Competitive Advantage in Technology Intensive Industries

Chapter 7 Teaching Note

This chapter introduces the learner to the meaning of competitive advantage and posits that a firm’s strategy is defined as the managers’ theory about how to gain and sustain competitive advantage. The manner in which a firm creates its competitive advantage by creating more economic value than its rivals, and explains that profitability depends upon value, price, and costs is demonstrated. The relationship among these factors is explored in the context of high-technology consumer goods—laptop computers and cars. Next, the chapter provides an explanation of a SWOT [S(trengths) W(ake) O(pportunities) T(hreats)] analysis.

Examining the interplay of firm resources, capabilities, and competencies, the chapter proceeds to emphasize that both must be present to possess core competencies essential to gaining and sustaining competitive advantage through strategy. Next, a description is provided for the value chain by which a firm transforms inputs into outputs, adding value at each stage through the primary activities of research, development, production, marketing and sales, and customer service, which in turn rely upon essential support activities that add value indirectly. There then follows an overview of the PEST [p(olitical) e(conomic) s(ocial) t(ecnological)] Model for assessing a firm’s general external environment and Porter’s Five Forces Model. The chapter then provides an overview of the strategic group model and illustrates that model by reference to the pharmaceutical industry. It is noted that opportunities and threats to a company differ based upon the strategic group to which that firm belongs within an industry. Finally, the chapter facilitates an exploration of the importance of strategy in technology intensive industries and emphasizes that sustained competitive advantage can be accomplished only through continued innovation.

Block 1. What is Competitive Advantage?

Objectives:

a) A definition of competitive advantage is elicited.
b) A definition of strategy is elicited.
c) The definition of strategy is related to the definition of competitive advantage.

Why does a given athlete outperform everyone else? In the personal or corporate arenas, what is competitive advantage? The answer may be elicited from students that competitive advantage is obtained when a firm’s profitability is greater than the average profitability for all firms in its industry. Competitive advantage is defined as a firm’s profitability which is greater than the average profitability for all firms in its industry. The question is then posed “How is competitive advantage achieved?” That is, “what is the relationship between competitive advantage and strategy?” It may be posited that primarily strategy is concerned with gaining and sustaining Competitive Advantage. It is proposed that a strategy is a plan to achieve an objective. A firm’s strategy is the managers’ theory about how to gain and sustain competitive advantage. Sustained

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competitive advantage occurs when a firm maintains competitive advantage for a number of years.

Focusing questions:
- Why do some technology start-ups succeed, while others fail?
- What determines overall firm performance?
- What can you as an entrepreneur or manager do about it?
- Why is Sony, as a new entrant into the market for home video games dominating the incumbent firm Sega, who helped create the industry?
- Why is Apple outperforming Dell?

This strategic plan reflects the managers’ assumptions about the company’s strengths and weaknesses as well as the competitive dynamics in the external industry environment. A strategic plan is, therefore, expressed in a logical coherent framework based on an internal analysis of the company’s strength and weaknesses [S(trength) W(akelessness)] as well as of the external (environmental) opportunities and threats [O(pportunities) T(reats)] it faces, making up the so-called SWOT Analysis. A firm’s strategy details a set of goal-directed actions that managers intend to take to improve or maintain overall firm performance. If the managers’ assumptions align closely with the competitive realities, successful strategies can be crafted and implemented, resulting in superior firm performance. This definition of strategy highlights the pivotal role managers play in setting and implementing a firm’s strategy, and thus in determining firm performance. Achieving sustained superior performance over a company’s direct rivals, therefore, is the ultimate challenge in strategy. Simply put, a firm that outperforms its competitors has a competitive advantage. If this firm is able to dominate its competitors for prolonged periods of time, the company is said to have a sustained competitive advantage. A firm that enjoys a competitive advantage not only is more profitable than its competitors, but also grows faster because it is able to capture more market share, either directly from competitors or from overall industry growth, due to the firm’s stronger competitiveness.

The example is presented of a student’s laptop purchased for a given price but most likely of far higher value when one uncovers how essential this piece of equipment is to the student and how much they would pay for the laptop if necessary. This example introduces the concepts of consumer surplus and value creation.

Discussion Questions:
1) What is competitive advantage?
2) What is strategy? What is not a strategy? Give reasons in each case.

