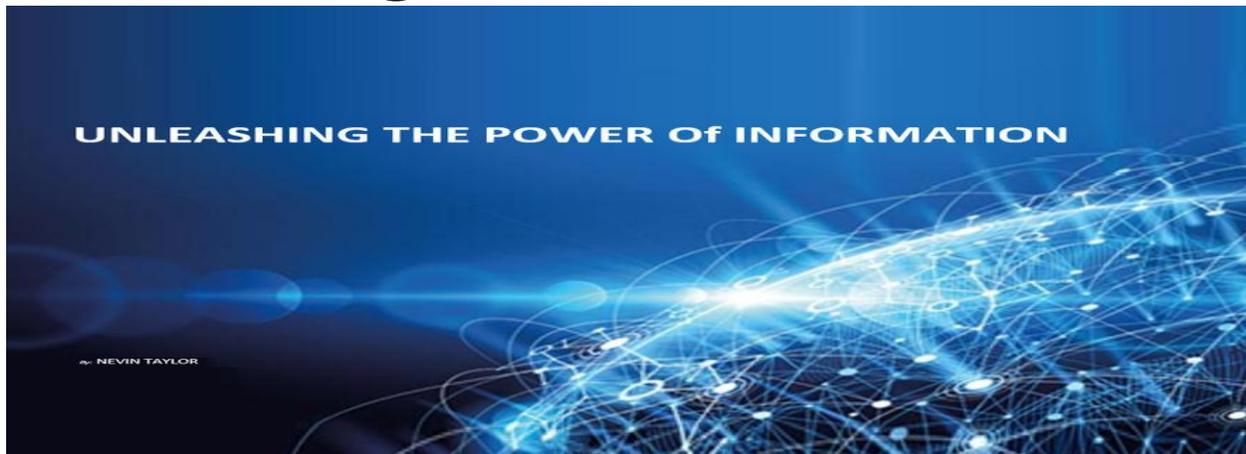


Unleashing the Power of Information



By: Nevin "Mustang" Taylor

"The world has become increasingly interlinked through and as a result of technological means. To date, technology's role has been of supporting and enabling function. As such, technology has become interwoven into all aspects of operational and tactical levels of engagement. Advantageous as it appears, this growing reliance upon technology creates its own inherent vulnerability." (CITD, 2013)

"Technology's unique collaborative capabilities afford the opportunity to discover and explore the art of the possible in greater breadth and depth than ever before. Through fully collaborative, synchronized systems, the resulting synergy is at the core of gaining and maintaining current and future asymmetric advantage within the information environment. Ultimately, the predictive capacity to identify second and third order of effects is a testament to the integrated system's ability to correlate causality." (CITD, 2013)

"The following will an endeavor to transform paradigms, to proactively leverage technology, in a way that matures and heightens understanding. By integrating multiple frames of reference, leaders will mature their situational awareness and thus elevate their capacity to make informed decisions. Through this innovative new approach, technology will be utilized as a catalyst for collaboration to facilitate organizing data into information that can be correlated and fused in a manner that allows for it to be effectively communicated (Collaborate-Coordinate-Communicate; C3)." (CITD, 2013)

Traditionally, technology has been used in a supporting capacity at the operational level, synchronizing tactical objectives through Command and Control (C2) networks. This reactive approach precludes fully utilizing technology's full capabilities. Through proactive engagements leveraging technology's catalytic capacity, the opportunity to drive a collaborative partnership at the strategic level that explores the art of the possible within the science of the probable presents itself." (CITD, 2013)

"Hence, by considering the ends, ways and means and correlating them against second and third order of effects, current and future risk will be assessed against the causality of ones actions. By applying this new paradigm, the asymmetric advantage information holds will be leveraged to create opportunities. It is through this unified endeavor, that a collaborative strategic focus will empower the fulfillment of organizational objectives." (CITD, 2013)

This paper will explore how current technologies are leveraged to identify and mitigate internal and external risks. It will highlight the reactive nature of current technological paradigms and explore the transformational process required to leverage technology's collaborative capacity. Additionally, it will propose a revolutionary change in mindset to leverage Information Superiority (IS) and provide the necessary control to exercise the freedom of action required to dominate that environment. Ultimately, Information Dominance (ID) affects the cognitive level of human interaction. Proper application of ID within the information environment must leverage technology in a way that unleashes the power of information to inform the decisionary process in a way that surpasses current understanding.

