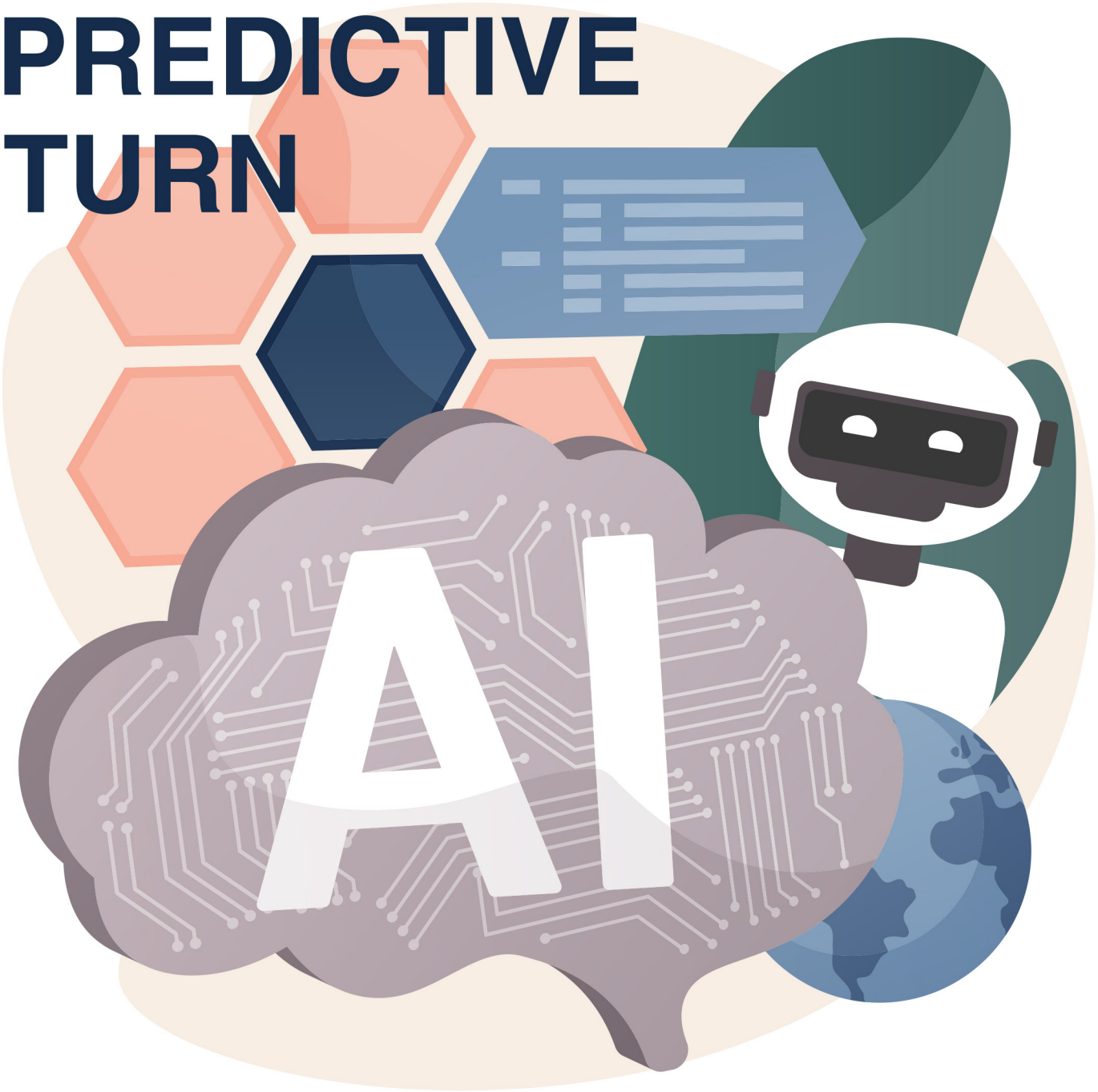
THE PREDICTIVE TURN



Preparing to Outthink Adversaries Through Predictive Analytics

■ *By MAJ Anthony Grajales*

In 1999, Bill Gates's book *Business @ the Speed of Thought* predicted technology like the internet, email, and desktop business programs would transform industries. Gates argued that these tools should be part of a digital nervous system, connecting every facet of a business to boost capabilities and accelerate responsiveness in the fast-paced digital world. Today, the Army faces a similar revolution. While we have discussed integrating artificial intelligence (AI), predictive analytics, and quantum computing, these tools are not just for automating existing processes. Instead, they should help us outthink our adversaries by enabling faster, more informed decisions in an increasingly complex world.