Block 2. Internal and External Analysis (SWOT)

Objective:
The learners are introduced to the concepts of internal and external (SWOT) analysis and learn how to carry out such analyses.

In order to create and sustain competitive advantage, the firm’s managers must understand the firm’s internal strengths and weaknesses as well as its opportunities and threats that present
themselves in the firm’s external environment. A SWOT analysis is proposed to this end and so as to formulate a strategy that allows a coherent fit between the company’s resources, capabilities, and competencies, on the one hand, and its industry structure, on the other hand.

2.1. Internal Analysis: Resources, Capabilities, and Core Competencies

Superior firm profitability is the result of a firm’s gaining and sustaining competitive advantage through strategy. To be able to leverage a strategy into competitive advantage, however, a firm must possess core competencies, that allow the managers to manipulate the underlying drives of profitability i.e., perceived value and cost. To obtain a competitive advantage, a firm must have competencies that allow it to create higher perceived value than its competitors or to produce the same or similar products at a lower cost, or to do both simultaneously. Companies compete as much in the product and service markets as they do on developing competencies. Superior or core competencies allow managers to create higher perceived value and/or achieve a lower cost structure (Prahalad & Hamel, 1990).

Core competencies are built through the complex interplay between resources and capabilities. Resources are assets on which a company can draw when executing strategy. Resources fall into two categories: tangible (such as land, buildings, plant, and equipment) and intangible (such as brand name, reputation, patents, and technical and market know-how). Finally, a firm’s capabilities are the managerial skills necessary to coordinate and orchestrate a diverse set of resources and to deploy them strategically. A firm’s capabilities are by their nature intangible, and are captured in a firm’s routines, procedures, and processes (Teece, Pisano, & Shuen, 1997). As depicted in Fig. 5, the interplay between resources and capabilities allows managers to create core competencies, which are then leveraged to formulate and implement strategy with the goal of attaining a competitive advantage and thus superior profitability.

It is important to realize that competitive advantage can stem from both the resource and the capability side. To be the basis of a competitive advantage, a firm resource must be: (1) valuable (V), thus allowing the managers to exploit opportunities or mitigate threats in the firm’s external environment; (2) rare in terms of scarcity (R); (3) imitation protected, so only imperfect imitation is possible (I); and (4) substitution protected (N), in the sense that equivalent substitutes are not readily available (Barney, 1991). In short hand, this resource-based framework is termed VRIN.

Yet, managers need to be aware of a critical distinction. While resources can have some or even all of the VRIN attributes, unless a firm has the (science, engineering, and managerial) capabilities to orchestrate and deploy these resources in an effective and efficient manner, the managers will not able to create a core competence and thus will fail to achieve a firm-level competitive advantage. On the other hand, the managers may be able to draw only on average resources that do not fulfill any of the VRIN requirements, but the firm possesses superior capabilities of coordinating, orchestrating, and deploying the average resources that results in superior performance (e.g. McDonald’s versus Mom and Pop’s Burger Joint, The US Army versus USPS).
2.2. The Value Chain and Activity Systems

The concept of the value chain captures the notion that a firm engages in a number of activities to transform inputs into outputs, and through this process adds value at each stage (Porter, 1985). This transformation process is composed of a set of distinct activities, such as research, development, production, marketing and sales, and customer service. While these so called primary activities directly add value by transforming inputs into outputs as the firm moves a product or service horizontally along the value chain, each of the distinct primary activities along the way is supported by other activities, such as information systems, operations management, human resources, finance, accounting, and general management. Together, the latter activities are called support activities, as they add value indirectly, while primary activities add value directly. Competitive advantage requires different positioning strategies through strategically choosing a different mix of value chain activities in order to deliver a unique value at a competitive price (Porter, 1996). Activities are therefore the basic units of competitive advantage. It is important to note, however, that competitive advantage or competitive disadvantage at the firm level is the outcome of the interplay among all of the firm’s activities, not only a selected few.

