

USING INFORMATION TECHNOLOGY AS A STRATEGIC WEAPON: LESSONS FROM THE RED BARON

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Abstract

Organizations investing in information technology (IT) over the past decades have categorically seen the uses of IT change. At one point, IT was considered a key strategic tool to gain competitive advantage; however, today, acquiring basic IT functions is a necessity in order not to be at a competitive disadvantage. It takes advanced IT systems, coupled with good strategy to develop an IT competitive advantage. With good strategy and advanced IT systems, some organizations can use IT as a weapon to secure market share and/or eliminate the competition. We suggest in this article that there are strategic points of which organizations should be aware during the implementation and use of information technology. These lessons come from the strategic lesson plans of the ace aviation fighter pilot, the Red Baron.

Keywords: IT Strategy, Competitive advantage, Change, Aviation, Technology.

1. INTRODUCTION

Competitive dynamics is a core element in the development of a successful strategy (Porter, 1980). By competitive dynamics we mean the total set of actions and responses taken by the firms competing within a given market (Hitt, Ireland and Hoskisson, 2005). The world of competitive dynamics is often best understood when explained in relation to the development of military strategy. As the opening quote highlights, competitive dynamics often utilizes terms, such as attack, response, or retrench, that are used just as much on the battlefield as in the board room. Thus, we suggest that some of the lesson learned on the battlefield may be applied to the strategic decisions making of modern organizations. More specifically, we argue that there may be much to learn from the tactics of one of the greatest fighter pilots of all time, The Red Baron.

In this paper we seek to integrate the lessons of the Red Baron into a normative model that suggests that IT can be a strategic weapon in the competitive dynamics arena. At one time, Information Technology (IT) was thought to play a key role in the strategy development process as it related to competitive dynamics (Mata, Fuerst and Barney, 1995). More recently, however, IT has been identified as a potentially corrosive element in an organization, inhibiting the competitive posture of the organization (Carr, 2004). In this paper we take

the former perspective to argue that IT is, indeed, an important organizational capability that can be used as a weapon in competitive actions.

In order to highlight the strategic role that IT systems can play within organizations, we build on the idea that information flows are a key driver of competitive dynamics (Chen, 1986; Smith, Grimm, Cannon and Chen, 1991; Chen and Hambrick, 1995). As such, we draw on Smith et al.'s (1991) foundational study on the role of information processing as a determinate of competitive actions and responses (Table 1). Smith and colleagues suggested that information processing, sensory systems, analyzing mechanisms, and decision making processes are all important elements of competitive dynamics. We use this framework to provide structure to our normative argument that IT may serve as a competitive weapon, and that lesson from the Red Baron provide useful insights into the deployment of the IT weapon, as it relates to competitive dynamics.

This paper is expected to make several contributions to both the information systems literatures and the strategic management literatures. First, it is hoped that our integration of the Red Baron's lesson into the realm of competitive dynamics will provide theoretical insights into the role of IT as a catalyst for competitive actions or responses. For example, the Red Baron informs that one should secure an advantage before attacking an opponent. Applying this rule to the information systems domain, we assert that IT systems can be configured so that information can be gathered and transferred to key decision makers thereby allowing the organizations leaders to know if they have secured an advantage before engaging in competitive actions. We provide similar theoretical arguments for some of the other Red Baron lessons, and anticipate that these insights will be useful to information system and strategy theorist. Finally, we anticipate that our application of the Red Baron's lessons to the competitive dynamics area will provide a series of useful rules regarding competitive actions and, moreover, an increased understanding into the relationship between IT system capabilities and the firm's ability to take competitive actions.

2. COMPETITIVE ACTIONS AND RESPONSES

At the firm level, competitive dynamics involves the actions or responses taken by the individual organization (Chandler, 1977). We define a competitive action as specific move, such as a price cut or entrance into a new product market, initiated by a firm with the intention of improving or defending its relative competitive position (Smith, Grimm, Cannon and Chen, 1991). Similarly, we define a competitive response as an identifiable counteraction taken by a firm in an attempt to protect or improve its position relative to its competitors (Porter, 1980; Smith et al., 1991). Schumpeter (1934) was one of the first to recognize that a market provides an arena for experimentation through action; some firms are content to follow and imitate while others seek a leadership position. Firm's who seek the later position hope to reap the benefits of first

mover advantage (Peteraf, 1993) and make claims to scarce and valuable resources (Barney, 1991). Because the firms who initiate these actions seek to earn monopoly rents for as long as possible, they are more likely to launch competitive actions when competitors are unlikely or slow to respond (Nelson and Winter, 1982 ; Kogut, 1999).

