Book Review: *The Innovators*

Walter Isaacson, *The Innovators: How a Group of Hackers, Geniuses, and Geeks Created the Digital Revolution.* Simon & Schuster, New York, NY., 2014. ISBN: 9781476708690. 542 pp. About $20.00.

The Innovators: How a Group of Hackers, Geniuses, and Geeks Created the Digital Revolution, by Walter Isaacson provides a descriptive and expansive look into the causal forces that created the digital revolution. While modern society often takes for granted much of the conveniences afforded by the digital age, Isaacson's insightful examination of how these conveniences were realized provides us with a deeper understanding of the innovative process and how the creation of these goods and services were the result of evolutionary steps realized over several decades. An examination of history and of the key actors that played a role in realizing the digital revolution, however, is more than a recitation of facts and timelines. In this respect, Isaacson's seminal work into the evolutionary and innovative process of the digital revolution reveals several truths for creating and sustaining innovation. These key insights are also directly relevant to posturing national security and strategic intelligence endeavors to meet the modern-day challenges of the global operating environment.

The book introduces the novel concept of *poetical science*, which is the intersection of the power of imagination and the realm of the possible coupled with the logic of science and engineering. Countess Ada Lovelace (1815–1852), the child prodigy of the romantic poet Lord Byron, inherited the poetical love of imagination and metaphors from her father and a deep appreciation of science and mathematics from her mother's influence. Her ability to conceptualize possibilities and apply them to a scientific expression resulted in working with an early inventor, Charles Babbage, to envision an analytical engine capable of processing complex mathematical equations. Lovelace conceptualized the ability of programming Babbage's engine not only to perform a discrete task, but also to perform several tasks through the use of punch cards, which up to this point had been used in the textile industry to automate production. In other words, she incorporated a practice from another industry and conceptualized the ability to program a machine through implementation of precise instructions complete with sub-routines to focus on tackling and processing several tasks. More importantly, she was also able to assert the ability to not only program mathematical concepts, but also the expression of symbols captured in logical statements—an early insight that would later become a core concept in the digital age. Her ability to fuse the abstract with scientific logic would become the basis of *poetical science* and a trait commonly found in future innovators.The ability to bridge the abstract with logical realities forms an essential component of national security and strategic intelligence—namely, the ability to

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envision and formulate estimative intelligence within a framework of possibilities. In an increasingly complex operating environment, the ability of these communities to agilely function and address complexity is a critical and highly sought after skill. Another skill highlighted in Isaacson's book is the concept of collaboration to foster a creative environment. The creative capacity of team-based approaches versus the work of the solitary individual is identified as a key attribute to innovation. While Isaacson identifies and acknowledges cases of individual genius and the capacity to conceptualize future possibilities, he also emphasizes the inability of a singular approach to implement those concepts into action. The creative capacity that results from the free expression of ideas, brainstorming, and testing of hypotheses is highlighted throughout *The Innovators* as is how it led to the pioneering work in early computers and materials science to create the transistor and later the microchip. The key take-away for the national security and strategic intelligence community is the vitality of a collaborative and team-based culture, as opposed to relying on solitary experts. Isaacson's insights into Konrad Zuse and John Vincent Atanasoff effectively demonstrate the limitation of the solitary genius to effect broader change. In terms of national security and strategic intelligence, the collaborative approach has implications for establishing communities of interest, information sharing, and knowledge management—all key issues that continue to challenge the present-day community.

Closely tied to the ideal of establishing effective and collaborative teams is another foundational concept emphasized by Isaacson throughout his study of innovation. Equally as important to establishing effective teams is ensuring that the team is intellectually diverse by integrating different perspectives and specialties. The composition of the team matters. While the term "centers of excellence" may seem passé, *The Innovators* highlights the importance and vitality of establishing venues where interdisciplinary expertise can work and operate in a common area to exchange ideas and leverage expertise. Early collaboration between the US government and key centers of learning at Harvard, Princeton, the Massachusetts Institute of Technology (MIT), and the University of Pennsylvania during the Second World War led to significant advances in computer technology through the integration of visionaries, engineers, scientists, and management experts. When the nature of innovation shifted to the private sector after World War Two, the technological advances of Bell Laboratories, Xerox PARC, and Stanford Research Park—an early venue for academia and venture capital—are illustrative of these interdisciplinary venues. The implication for the US Intelligence Community, which is often typified by its stovepipes and cylinders of excellence, is clear. Ensuring and leveraging horizontal integration across disciplines can foster the innovation that is necessary to tackle a complex global threat environment. In this case, many of the findings from the 9/11 Commission and subsequent literature on intelligence reform are apropos.

