COGNITION In The AGE KNOWELDGE

By: Nevin "Mustang" Taylor

A domain enlightened by Big Data, empowered by the information environment, and evolved through the creative capacity of mankind

"We are transitioning from wars of attrition to wars of cognition."

Gen David Goldfien – CSAF

In his pivotal speech at a recent Air Force Association, the Air Force Chief of Staff astutely acknowledged the transition from the industrial age, with a focus on a war of attribution, to the new age of knowledge with direct forbearance on leveraging cognition. He awakens us to this new reality of today's interconnected world with the following questions:

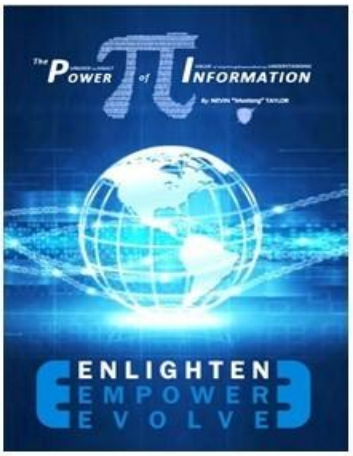
- *Does it connect?* **GOOD**
- *Does it share?* **BETTER**
- *Does it interconnect?* **IDEAL**

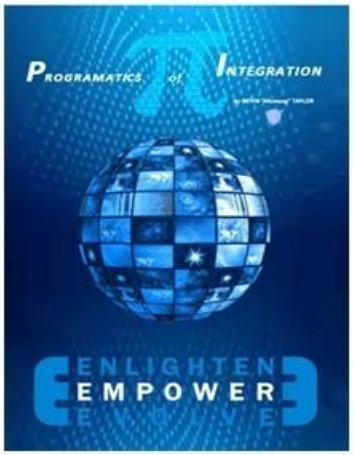
Today's society is leveraging data to make informed decisions with greater dependence on data that is fit for purpose and operationally relevant. By capitalizing on the inherent power of the information environment to harness the creative capacity of ideas, the ability to unleashing the capacity to enlightened knowledge which empowers understanding has created a formidable Challenge to Collect, Catalog, Correlate, Contextualize, Cost, Characterize, Coordinate Communicate and identify the Causality and Consequences (10C) of actions taken measured against desired results to be achieved. As they endeavor to mature knowledge into actionable understanding that affords them the ability to make wise choices, they come to realize that thinking before they act, beginning with the end in mind, offers an excellent opportunity to work smart, not merely harder, in today's interdependent, highly complex world. The opportunity to influence this environment in a way that affects their ability to support, enhance, and evolve (SEE) mission operations provides the means for competitive advantage as they transition from an industrial society to our current state where knowledge is king.

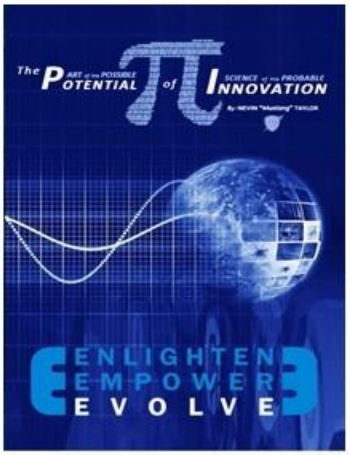
OBSERVE	PROBABILITY	SCIENCE	OBJECTIVE _
1C. Collect	Store	DATA	WHAT
2C. Catalogue	Structure	INFO	WHERE
OREINT	**PERSPECTIVE**	**ART**	**OBJECTIVE _**
3C. Correlate	Frame of Reference	KNOW	HOW
4C. Characterize	Situational Awareness	UNDERSTAND	WHEN
DECIDE	**POTENTIAL**	**THINK**	**OBJECTIVE _**
5C. Context	Options	WISDOM	WHY
6C. Cost/Benefit	Opportunity	GENIUS	
ACT	**PERFORM**	**ENGAGE**	**OBJECTIVE _**
7C. Coordinate	Synchronize	MANAGE	WHO
8C. Communicate	Disseminate	LEAD	
LOOP	**PERPETUATE**	**EFFECT**	**OBJECTIVE _**
9C. Causality	Dependencies	INFLUENCES	LEARN
10C. Consequence	Results	EFFECTS	

As we launch into this new endeavor, we must be cognizant of the definition of cognition as the mental action or process of acquiring knowledge and understanding through thought, experience, and the senses. It is through our structuring of data into information and characterizing the relationships within it that knowledge evolves into understanding. Recent emphasis on the size and scope of data accumulation has highlighted the need to manage it in a way that ensures it is fit for purpose. Recent efforts to focus on the maturation of information into knowledge underline the importance of ensuring it is operationally relevant to provide contextual understanding. And finally, our ability to think and understand the causality of actions, given the interdependencies involved and the results to be achieved, enables us to anticipate potential consequences in both time and space.