Competitive dynamics researchers have also explored the idea that competitive actions and responses are likely the function of many different influential factors. For example, Williams & Rein (2007) develops an extensive model of competitive dynamics and posits that the characteristics of the actor, the action, the rival, and the response all play important roles in determining who is likely to engage in action or response behaviors. In a similar vein, Chen and Hambrick (1995) conducted an empirical investigation of the competitive dynamics in the airline industry and found that firm size played a key role in determine the method of competitive attack or response. More specifically, they found that smaller firms speedily initiated competitive challenges, but were secretive, in executing their actions.

The studies discussed above are just a few examples of a large body of research on competitive dynamics. However, they highlight a common theme within the competitive dynamics research, which is that information flows are key element in many of the action – response frameworks (e.g., Smith et al, 1991; Chi, Holsapple, and Srinivasan, 2007). The central assumption is that the managers are rational, and thus, seek to obtain and process any information that may provide insights into competitors current or planned activities (Chen et al., 1991). This information serves as a platform for the detection of competitive threats, the launch of new attacks, or the engagement of response activities. Because, in most organizations, the task of information acquisition and processing often falls upon the shoulder of the Information Systems (IS) or the Information Technology (IT) departments, we now turn our attention to the role of IT in competitive dynamics.

3. THE ROLE OF IT IN COMPETITIVE DYNAMICS

Today's environment for competition could be said to be vastly different than just a decade ago because of the introduction of the commoditization of information technology. IT, once viewed as a tool of competitive advantage, may be viewed today as a homogenized part of organizational day-to-day operations. Or more easily put, IT is almost ubiquitous and unseen in day to day operations, yet is the foundational to functionality. In some cases, IT is suggested to be a competitive disadvantage or the cause of long-term negative effects (Porter, 2001). Yet, the inclusion of information technology within the workplace has obvious benefits (Carr 2004).

When competing organizations have similar IT capabilities and the environment consists of a level playing field, we suggest that a new strategy is needed to gain advantage. No longer will the original IT strategies create a competitive advantage (i.e. website design, web-securities, online information outlets, online

purchasing, increased access speed, etc.). Instead, the original IT strategies merely provide parity in the competitive environment and may only keep an organization from being at a competitive disadvantage. Our suggestion is, to examine the lessons of the Red Baron for implications where IT could be used not only as a competitive advantage, but also potentially as a weapon to insure the survivability of an organization.

The Red Baron, IT, and Competitive Dynamics

Unlike any war the world had ever seen before, World War I was fought in two arenas: in the trenches and, for the first time, in the air. When the war broke out in 1914, the airplane, a new disruptive technology (Christensen and Armstrong, 1999) just a decade old, was untested as a weapon of combat. Yet over the course of the four-year conflict, fighters seemingly evolved from flimsy converted reconnaissance planes to powerful, deft machines of war. Once commanders began to recognize the potential power of the fighter aircraft the need for skilled pilots and key aerial combat strategies began to grow. One man is known for fulfilling both of these needs in a way few could have imagined. His name was Manfred von Richthofen, aka the "Red Baron."

The Red Baron was the highest-scoring fighter pilot of World War I. In 20 months of combat, he officially shot down 80 enemy aircraft, including 21 planes in the month of April, 1917, alone. For his achievements, Richthofen received 24 military decorations, more than any other German aviator of the War. Until he, was shot down in April, 1918, allied pilots had ample reason to dread the sudden appearance of the Baron's bright-red fighter sweeping towards them out of the sun, and many of these pilots must have wondered what was going on inside his head as he approached (Lexi, 2004).

The Red Baron studied under the German ace Oswald Boelcke -the first German pilot. In his studies under Boelcke, the Red Baron mastered the "8 rules" of engagement. These rules have since been used, in varying degrees, by most of the western world's armies in times of strategic engagement (Red Baron, 2005). We believe that some of these rules can also be applied to competitive dynamics and the development and deployment of IT as a strategic weapon. As such, we draw on Smith et al.'s (1991) foundational study on the role of information processing as a determinate of competitive actions and responses (Table 1). In this research, Smith and colleagues develop and test a framework that suggests that information processing, sensory systems, analyzing mechanisms, and decision making processes are all important elements of the information – competitive dynamics relationship. We seek to integrate lessons from the Red Baron into this framework in an attempt to provide a normative approach to the use of IT as a strategic weapon.