Yet, challenges remain. Despite the promise of predictive analytics to revolutionize distribution, route planning, and transportation management, many tactical units still find it challenging to grasp and use these tools. As the Army integrates advanced algorithms, there is a growing gap between the technology's potential and its practical application on the ground. That is why it is crucial for leaders to start preparing now. This article offers sustainment leaders insights into predictive analytics, along with practical steps to help navigate implementation challenges and spark innovation. While it is easy to view predictive analytics as just a forecasting tool, its true value lies in boosting our strategic agility, helping us stay in control and to secure an edge through foresight rather than just automation.

Driving Predictive Power

The Army has invested greatly in predictive analytics. According to Training and Doctrine Command Pamphlet 525-4-1, The U.S. Army's Functional Concept for Sustainment 2020-2040, predictive analytics is meant to be about risk reduction and decision support. As the operational environment and adversaries change, the question becomes, "What risks and decisions is the U.S. Army trying to predict?"

To unlock the true potential of predictive analytics, sustainment forces need to begin with the basics: understanding and using the right data. It is essential for logistics officers to know what data they are collecting, analyzing, and using to guide decisions, which can vary across echelons. Typically, sustainment units focus on four core questions:

1. What capabilities are currently available/anticipated?
2. How much does the supported unit require?
3. Can the supporting unit meet those needs?
4. How can sustainment be delivered without interruption?

These questions reveal underlying issues, risks, and crucial decision points.

From Predicting to Preempting

The real potential of predictive analytics is not just in forecasting what may happen, but in using those insights to disrupt adversaries before they have a chance to act. In this sense, military logistics is transforming from a reactive to a proactive discipline. Instead of merely responding to crises or challenges as they arise, forces can position themselves strategically to neutralize threats before they materialize.

Consider the following scenario: During recent hurricane planning and preparation, the 3rd Division Sustainment Brigade at Fort Stewart, Georgia, used open-source AI to track incoming hurricanes and plan convoy support centers to preposition nodes. This predictive system identified an emerging pattern of road traffic, mandated evacuation routes, potential flood zones, and supply chain activity that suggested prepositioning capabilities into two specific support regions. Instead of waiting for the hurricane to occur and reacting accordingly, units were preemptively staging supplies, conducting troop-leading procedures, and even integrating additional units much more rapidly. However, the goal is not just to predict and prepare but to act in a way that forces an enemy to react, creating a cycle in which the adversary is always on the back foot. This hurricane planning highlighted how these lessons could be applied against an enemy.

Predictive analytics, in this sense, becomes a tool for outmaneuvering rather than simply outpacing. It offers a way to control the tempo

of operations by forcing the enemy into a series of reactive moves, all while keeping one step ahead.

The Enemy and Predictive Analytics

The OODA loop — observe, orient, decide, act — is central to predictive analytics in military operations, emphasizing speed and adaptability. By accelerating the observe and orient phases, predictive analytics helps leaders anticipate moves in the decide phase, enabling preemptive actions that disrupt the adversary's decision-making cycle. In logistics, this means predicting supply needs and positioning resources in advance, ensuring forces are always equipped. Ultimately, the goal is not only efficiency but also a sustained advantage, where decisions are driven by foresight and an understanding of likely enemy actions.

To use predictive analytics against our enemies, leaders must understand what actions in their operational environment require faster decision making. Utilizing the four core questions mentioned above is a start, but more depth is needed. Sustainment officers must begin to use data now to outthink the enemy. This does not require fancy software or proprietary data tools. The easiest recommendation for sustainers is to understand simple analytics such as trend analysis, moving averages, and simple linear regression.

Trend analysis can be as straightforward as using a spreadsheet to plot historical data and identify patterns. During the 3rd Division Sustainment Brigade's participation in Austere Challenge 24, it was found that enemy forces were destroying M1 Abrams and M2 Bradleys faster than anticipated, while Paladins and Apaches remained untouched. This insight highlighted the need to coordinate with the maintenance section for improved battle damage assessment and repair for maneuver platforms. Additionally, sharing this data with the S-2 and division planners enhanced the planning and positioning of Paladins and Apaches for effective counterattacks.