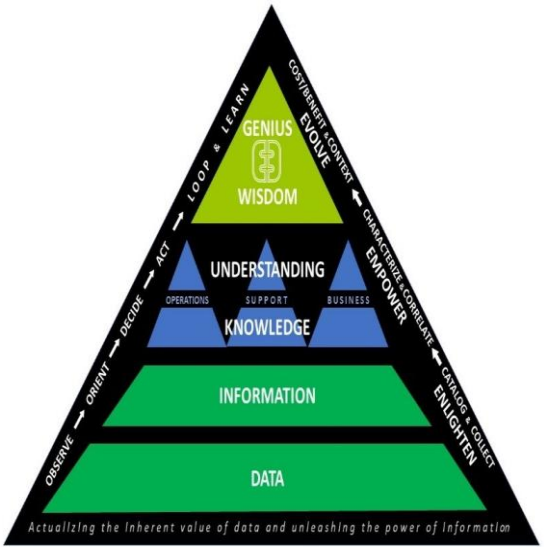
I recently published a series of three books outlining these areas, which illustrate the essential actions to be taken to enlighten, empower, and evolve (E3) in our ongoing efforts to derive strategic competitive advantage. They highlight the need to examine past conditions to inform current circumstances, thereby identifying the options and opportunities available in the future. The First book on “The Power of Information” outlines how to collect data and catalog information to ensure it is Visible, Accessible, Understandable, Linked, and Trustworthy (VAULT). The second “The Programatics of Integration” assimilates this to correlate knowledge into contextualized understanding to ascertain the Veracity of the facts, elevate our Awareness of the situation, to empower understanding that facilitates the Evolutionary process (VALUE). Third is a book on “The Potential of Innovation,” which explores the art of the possible within the science of probable to identify options and opportunities to transform the organization in a manner that actualizes its potential. These three distinct functions must be matured to maximize the likelihood of success in establishing a Data-Driven Organization (2DO) and optimizing effectiveness in this highly competitive information environment.





