Riding the Crest of the Data Revolution

C. D. Moore

Nearly every facet of our lives has been impacted by an exploding level of digital connectivity with corresponding rivers of data touching all aspects of society.

Whether we like it or not, a revolution is under way in the science of data collection and analysis with direct implications for all parts of our day-to-day existence ... with both positive and negative effects.

Today we live with mounting challenges associated with this data revolution and the digital transformation, from ransomware and identify theft to privacy issues. On the other hand, the advancements are driving increased connectivity, improved productivity and greater efficiencies in our personal lives as well as business activities.

Moore, a retired U.S. Air Force (USAF) lieutenant general, began his military career as a fighter pilot and experimental test pilot for many aircraft types, including the F-22 fighter jet. He later served as an acquisition leader and guided the Defense Department's premier fighter programs—the F-16, F-22 and the F-35. Prior to retiring, he led the USAF Life Cycle Management Center, a 26,000-member organization supporting more than 3,000 programs. He currently serves on several corporate boards, including Clockwork Solutions LLC, a predictive analytics company in Austin, Texas.
The rapid growth of social media and global communications are clear examples of this digital transformation. Companies are harnessing large amounts of data and employing ever-more-sophisticated data analytics to tailor products and services for a worldwide customer base. Companies are compiling and studying data to more efficiently meet the needs of a diverse, mobile and digitally connected population. Almost all industries are changing to keep pace with this data revolution—from transportation and communication to recreation and entertainment.

One of the more exciting and impactful areas associated with this data revolution involves system logistics, specifically the ability to collect and analyze large amounts data to dramatically improve system performance—increasing system availability while lowering operating costs. Just imagine operating a system—a car, an aircraft or an expensive piece of industrial equipment—and rarely dealing with unplanned breakdowns because of the ability to integrate multiple sources of data to accurately forecast component problems before they result in failure.

Large numbers of disparate data sources can now be compiled, correlated and analyzed in order to more accurately predict system performance. The science of predictive analytics has advanced to the stage where unexpected system main-

The Department of Defense (DoD) spends billions of dollars every year sustaining weapon systems, and those expenditures increase as weapon systems age. By harnessing the power of advanced predictive analytics, and pursuing conditioned-based maintenance (CBM), the DoD is well positioned to dramatically improve system availability while slashing sustainment costs. The advancement in predictive analytics is at the point where maintenance concepts for military weapon systems can move from schedule-driven and costly preventive procedures to more efficient data-informed and CBM activities accompanied by more accurately forecasted parts requirements. These are the benefits of CBM—a more cost-effective approach for managing fleets of systems supported by rapid improvements in the science of data management and predictive analytics.

The linkage between predictive analytics and CBM has direct application on fleet management—whether of aircraft, ground

Figure 1. Experiential Asset Life-Cycle Support Costs and Availability

![Graph showing experiential asset life-cycle support costs and availability comparisons.](image)

Figures produced in coordination with Clockwork Solutions of Austin, Texas.

Figure 2. Component Historical and Predictive Demand Comparison

![Graph showing component historical and predictive demand comparisons.](image)
vehicles, or support systems—where large amounts of data can be compiled and analyzed to accurately predict system performance. Money saved from employing smart predictive analytics on fleets of systems can be used to modernize and recapitalize the force structure. This is good for the military establishment and good for the taxpayer.

The world is undergoing a digital transformation, and the DoD has an opportunity to be the leader in the application of predictive analytics to change how fleets of systems are sustained. The potential for saving billions of dollars while simultaneously increasing system availability and warfighting readiness is well beyond the theoretical stage. The first step in this process is determining that the time is right to transform; the logical next step is partnering with the right product and service provider with a proven track record in the application of advanced predictive analytics. If done correctly, the results will speak loud and clear.

What does this transformation look like at the tactical level? Before a component fails, suspect parts are procured with the appropriate lead time to support the preplanned removal and replacement; and, if a part does fail, the supply system has been accurately primed using a more effective reliability forecasting capability. For those responsible for fleet management, employing these advanced prediction capabilities and forecasting tools provides the means to completely alter the supply and repair processes. No longer are managers and logisticians tied to inherently inaccurate and inefficient historical extrapolations for determining repair and parts requirements. In this enhanced forecasting process, system downtime is significantly reduced, savings accrue from a more accurate and timely parts procurement, and, most important of all for the DoD’s combatant commanders, system availability and readiness increase dramatically.

When companies and government organizations embrace this data revolution and capitalize on the latest predictive analytics capabilities, the results will produce a stark contrast from the past. However, those who remain trapped in using historical forecasting methods soon will realize that the old sustainment model is no longer affordable nor competitive. The data revolution is here and it is dramatically changing how we live, think and operate. The logistics paradigm is changing, and those who capitalize on the most advanced predictive analytics tools will become the industry leaders.

The old adage has it that one must lead, follow or get out of the way. There are opportunities today for organizations to lead in the data revolution by embracing new predictive analytic capabilities and driving more cost-effective ways of doing business. Those who do so will be the competitive winners in this transformational, data-rich era; others will be left behind. It is past time to employ the full power of advanced data analytics.

The author can be contacted at cd.moore@daytonaero.com.