**“We are drowning in information, while starving for wisdom.
The world henceforth will be run by synthesizers,
people able to put together the right information at the right time,
think critically about it, and make important choices wisely.”**

E.O. Wilson (Wilson, n.d.)

Exploring the value of information and determining how best to leverage and protect it, we must first define it and establish a common framework for viewing it. The basic building blocks of what ingredients formulate information, how it is developed, matured, validated, assessed, and operationalized, the power contained within will bear practical application through the decisionary process. By first examining what information is, understanding the environment in which it exists, we will begin to know how best to leverage it. Then and only then will we begin to understand why information is essential.

This paper will define information, provide the framework for the environment in which it exists, and then demonstrate its operational value. Therefore, starting with a more traditional outline that defines the what, we will move to the how and bring the reader to the why. As we continue to represent the cyber domain, we must understand how to assess the value of information and determine its purpose to leverage it most effectively. (CIO, 2007) Ultimately, understanding why we need information provides us the opportunity to know how best leverage it. Simon Sinek, in his book *Start With Why*, argues that we should provide information from a proactive, top-down perspective in a way that inspires action.

Information is defined as “a collection of facts or data... knowledge acquired through experience or study” (Online, n.d.) Therefore, by organizing data in a useful manner as to be easily accessed the value of information begins to evolve to actionable knowledge. It is at this point that the inherent stored value of organized data is leveraged and operationalized to enlighten us as to the opportunity to garner a strategic advantage. As we explore industry standards as outlined by the National Institute of Standards and Technology (NIST) 800-33 (Stoneburner, 2001), it is from these standards, guidelines and framework that we learn that information must be Confidential, have Integrity, and be Accessible (CIA) to be of any strategic value. As we begin to correlate the impact of the ingredients that ascribe its worth, the last two measures of veracity and timeliness directly determines its inherent impact to the

decisionary process. It is the first ingredient which requires information to be secure that determines its strategic value as outlined in figure 1 below. For in the end analysis without accurate and timely information the overall result of decisions based upon flawed data can only yield bad results given the old advantage Garbage-In-Garbage-Out (GIGO).



(Figure 1 – Strategic Value of Information (CITD, 2013))

With continued efforts to understand cyber and the man-made domain of technology, there are ongoing efforts to expand its capacity. Given the cross-cutting nature of cyber and the interlinked world environment, DoD finds itself increasingly reliant upon the resulting interdependencies of information supporting relationships to synchronize efforts through Command and Control (C2) endeavors. The catalytic capacity to leverage data to capitalize upon the synergy derived from a team-focused collaborative endeavor ascribes to the potential value it possesses. The inherent over-reliance on driving to pure knowledge precludes the evolutionary capacity to explore the art of the possible while effectively managing expectations within the science of the probable. Thus, the automated nature of technology affords the opportunity to account, organize, and assimilate data into information to identify the breadth of possibilities in this dynamic, ever-changing world.

The effects of information reveal themselves as we understand the evolution of the cognitive process. Throughout, cognition is shaped by how data is organized into information and thus correlated into knowledge, which in turn awakens us to the significance of how the transitions shape and mature our view of the world, as illustrated in Figure 2 below. It is through understanding the 2nd and 3rd orders of actions taken against the desired results to be achieved that an enlightened understanding becomes apparent, as ascribed to the contextual framework offered in Figure 2 below. Thus, the importance of information as the centerpiece to the cognitive process becomes clear.



(Figure 2 – Understanding Model (CITD, 2013))

With increased efforts to evolve Situational Awareness (SA) elevates understanding of the world around us, Sun Tzu's sage advice to victory is to "know the enemy and know yourself, you need not fear the result of a hundred battles. If you know yourself but not the enemy, for every victory gained you will also suffer a defeat. If you know neither the enemy nor yourself, you will succumb in every battle." (Hart, 1910) Today's high-tech ability to organize, correlate and fuse information with an ever-greater enlightened prospect for the operational commanders affords the adaptation to the military environment at the speed of light. Thus, ETTA provides an excellent framework of the informational environment, which is made up of a physical, informational, and cognitive building block that serve to enlighten the operational commander with accurate and timely information upon which to make informed decisions, as illustrated below in Figure 3. (CITD, 2013) (Staff, 2012)



(Figure 3 The Information Environment ((CITD, 2013))

