# Chapter 3
# A Strategic Decision-Making Framework in Cyberspace

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## ABSTRACT

*Cyberspace possesses unique characteristics, which should be taken into consideration in order to ensure the success of cyber operations or joint operations. How can the unique characteristics be addressed in strategic decision making? How can relatively more effective and efficient courses of action be selected or generated in cyberspace within a short period of time? These questions need to be addressed. This chapter briefly discusses the key requirements for strategic decision making. After a discussion about the key unique characteristics of cyberspace, it reveals the challenges that traditional strategic decision-making models are facing. Based on this analysis, this chapter proposes a new strategic decision-making framework in cyberspace, which helps to select or generate relatively more effective and efficient courses of action for a specific environment within a short period of time, thus guaranteeing the success in missions.*

## INTRODUCTION

Strategy, according to Murray and Grimsley (1996), "is the art of the possible". It is "the art and science of developing and using the political, economic, socio-psychological, and military powers of the state in accordance with policy guidance to create effects and set conditions that protect or advance national interests relative to other states, actors, or circumstances". One power that is not mentioned in the above list is the information power, which has become more and more important as

the Internet is widely used and social media running on the Internet have become so popular.

As pointed out by Yarger (2008), the purpose of a strategy is to translate political purpose "into strategic effects that shape the strategic environment favorably". An effective strategy clearly defines ends, ways, and means. It materializes the guidance provided in a policy. As a result, it can provide "a coherent blueprint to bridge the gap between the realities of today and a desired future". Strategic thinking, in Yarger (2008)'s term, consists of strategic theory supported by systems thinking, critical thinking, creative thinking, ethical thinking, and thinking in time. A strategic appraisal process is comprised of the following seven steps: (1) stimulus or requirement, (2) determination of interests, (3) determination of intensity of interests, (4) assessment of information, (5) determination of strategic factors, (6) selection of key factors, and (7) formulation of strategy.

The guidance for strategy formation mentioned above can be applied to various physical environments. When it is applied to cyberspace, what additional components should be included to ensure the success of missions? To answer this question, the unique characteristics of cyberspace have to be discussed first.

Unlike other domains such as land, sea, air, and space, the cyber domain was not created by nature but by humans. The foundation of this new domain is the information and communications technology (ICT), which supports computation and human communications. Over the years, various applications have been developed to support different human activities in different fields such as education, research, critical infrastructure, business, industry, agriculture, medical science, military operations, social activities, and entertainment. In the cyber domain, there are two major components: (1) humans, and (2) computer and telecommunications systems, including software and information on these systems. However, these two major components are not compatible with each other. Computer and telecommunications systems are not action-initiators as they perform very fast actions based on instructions provided by humans. They are discrete in nature so that they are not good at dealing with anything ambiguous or fuzzy. However, humans are action-initiators as they provide computer and telecommunications systems with instructions. Humans are good at using heuristic approaches, or simply shortcuts and intuition but humans are slower than computers in actions. Hacking is an activity that is initiated by humans. It exploits and takes advantage of vulnerabilities in computer and telecommunications systems as well as software running on these systems. In a more complex environment, it also takes advantages of people, as evidenced by social engineering attacks.

Based on their research, Chen and Dinerman (2018) identify several unique characteristics of cyber operations: the capability of intelligence collection, stealth maneuvers, and surprise effect. In addition, virtual space and cyber speed are other unique characteristics of cyberspace. As cyberspace is built on the ICT, it offers fast

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