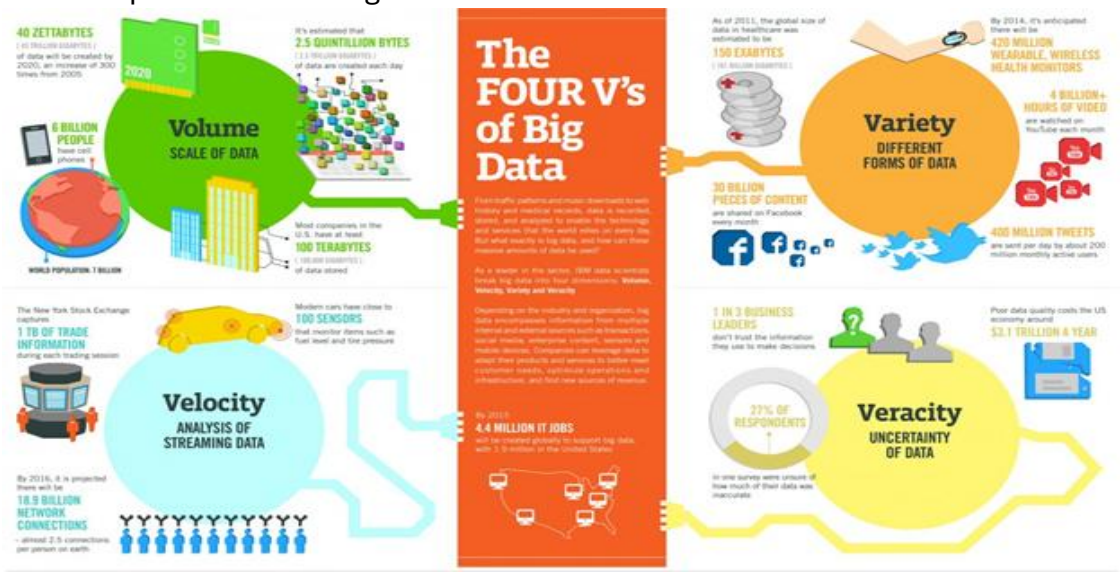


As outlined in a recent paper "Data Operations Development," the ascribed 10Cs are essential to mature the cognitive process as illustrated below. The first two C's/Collect and Catalog are the work of an organization's Chief Data Officer (CDO) to ensure effective data resource management (DRM). By providing the organization's data is fit for purpose to inform decisions, their ability to derive heightened confidence and mature operation is established through a firm foundation upon which to sustain ongoing operations. The next two C's/Correlate and Contextualize are the focus of their Chief Knowledge Officer (CKO) to formulate a keen understanding of the operational picture. By illustrating the relationship and illuminating the interdependence, the resulting knowledge helps evolve understanding and capitalize on available options to seize current and future opportunities. The next two C's/Characterize and Cost/Benefit provided by the Chief Analytical Officer (CAO) outline the strategic trade space available to transition and transform the organization by actualizing potential value available in the future state.

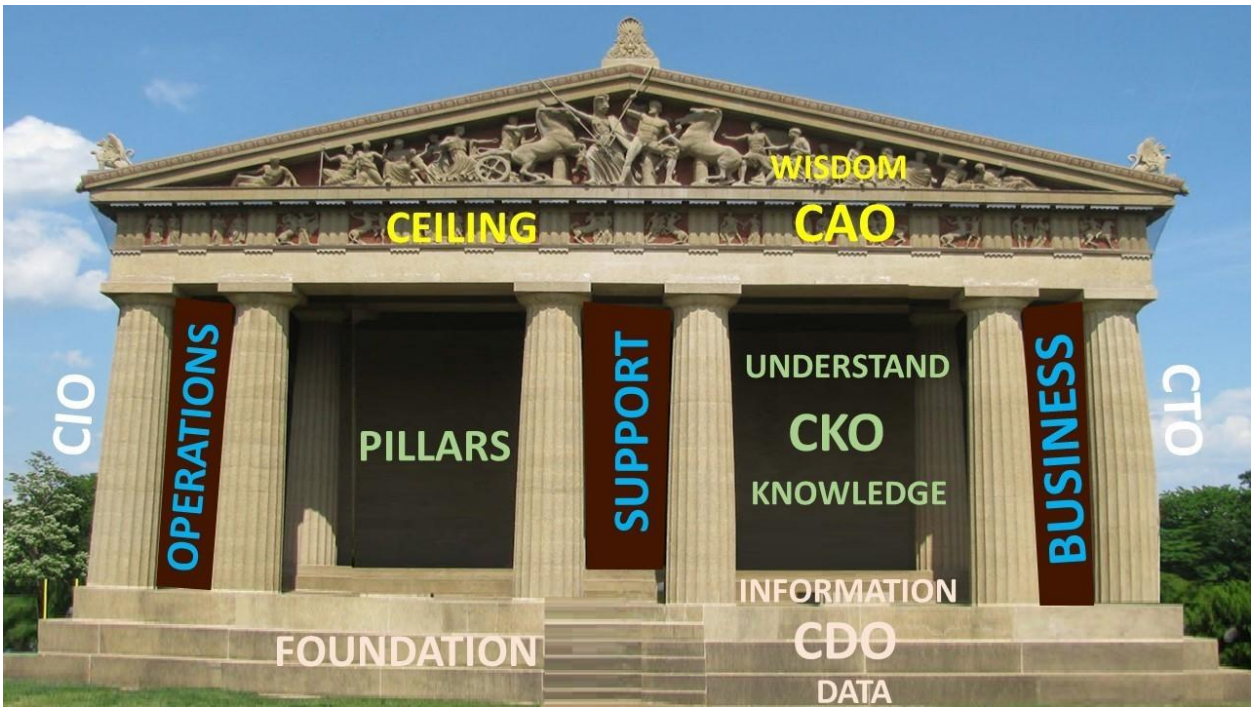


The need to communicate and coordinate with the entire organization is an essential effort in the formulation of collaborative teams, and the criticality of synchronizing activities is critical to achieving the objectives that fulfill their collective goals. By identifying the influencers (causality) of actions taken and measuring them against the results to be achieved (consequence), the pathway forward will afford an interactive process that matures and evolves to actualize their potential to transform into their ideal future state. It is through the application of numerous technologies that evolution's interactive process is facilitated.