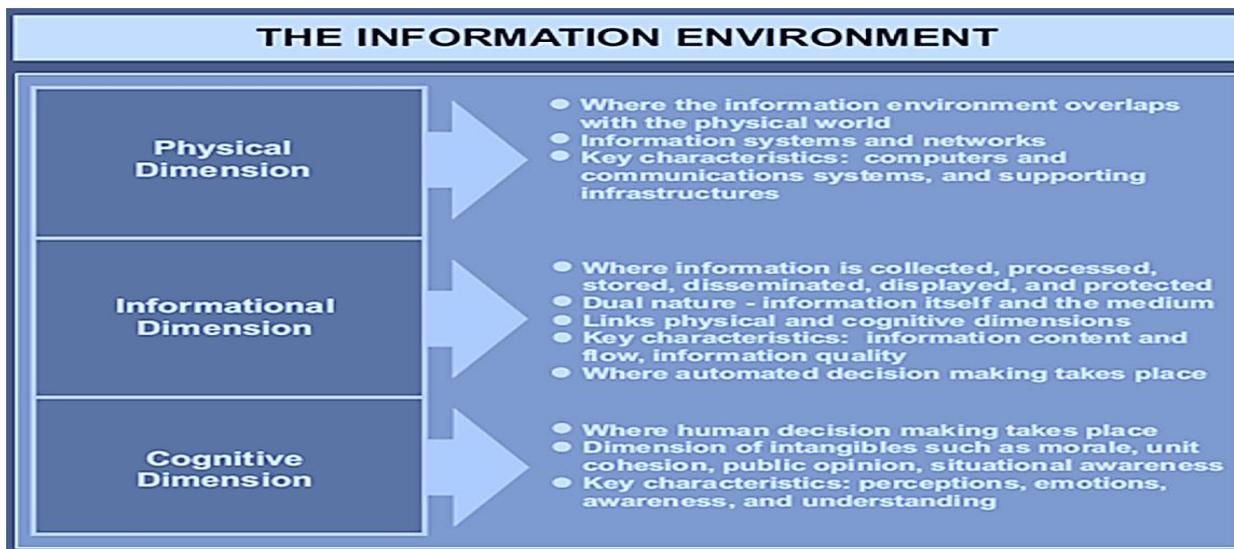
Today organizations are looking to drive collaboration within this Information Environment enhanced by the synergistic capabilities. It is through aligning the capacity to leverage information that evolves the ability to drive efficiencies through the consolidation of data centers and the eventual migration to the Cloud. By leveraging technologies, the result will ensure effectiveness through increased accessibility and resulting resiliency as it lowers cost in a resource constrained environment. As Winston Churchill so eloquently stated;

“Gentlemen, we have run out of money. Now we must think.”

(Churchill, n.d.)

For only through a comprehensive understanding of this environment as outlined in figure 4 and 5 below and the attributes and benefits associated with each phase of the maturation process will we begin to appreciate the interdependent complexities of the challenges that are before us. For once we master this environment and understand why it exist we will be better able to effective transition and evolve to the cognitive level.

In our more for less world, technologies afford a better means to validate a multitude of sources which establish relationships upon which the maturation process of data becomes knowledge. It is from this Frame Of Reference (FOR) that historical actions inform potential future opportunities. Thus, understanding of how to look at current conditions from informed actions of past performance develop one's FOR. It is this FOR that is the lens upon how to see the world which formulates their Situational Awareness (SA) of what is see given the environment's current state. In the words of Edmund Burke;



(Figure 4 –Information Environment ((Staff, 2012)

“Those who cannot learn from history are doomed to repeat it.”

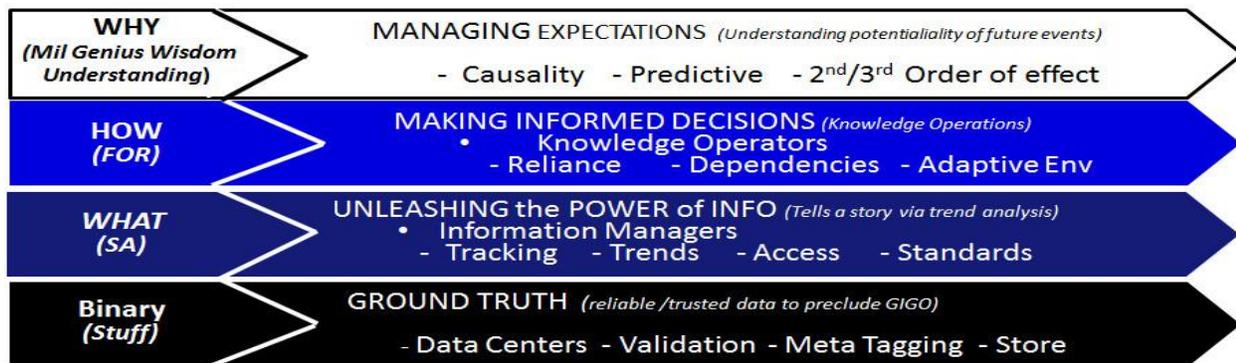
(Burke, n.d.)