4. INFORMATION ACQUISITION AND PROCESSING

Competitive actions taken by rivals send signals that must be assimilated and interpreted by the focal firm. For example, Woodrow and Woodside (1982) discuss the introduction of pay-per-view services within the communications industry. They state that “pay-per-view had become one of several prospective services that could expand the market and improve the competitive position of existing firms within the communications industry” (Woodrow and Woodside, 1982, p. xviii). In this case firms within this industry would closely monitor the other firms in their markets to see if they embraced the pay-per-view model. The competitor’s action (or inaction) may lead to an opportunity or a threat that necessitates a response by the focal firm (Huber and Daft, 1987). Porter spoke to this process when he argued that “market signals are indirect means of communication with the market place, and most if not all of a competitor’s behavior can carry information that can aid in competitor analysis and strategy formulation” (1980, p.75).

The discussion above suggests that firm’s should seek to obtain and assimilate information regarding their competitors’ tactical and strategic actions. This is especially true of strategic actions. Strategic actions require the commitment of significant amounts of resources and are often difficult to interpret. In the pay-per-view example, the commitment to invest in the infrastructure required to offer these services could be considered a strategic action. Before making such a large commitment, the focal firm may wish to see what kinds of returns the competitors who made this commitment receive. The problem with this response is that the firm’s leaders must secure this information, decipher it, and hope that if a response is required that they have not missed the opportunity to be a key player in the pay-per-view market. In this scenario, everything hinges on information flows and IT plays a key role in information acquisition and processing. This leads us to our first rule from the Red Barron: *“Try to secure advantages before attacking. If possible, keep the sun behind you.”*

Rule number one contains two parts for consideration. The first part to rule one is to secure the advantage *before* the attack. Porter (2001) stated that the information revolution is affecting competition in 3 ways: 1. changing industry structure, 2. creating competitive advantages by lowering costs or enhancing differentiation, and 3. spawning new business. Further Porter stipulated five steps that can be taken to exploit opportunities created by the information revolution: 1. Assess the information intensity of products and processes. 2. Assess the role of information technology in industry structure. 3. Identify and rank ways in which information technology could create a competitive edge. 4. Consider how information technology could create new businesses. 5. Develop a plan to take advantage of information technology (Porter, 1985). By using these steps, companies can better secure the advantage before the attack. Before he entered the air, the Red Baron knew who the enemy was and understood their capabilities.

The second part of this rule is to keep the sun behind you. Simply, maintain clear vision, and enable the organization to see the task environment. However, the desire is to blind the competitor from your approach and your activities (business intelligence). If a firm possesses a resource or a capability (in this case IT) that is possessed by competing firms, that capability or resource is not a source of competitive advantage. However, if a firm possesses a capability that is not possessed by competing firms, a potential advantage may be claimed (Mata et al, 1995). As information technology has commoditized, competing firms have attempted to identify strategic niches with IT. Further, keeping these strategic niches secret has to be the priority, while at the same time trying to observe and counter the competing firm's movements.

Returning to our communications industry example, one can see how the application of this rule may be of benefit as the pay-per-view market developed. The development of IT technology that allowed for the efficient offering of pay-per-view programs was a significant development. In the early stages of the pay-per-view development, access to this technological capability was a key strategic weapon that could be deployed at will. In order to secure an advantage before the attack, the focal firm would need to have information regarding their competitors ability to secure the key technology and their intended actions. The collection of this intelligence could be achieved many ways (e.g., insights from suppliers), but would need to be aggregated by way of an intelligent IT system that would provide strategic decision makers with timely and accurate information. IT could also play a key role in "keeping the sun behind you" by protecting key information as actions or responses are taken. For example, as the focal firm entered the pay-per-view market they would need to ensure that suppliers, marketing agencies, and sales people were given only the essential information and that their activities were closely monitored, at least until the new service was formally launched. Consolidated databases with monitored access may provide the information protection required to follow the Red Baron's first lesson.

5. SENSORY SYSTEMS

The central idea behind competitive dynamics is that competitors engage in series of actions and responses over time (Chen and Hambrick, 1995). However, for a firm to engage in a response they must first be aware that their competitor has taken an important competitive action. In this way, sensory systems become vital to the speed and quality of strategic decision making (Dollinger, 1984, Porac and Rosa 1996). It has been shown that many firms have difficulty just identify who their direct competitors are, much less securing information regarding the action these firms are taking (Porac et al, 1996). As such, it is important that firms maintain an external orientation and develop information systems at the boundaries of the organization (Thompson, 1967; Chen et al., 1991). For example, researchers have shown that the use of inter-organizational systems, IT that support applications across firm boundaries, can be used to obtain boundary focused information and that information can then be used to secure competitive advantage (Chi, Holsapple

and Srinivasan, 2007). In this way IT plays an important role in the development of effective sensory systems that can be used to identify competitors, analyze opportunities, and detect threats. This idea leads us to our second rule from the Red Baron: *“Always keep your eye on your opponent, and never let yourself be deceived by ruses.”*

