliances and partnerships in an era of strategic competition, U.S. policymakers need to modernize their tools for conducting such analyses. This project represents an exploratory research effort to establish a rigorous method for studying the future of U.S. alliances and partnerships. Further research using this approach holds out the prospect of studying how an alliance or partnership might change in response to changes in underlying conditions, such as a coup or revolution. It could also help pinpoint potential opportunities for further investment and relationship building:

- Does increasing foreign assistance strengthen alignment?
- How do arms exports affect alignment, if at all?
- Does the size of U.S. diplomatic representation influence alignment patterns globally?
- Do drops in indicators of a country's civil liberties impact its alignment with the U.S.?

Data science cannot definitively predict the future for these and other questions. But through its methods, we can survey the past with an unequaled level of detail and detachment, making data science a uniquely informative decision aid.

Read the full report on CNA.org: *The Future of US Alliances and Partnerships: A Data Science Approach*

ABOUT CNA

CNA is a nonprofit research and analysis organization dedicated to the safety and security of the nation. It operates the Institute for Public Research — which serves civilian government agencies — and the Center for Naval Analyses, the Department of the Navy's federally funded research and development center (FFRDC). CNA develops actionable solutions to complex problems of national importance. With nearly 700 scientists, analysts and professional staff, CNA takes a real-world approach to gathering data, working side-by-side with operators and decision-makers around the world. CNA's research portfolio includes global security and strategic competition, homeland security, emergency management, criminal justice, public health, data management, systems analysis, naval operations and fleet and operational readiness.

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