The importance of learning and evolution is at the core of an enlightened species and the necessary adaptations and transformations to gain and maintain a competitive advantage in this quickly evolving, interlinked world. For it is this progressive process’s reliance on reflective competencies that the application of 20/20 hindsight assesses the results of actions taken against the outcomes to be achieved. John Boyd clearly understood this in his OODA Loop adaptation model. (Coram, 2002) Ultimately, one quickly realizes that today’s SA becomes tomorrow’s FOR, as illustrated in figure 5 below.



(Figure 5 Cognitive Model ((CITD, 2013))

With these models in place, the methodology to operationalize information presents an opportunity. For the ingredients that encapsulate how information informs our perspective on the current environment, in turn serve to bring to pass deterministic actions intended to transform it. Therefore, accurate, well-organized data paints an enlightening operational picture, allowing leaders to make informed decisions. Thus, the value of gaining a strategic advantage, as outlined in Figure 4 below, ensures the steps toward cognitive processing necessary for informed decision-making. Therefore, by effectively managing expectations through enlightened understanding the maturation of mental capacity is attuned to what Clausewitz described in his book On War as; military genius. (Howard, 1989)



(Figure 6 – Cognitive Process (CITD, 2013))

Overall, information superiority and information dominance are the operational cornerstones to provide benefits of leveraging information to derive strategic advantage. It is within these parameters that Herbert Simon’s conceptualized the concepts of bounded rationality. He foresees that actions should be taken in spite of ambiguous information in an attempt to produce rational decisions in a Volatile, Uncertain, Complex, and Ambiguous (VUCA) environment. For the heuristic opportunity to consider the myriad of plausible limitless options should not become a paralysis that stagnates the organization’s ability to progress within this volatile ever-changing environment. (Simon, 1984) (Gerras, 2010)

There is a growing desire to achieve information superiority in the information age as we prepare to enter the age of knowledge. The information age is a period in history upon which the technological tools of computers and networks were applied to garner strategic advantage to the acquisition and use of data during its organization into viable information. As such, Information Superiority’s focus is on the physical attributes of the information environment as illustrated in figure 7 above. It is the overarching ability to control the access to and processing of data at rest and in transit, along with the opportunity to deny one’s adversaries the same, that is at the heart of the strategic advantage afforded by obtaining IS within the cyber domain. Thus, by excelling in greater proportion than our adversary and integrating capabilities in a way to become self-synchronizing, the benefits from a Net-Centric approach to leveraging technologies offer an asymmetric strategic advantage on the field of battle.



(Fig 7–Info Superiority Environment (CITD, 2013))

Ultimately by utilizing technology’s competitive advantage for a better flow of information, the opportune benefit of gaining and maintaining information superiority affords strategic advantages in warfare. Current efforts for information superiority are defined as “the capability to collect, process, and disseminate an uninterrupted flow of information while exploiting or denying an adversary’s ability to do the same.” (Winters, 1997) Information Superiority (IS), simply put, is to have a preponderance of data, control of access, and more efficient processing than your adversary. Hence, the three functions of IS are support, C2, and engagement in offensive/defensive application. To that end, Information Superiority (IS) simply put is to have a preponderance of data, control of access and more efficient processing than your adversary. Hence, the three functions of IS are support, C2, and engagement in offensive/defensive application. By effectively leveraging these three attributes, one can garner and maintain Information Superiority as ascribed in figure 8 below.