The first step is for the CDO to get everyone on the same page. The need to coordinate and synchronize this requires data that is registered and ascribed to a standard reference, such as an enterprise data dictionary so that it can be visible and discoverable. Then the means to structure it, like that used in libraries, such as a Dewey decimal system, provides an information asset catalog so it can be accessed and searched. Finally, a portal to provide a means to query it, as is done through a reference librarian, ensures ready access to it. Through effective data resource management (*DRM*), they establish a foundation for collecting and discovering data and cataloging it in a way that provides structure, enabling it to be searched in a manner that informs decisions. This is no easy task given the volume, variety, velocity, and veracity of big data. By effectively structuring data as an organizational resource and managing it to provide a typical frame of reference, the result is a foundation for assessing the factual veracity of prescriptive modeling while offering a mechanism to mature the process of making informed decisions.



The cognitive process is for the CKO to identify the relationships between actions taken and the results to be achieved. Correlating information to ascribe knowledge characterizes it to facilitate contextual understanding, the potential of available options and relevant future opportunities offers the organization a proactive approach to influence and effect their environment. Illustrating the relationships that illuminate the dependencies that provide the means to accomplish predictive modeling informs probabilistic-deterministic approaches that ascribe available options to inform good decisions. The causality of actions as related to consequences within this interlinked, interdependent environment provides the quintessential framework upon which to mature the level of understanding necessary to make good decisions. By characterizing the potentiality of outcomes and synchronizing actions taken measured against results to be achieved we are able to manage present expectation through leveraging knowledge operations via the aforementioned framework that provides potentiality of future consequences.



The final step is for the CAO to provide a thorough analysis of the facts and dependencies upon which to determine the potential of available options to achieve potential opportunities. By demonstrating the application of facts to opportunities, the strategic trade space will reveal the pathway forward to the actions required to evolve and transform the organization. In the end, analysis will apply data that informs decisions, thereby advancing knowledge and surpassing future understanding, essential to making wise, well-informed decisions.

We are Drowning in Information and Starving for Wisdom

John Naisbitt

Given today's insatiable appetite for data and their infatuation for expanding knowledge that surpasses current understanding, we are struggling to leverage technological tools to support the 10C with still ill-defined concepts like Artificial Intelligence and Machine Learning. All to create decision support tools to facility the cognitive process has yet to be defined and demonstrated. The criticality for the CDO to structure data to afford machine-to-machine processing of analytical information provides the means to facilitates the foundational maturation of the information environment in a way that informs the decision-making process. The CKO assures a consistent means to operationalize knowledge through the aggregation of information in order to provide contextual understanding in their ongoing efforts to proactively prepare to capitalize on current and available options. By leveraging machine learning to evolve situational awareness, they are able to identify the trends that presents future opportunities.

It is through modeling and simulation that identifies past and present causalities which leverage those influences that affect the propensity to capitalize on available options and future opportunities to seize the day through in-depth analysis in order to actualize the inherent value of understanding to make wise choices. By utilizing prescriptive modeling of the past circumstances to establish a baseline/FOR upon which to accomplish predictive modeling of present conditions we are able to evolve awareness through probabilistic deterministics/SA and become informed of future possibilities from potentiality modeling via AIMLearning.

As the adage stipulates, “I believe none of what I hear, half of what I see and only that which I experience.” Thus, the demands that we show not just talk about how to proceed in our ongoing efforts to enlighten, empower and evolve (E3) are imperative to proceed in a productive manner. Therefore, it is imperative that we THINK…TRY…TEST to capitalize on the creativity. Through the creative process we can conceptualize and produce prototypes that illustrate operational benefits of exploring and creating tomorrow’s future today. It is through visualization that we show the advantage to be derived to impart understanding from the well-known saying “a picture is worth a thousand words.” Experiential learning provides the means to effectively collaborate and coordinate activities to synchronize efforts in a way that provides results. It is the demonstration of the VALUE of the capabilities that advocacy can be applied to acquire essential resources to actualize the idea. Thus, a virtual environment to try and test, provides the critical ingredient to learn and evolve as outlined in my paper on VAMRealities.

The reliance on the Chief Information Officer (CIO) and Chief Technology Officer (CTO) to establish interoperable systems and leverage technological tools that facilitate this process, respectively, is a critical component for ensuring competitive advantage. Thus, an organization must put the five functions CDO/CKO/CAO/CIO/CTO in place to create a data-driven organization (2DO) as outlined in my paper on the same topic if it is to be competitive in the cognitive domain, for it is through a foundation established by the CDO that we can SEE the propensity to unleash the power of information. The newly established emphasis on formalizing knowledge ops by a CDO provides an opportunity to operationalize and integrate programatics into ACE operations and to empower understanding essential to making informed decisions. And it is the CAO who performs the requisite analysis to demonstrate the criticality of producing results and advancing progress in a proactive manner to actualize the inherent value of working smarter in the cognitive domain in today's age of knowledge.