On a more strategic level, Isaacson clearly illustrates the vision and realization of Bush's iron triangle of the military-industrial-academic complex. Vannevar Bush, a professor and later dean of engineering at MIT and an early inventor of an analog computer capable of solving complex differential equations, would later become President Franklin Roosevelt's top science advisor during World War Two and a key leader in mobilizing the Manhattan Project. He was also pivotal to establishing Raytheon, a large electronics conglomerate and fixture within the private sector and the establishment of the National Science Foundation, an independent US government agency responsible for fostering scientific research and education. The crossroads of the US government, the private sector, and academia remains a vital relationship that needs to be sustained. For the national security and intelligence communities, this relationship should remain an integral component of developing the next generation of security solutions to diverse and complex threats.

While team-based approaches, the integration of group diversity, and strategic organizational frameworks are effectively illustrated throughout Isaacson's work, *The Innovators* also highlights an important component of effective leadership. Consistently throughout his narrative, Isaacson examines the key relationship between the innovator and the actualizer. Whether in the combinations of Taylor-Roberts, Gates-Allen, Jobs-Wozniak, or Page-Brin, each of which went on to create ARPANET, Microsoft, Apple, and Google, respectively, the symbiotic nature of not only envisioning the realm of the possible, but placing that vision into effective practice is a key enabler of success. Conversely, he also identifies cases where notable advancements were conceived, but were poorly or not executed at all due to the inability of placing concepts into engineering or business practice. As he states, "great concepts are worth little without precision execution" (74). The perceived success of innovation is all for naught if it cannot be effectively fielded. In terms of national security and strategic intelligence, great ideas are simply that—ideas of no consequence if they cannot be actualized.

The Innovators: How a Group of Hackers, Geniuses, and Geeks Created the Digital Revolution is a compelling work that provides excellent insight into a highly technical subject. The kernels of truth contained in Isaacson's sweeping narrative provide several insights of relevance to national security and strategic intelligence issues. The relationship between creativity and collaboration reinforces the need for developing novel national security and intelligence approaches across the enterprise while operating in a complex environment. Closely related to this collaborative necessity is the imperative of integrating a diversity of intellect and perspective into team-based and community-based approaches. As evidenced by Isaacson's keen insight, it is also vital to effectively pair visionaries and deep thinkers with practical and product-oriented individuals to realize envisioned objectives. In other words, the successful realization of a vision is highly dependent on the ability to enact a plan. Additionally, on an organizational level, *The Innovators*

examines the productive synergy that can exist with effective collaboration between government, academia, and the private sector—a key lesson for the national security and intelligence community as they seek to adopt agile, relevant, and scalable approaches to unique security issues.

Lastly, Isaacson effectively weaves the key attributes of leadership that are necessary to operate in a complex environment while emphasizing the importance of perspective. The effective pairing of strategic leaders—the visionary and the focused doer—is an area that merits closer examination and hopefully will be the basis of future study. The innovators and visionaries that Isaacson identifies in his work, however, had two consistent leadership attributes. First, they knew their product and what it could deliver. They understood the relevancy of what their services could provide their customers and had a deep understanding of the steps necessary to create a usable service. Second, they were also cognizant of how to create and sustain effective teams. The effectiveness of these teams was framed by the free exchange of ideas that sought to establish the creative tension and integration of perspectives. The perspectives were also consistently supported by both the artistic and scientific interests—or *poetical science* that existed within these unique individuals.

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