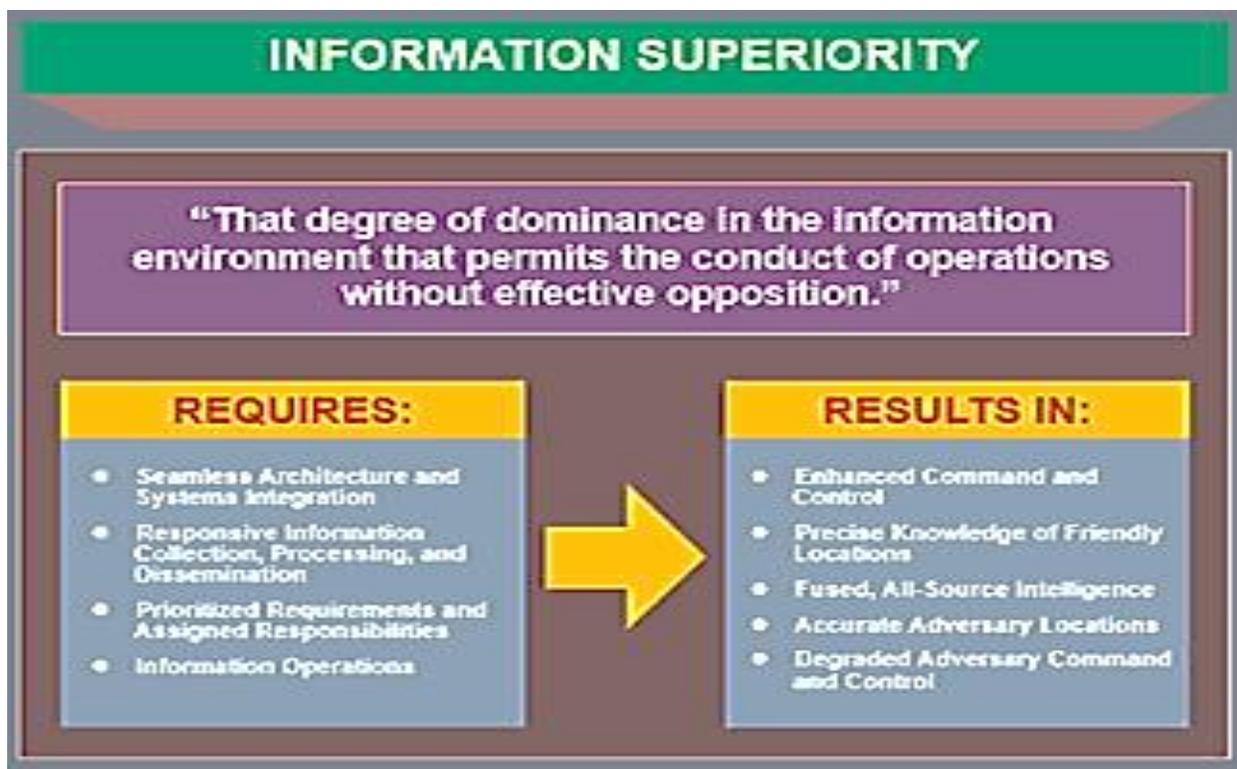


Fig 8–JP Info Superiority (Staff, 2012)

To accomplish IS, the organization must possess the ability to deploy technology to “plan, coordinate, integrate, synchronize, and conduct activities. (Command, 2009) By proper alignment of the tools of their trade cyber operators are able to control their environments to ensure data at rest, in transition and during processing is protected. Within the tradecraft of information superiority, there is a plethora of technological tools to control the physical aspects of the information environment. From firewalls to control access, intrusion detection to monitor activities, backups to provide resiliency, disconnects to mitigate risk, encryption to ensure privacy and redundant systems to provide for resiliency with a focus upon ensuring the control of and protection of US data.

Thus, the ever-increasing reliance of these networks and the data resident on them makes them targets for would-be attackers, presenting an ever-clear and present danger. To manage the increased risk due to this reliance, technology is leveraged to track and account for the vast amount of data in the information environment. These systems, which store, disseminate, aggregate, and protect this vast interlinked global network, have become critical to the organization's ability to optimize operations. (Barwinczak, 1998)

The world is plagued by hackers seeking to undermine DoD's ability to Command, Control, and Communicate with Computer Systems (C4). (Barwinczak, 1998) The operational necessity to operate without impunity and deny others the freedom of action to do the same affords the strategic advantage of informed forethought provided by the power of information. Thus, steps must be taken to gain and maintain information superiority to preclude ongoing endeavors to access through brute force, limit access through denial of service attacks or manipulate and hijack data via virus. (Jr. C. A., 1998)

The increased necessity to ensure secure networks is highlighted given the ever-increasing threat and ongoing attacks directed to disrupt, access, and manipulate data. With continued effort to understand the level of vulnerability to existing networks, "the shared risk nature of this problem requires integrated, comprehensive and consistent defense-wide information assurance practices." (Jr. C. A., 1998) With increased emphasis and reliance on information physical infrastructure for SCADA, telecommunication, finance institutions, transportation, and emergency services, the Presidential Commission on Critical Infrastructure Protection acknowledges the criticality of data for the whole of government and the role that gaining and maintaining information superiority serves to fulfill US vital national interest. (Marsh, 1997)

Information Dominance (ID) exists to harvest information within the information environment, correlate it into knowledge, and enable the senior leader to influence and shape the cognitive level of decisions. It is the ability to leverage the results of the Knowledge Managers' efforts to correlate information into enlightened knowledge, which drives understanding and influences relational perspectives and actions that transform the environment. Ultimately, ID requires proactive transformational leaders with the vision and the inspiration to operate at the cognitive level of the information environment. For it is the mission of ID to enlighten one's FOR and elevate their SA to influence perspective, perceptions and paradigms (3P) and thus effect long term actions on the world stage.