Keep your eye on your opponent, and watch what they are doing. From the beginning of most degree programs in business, whether at the undergraduate or graduate level, the understanding of the simple SWOT analysis is a key tool taught to strategy students. Understanding your organization’s strengths and weaknesses as an internal audit and being able to scan the environment, specifically your opponent, for opportunities and oncoming threats is essential to organizational success (or even survival) (Porter, 1980). As found in rule two, there is a cat and mouse game of contingencies between competing organizations (Thompson, 1967). This is why the development of key IT systems is so critical. IT can be used to collect information from the field and can aid in developing an understanding of whether or not competitive signals are (or are not) legitimate. For example, information technology has played a critical role in the airline industry (Chi et al., 2007). Information regarding competitor pricing, route schedules, and overall supply decisions must be quickly obtained and analyzed. Without the proper IT infrastructure this task cannot be completed in way that allows for timely responses to competitor actions.

In addition to legitimate signals and actions, the use of deceit is a common practice in competitive environments. Companies can and will use whatever “legal” means available to win market share. They may use public announcements that are rather fictitious in nature or provide key suppliers will false information in an attempt to throw off the competition. . As such, the second part of rule two suggests that if an organization follow the ruse; the company is likely to lose. This lesson may be best illustrated by an example of an allied tactic during World War II. During the later stages of the war the availability of tanks and artillery was scarce; as such, the allied forces placed inflatable tanks in strategic locations that would be easily seen by the enemy. This deception was used to create a ruse about the intended location of the allied invasion. Likewise, competitors may try to employ ruses to disguise their true intentions. Thus, IT systems that facilitates employees monitoring and reporting of competitive actions, and systems that aid in the determination of the legitimacy of these actions, become key strategic weapons in these competitive battles.

6. ANALYZING MECHANISMS

Just as sensory systems detect important environmental changes at the boundaries, analyzing mechanisms must be in place to effectively analyze and transfer information from sensory systems to key decision makers (Chen et al., 1991). Previous research has suggested that organization structure plays an important role in a firm’s ability to analyze and transfer information (e.g., Blau, 1970; Galbraith, 1977). The central argument is

that as an organization adds departments and levels it becomes increasingly difficult to properly analyze and transfer information to key decision makers (Aldrich, 1979 ;McKinley, W. and Andreas, G.S. 2000)

Returning to our pay-per-view example it easy to conceptualize as to how information may not flow through the organization. For example, a buyer may hear from a vendor that a competitor has just order equipment that could be used to develop pay-per-view capabilities. Unfortunately, that buyer analyzed the information and deemed it irrelevant, thereby withholding valuable information that organizational leaders need to make strategic decisions. It is this type of information stoppage that may be addressed by the implementation of advanced IT systems. As previously discussed, an IOS is an example of a system that can be used to gather, analyze, and disseminate information. The advantage of these types of systems is that the information blocks, which often result from increased organizational complexity, may be significantly reduced and lead to better strategic actions. This leads to our third rule from the Red Barron: *“Fire only at close range, and only when your opponent is properly in your sights.”*

Researchers have asserted that acting under conditions of high uncertainty often leads to increased financial risk (Mata et al., 1995). The third rule, suggests that organizations should seek to reduce the uncertainty (Thompson, 1967) associated with launching a competitive attack or engaging in a competitive response. Here again, our pay-per-view example illustrates the salience of this lesson from the Red Baron. In the formative years of pay-per-view services the key players were closely monitoring each other. It is unlikely that one communication provider would act unless it could reduce the uncertainty associated with that action. As such, the providers usually did nto act until they had enough information to ensure that they had their “opponents properly in their sights” (Woodrow and Woodside, 1982).