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Moving averages help reveal actual data trends by smoothing out outliers. For example, during a recent warfighter exercise, the support operations (SPO) section tracked fuel consumption over five days and noticed sharp increases on two days. The moving average was adjusted to help sustainment units balance demand with available fuelers, but another insight emerged. The spikes resulted from dynamic task organization changes, adding Stryker and armor units while removing light infantry. This revealed an overlooked planning factor: dynamic task organization changes can significantly affect sustainment needs, requiring units to respond even more rapidly to ensure consistent support.

Simple linear regression models can be applied in a spreadsheet to find correlations between an independent and a dependent variable. For instance, during garrison operations, the division

sustainment support battalion's SPO transportation section analyzed whether the mission type impacted the maintenance status of vehicle platforms. In this case, the mission was the independent variable, and maintenance status was the dependent variable. After tracking bumper and line item numbers on specific missions over 60 days, they found that forklifts sent to motor pools often went non-mission capable the next day. Research revealed that mislabeling of loads led to forklifts lifting overcapacity items, damaging their hydraulics.

These three analytics — trend analysis, moving averages, and linear regression — help leaders identify patterns, plan for uncertainty, and uncover correlations, which drive actionable improvements within a unit. By mastering these tools, sustainment leaders can better understand predictive analytics, which is crucial for effectively integrating AI. This foundational knowledge will enable the use of AI to transform battlefield operations by 2040.

Challenges to Realizing the Predictive Turn

While the Army acknowledges the benefits of predictive analytics, significant challenges remain in its implementation. At the platoon, company, and battalion levels, units often struggle with data collection, aggregation, and analysis; limiting the accuracy of predictive models. Despite numerous challenges, this issue requires immediate attention. Soon, sustainment leaders will be asked to create a concept of support that extends operational reach, endurance, and freedom of action more rapidly than ever.

Proficiency in predictive analytics is essential. While guessing its battlefield potential by 2040 may seem like science fiction, learning data analytics today could spark a revolution in military thought. As technological advances create more complex challenges, such as contested logistics, congested networks, limited suppliers, and dwindling resources, sustainment leaders will need innovative solutions. Embracing predictive analytics can enhance visibility, automate processes, and improve management efficiency, ultimately enabling leaders to anticipate adversaries' moves and disrupt their strategies.

Looking Ahead: The Future of Predictive Logistics

As military logistics continues to evolve, the use of predictive analytics will only grow more sophisticated. We can envision a future where logistics networks are so finely tuned that they can respond to shifting conditions in real-time, preemptively rerouting supplies, repositioning personnel, and dynamically adjusting strategies based on the latest data inputs. This is made possible by advancements in algorithms that change and create running estimates more quickly to enhance decision-making processes. Imagine running the military decision-making process in minutes thanks to predictive analytics and AI. This is a serious upgrade for decision making.

But the ultimate goal is not just efficiency or speed, it is strategic dominance. With these tools, the Army can efficiently preposition wartime stock, posture forces far forward, and integrate with host nation support and multinational corporations. It all begins with understanding the data now.

This is the true promise of predictive analytics. It is not just faster decision making or more efficient operations, but the ability to foresee, anticipate, and outmaneuver. In the future battlespace, the side that can predict the future more accurately and act on those insights more decisively will hold the upper hand.

Conclusion

As the military embraces the predictive turn, logistics will increasingly be about more than just moving supplies. As Bill Gates foresaw, technology goes beyond using email to communicate; it is about the connection it enables to create a competitive edge. Today's Army calls on us to harness predictive analytics to wage war at the speed of insight.

MAJ Anthony Grajales currently serves as the 87th Division Sustainment Support Battalion support operations officer in the 3rd Division Sustainment Brigade, 3rd Infantry Division, at Fort Stewart, Georgia. A logistics officer, he has served in various positions within the XVIII Airborne Corps. A graduate of the U.S. Army Command and General Staff Officer College and School of Advanced Military Studies, he holds a Master of Science degree in logistics and supply chain management from Embry-Riddle Aeronautical University.