(Fig 9–Info Dominance Environment (CITD, 2013))

By understanding the ingredients of information and the dynamic environment in which it operates, we can influence it. The world is rapidly evolving and the adaptive information environment that support it is exceedingly dynamic. One would be well suited to take Steven Covey's approach of to "Understand in order to be Understood" into account. (Covey, 1989) The ancient principles of Sun Tzu should be considered as they endeavor to keep pace and adapt as with the "water shapes its course according to the nature of the ground over which it flows; the soldier works out his victory in relation to the foe whom he is facing." (Hart, 1910)

Technology offers the opportunity to keep pace with the continual adaptive nature of this challenging environment as we endeavor to assess the veracity of data, apply security to ensure its confidentiality, and manage the vast networks that afford accessibility. Through proper adaptive planning, the opportunity to use technology to achieve operational objectives arises. (Santacroce, 2009) Hence, through mature FORs and enlightened SA, fully developed Courses Of Action (COAs) can be created that offer options to the operational commander that fulfill their strategic intent. It is through the balanced application of technology, with full consideration of the environment and its inherent risks, that strategic advantage is achieved, enabling informed decisions that fulfill organizational objectives.

Overall, ID is focused on the cognitive level, which examines the motivation for taking actions to influence the recipient in ways that affect the environment in a manner commensurate with our combined objectives. With this in mind, there are three ways to create a cause to action in someone: coercion, manipulation, or influence. The first, coercion, provides the most immediate results but is only as effective as long as the level of threat to the recipient is sustained and does not exceed the value they place on the actions they wish to achieve. The next, manipulative, yields less immediate results but has more long-term effect until the recipient becomes aware, then the loss of trust precludes future opportunities. Finally, influence requires the most effort to build a relationship of confidence, which often demands less immediacy and more time to yield long-term results.

It is within the sphere of influence that long-term relationships of trust upon which future collaborative endeavors can produce mutually beneficial results for all parties involved. It is within this are that the author recommends investing to establish long term relationship upon which to build nation. It is important to note that information superiority and information dominance are not different degrees of the same thing. The table to the right ascribes the contrast as to these two capabilities and infers the competitive advantage and focus of each. As illustrated in Figure 10 to the left, information superiority is about resolving problems and mitigating threats. Information dominance on the other hand endeavors to provide solutions by leveraging opportunities and transforming the environment to meet current and future objectives. It is the proactive nature of information dominance that requires a transformational leader with vision to harness its power. For the benefits to be derived, is the strategic advantage to transform the environment to what you want it to be.

INFORMATION SUPERIORITY	INFORMATION DOMINANCE
STATIC IN NATURE	DYNAMIC IN NATURE
PASSISVE	PROACTIVE
SPECIFIC	COMPREHENSIVE

(Figure 10 – Info Comparative (Winters, 1997))

The results of the transformational leader’s ability to master ID within the information environment will afford the opportunity in the words of Winston Churchill to ensure;

“History will be kind to me for I intend to write it.”

(Churchill, n.d.)

In summation, information operations is reliant on the information environment. It is within this environment that the organizations must gain and maintain information superiority. Once information superiority is achieved, the opportunity to influence and affect the environment and those in it at the cognitive level is limited only by our vision and imagination. Those with the capacity to learn from the past to envision the future and unleash the power of information can leverage knowledge with clarity to make wise decisions. Patton said it best;

Now is the time to drive forward and take up the mantle of knowledge. By mastering the maturation of knowledge and understanding, the application of transformational capabilities in information dominance enables the fulfillment of those goals that bring to fruition the vision of future opportunities. Ultimately, this future belongs to those courageous transformational leaders with the vision and tenacity to *Carpe diem*.

**“There are but two powers in the world, the sword and the mind.
In the long run the sword is always beaten by the mind.”**

Napoleon Bonaparte (Burke, n.d.)



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