7. DECISION MAKING PROCESSES

Up to this point we have argued that IT can be used in multiple facets to detect, analyze, and transfer information throughout the organization. However, even if this is accomplished we must acknowledge that strategic decision makers must filter and interpret the information provided. This is especially important in competitive dynamics, because strategic actions are often infrequent, may be the outcome of a diverse set of intentions, and the true effects of the action may be difficult to forecast (Barney, 1986; Chen et al., 1991; Chi et al., 2007). As such, it assumed that when a firm detects an action by one of its competitors the decision makers will engage in intensive information searchers (Stewart, May and Kalila, 2007). This makes the role of an effective IT system even more salient, because the decision makers may now seek out information that was previously thought to be irrelevant. If this information is stored and easily accessible, the time and resource expenditures required to conduct the information search may be reduced. Similarly, additional information that must be secured form outside the organization may be done more efficiently with an effective

IT system in place. Our central point is that organizations should put IT systems in place that provide strategic decision makers with the tools required to make the best decisions possible in regards to engaging in competitive actions or responses. This logic leads to the adoption of the next rule from the Red Baron: **“In any form of attack it is essential to assail your opponent from behind.”**

The fourth rule suggests that all organizations have vulnerabilities, and no matter what the strategy is for the attack, the attack needs to exploit those vulnerabilities. Being able to identify the vulnerabilities of the competing organization, however, is often difficult. Additionally, rule four implies the overlying theme that revealing your position is likely to make your organization vulnerable. If the competition is able to imitate your successful actions, then your source of competitive advantage may be lost (Barney, 1991). Thus, there is little evidence to support the idea that revealing your position is advantageous (Mata et al., 1995; Stubbart and Knight, 2006).

In a similar vein, Porter (1985) has discussed technological followership and posited that market followers can often secure profitable niches. Mata et al (1995) builds on Porter and implies that companies should strive to protect technological advancements and make them too costly to imitate. Once the focal firm has secured its own vulnerabilities it can begin to exploit the weaknesses of competitors. Thompson (1967) stipulates that when an organization has vulnerability or cannot show improvement in the task environment, it will seek to hold constant with those elements on which the organization is most dependent. Using advanced IT systems it may be possible to identify the elements held constant. As such, an attacking organization may find the vulnerability and use it to “assail its opponent from behind.”

8. COMPETITIVE ACTIONS, RESPONSES, AND PERFORMANCE

Ultimately, the intended outcome of any competitive action or response is to preserve or improve financial performance (Peteraf, 1993; Chen and Hambrick, 1995). Financial performance is the measuring stick for evaluating the effectiveness of strategic maneuvers. Because organizational leaders are responsible for improving or protecting financial returns a common response to an attack may be a hastily conceived response or to duck and cover (do nothing). However, the lessons from the Red Baron suggest the following: **“If your opponent dives on you, do not try to evade his onslaught, but fly to meet it.”**

The final rule suggests that organizations should not always attempt to avoid the competition; rather they may be best served by confronting the threat head on. Consistent with this idea is a comment made by Hal Rosenbluth (CEO of Rosenbluth International) who stated two very important concepts. The first is that organizational leaders should “have intimate knowledge of industry changes” and be able to “define the playing field that they can win on” (Clemons and Hann, 1999). These insights imply that when an attack is imminent, the presentation of strength, courage, and tactical positioning become key success factors. Even if

it is nothing but an illusion, presenting strength is of utmost importance for the success in the battle. Meeting the onslaught can also be a psychological building up for an organization (Bennett and Durkin, 2000). As employees begin to take patriotic positions of pride and of strength in the organization, providing synergistic results can be devastating to the opponent.

9. DISCUSSION AND CONCLUSION

The End of the Red Baron

Ultimately, an enemy pilot, Bill Bishop, shot down the Red Baron. Speculation as to what happened leads some to believe that the Red Baron violated his own rules, while others say it was a new technology in aircraft design that was implemented by the enemy making the enemy aircraft more maneuverable. Others say it was the Red Baron himself that became increasingly lackadaisical in his attacks and failed to be completely aware of his surroundings. In any case, the Red Baron was shot down and the idea that the eight engagement rules might be temporal. So we ask, are these lessons simply a relic of a bygone era, or are they valuable insights that can be used to guide the development of IT systems as strategic weapons? Our research suggests the latter.

TABLE 1 – LESSONS FROM THE RED BARON

Red Barron's Rules of Engagement	Organizational Information Flow Construct (Smith et al., 1991)
Try to secure advantages before attacking. If possible, keep the sun behind you.	Information Acquisition and Processing
<i>Fire only at close range, and only when your opponent is properly in your sights</i>	Analyzing Mechanisms
<i>Always keep your eye on your opponent, and never let yourself be deceived by ruses</i>	Sensory Systems
<i>In any form of attack it is essential to assail your opponent from behind.</i>	Decision Making Processes
<i>If your opponent dives on you, do not try to evade his onslaught, but fly to meet it.</i>	Competitive Actions, Responses, and Performance

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