It is critical to understand that operational effectiveness, accomplished through such programs like Six Sigma, is a necessary but not sufficient condition for competitive advantage. This is true because these programs are available to all companies and are taught to MBAs, and thus diffuse widely and rapidly within industries. While they accomplish an absolute increase in competitiveness of each firm implementing these programs, they do not change firms’ relative advantage vis-à-vis one another. To truly create competitive advantage, a firm must not only be operationally effective, but also choose a different strategic posture based on its unique system of activities.

A sustainable strategic position, therefore, requires important trade-offs. For example, it is often not possible to provide innovation at low cost, because innovation requires (very) high and ongoing R&D investments over time. Strategic positions are sustainable if they require trade-offs with other positions. Therefore, the essence about strategy is to choose what activities to engage in, and more importantly, what not to do. Companies with a clear strategic profile and posture outperform companies that attempt to be too many things to too many customers. Strategy therefore is about combining activities into a complex system that not only creates competitive advantage, but also protects from imitation. Ideally, the activities pursued are consistent to one another, while at the same time they also reinforce one another. This implies that the interconnected system of activities is more than the sum of its parts. Understanding competitive advantage as embedded in a system of activities also explains why imitating an entire system of complex activities is so difficult. While one can easily observe several elements of an activity system, what cannot be observed are the capabilities necessary to orchestrate and manage the network of activities. Strategic Activity Systems, such as the one for Southwest Airlines depicted in Porter (1996), show how a firm’s strategic position is built on a network of diverse activities. When activity systems are developed to a mature stage, a number of core strategic themes and a number of supporting strategic activities can be identified and implemented through a network of tightly linked activities (Siggelkow, 2001, 2002).
Discussion Question:
How do you know a company has a strategy?

Block 3. External Analysis: Opportunities and Threats

Objective:
The learners become familiar with the concepts of internal and external advantage and learn to implement these concepts.

Besides internal analysis, the second major input for strategy formulation is a deep understanding of the firm’s external environment. This is done to identify opportunities and threats, with the goal of leveraging opportunities and mitigating threats. Events in the external environment, such as changing demographics, socio-cultural norms, deregulation, globalization, technological change, macroeconomic changes, as well as political and legal changes, can all create opportunities and threats for companies. One way to understand a firm’s external environment is to apply the PEST Model. This entails assessing the firm’s general environment along the following dimensions: Political/legal, Economic, Social, and Technological (PEST). While an accurate understanding of a firm’s general external environment is necessary, many of these work through affecting the underlying structure of the firm’s industry. An important first step, therefore, is to analyze the structure of the industry in which you are competing, or planning to compete. An industry is defined as set of companies that offer comparable products and services (i.e., substitutes); an industry is thus the supply side of the market. It is important to keep in mind, however, as industries converge (e.g., computing, biotechnology, and nanotechnology), it becomes harder and harder to produce accurate definitions of an industry. Thus, industry boundaries will be increasingly difficult to define.

As mentioned earlier, industries show different average profitabilities over time. This is due to different industry structures, some of which are clearly more favorable than others. These differences in underlying industry profitability are explained by each industry’s structure, which is assessed along such industry dimensions as the number and size of competitors, the similarity and differences in the product and service offerings, the height of entry and exit barriers, scale economies, and thus the cost to overcome these barriers. One simple dimension to understand industry structure is the size and number of competitors. If there are many small firms in an industry, the industry is fragmented, and generally exhibits low average profitability (what economists call ‘‘perfect competition’’). If there are only a few large firms in an industry, this industry structure is more favorable and can exhibit higher industry returns (‘‘oligopoly’’). The most favorable industry structure is the monopoly, where only one firm supplies the entire market. To more deeply understand industry structure, and how it affects firm performance, we now turn to the well-known Five Forces Model developed by Michael Porter.

3.1. Porter’s Five Forces Model
Porter’s Five Forces Model helps managers to understand the underlying industry structure, and thus aids in identifying threats and opportunities. This model is depicted in Fig. 7, and highlights
five forces that shape competition within an industry, and thus determine the overall industry profitability and its attractiveness. The viewpoint is that of an incumbent firm already active in an industry. These forces are: (1) the risk of entry by potential competitors; (2) the bargaining power of buyers; (3) the bargaining power of suppliers; (4) the threat of substitutes; and (5) the resulting intensity of rivalry among existing competitors (Porter, 1980). The risk of entry concerns potential competitors that are not yet competing in your industry, but have the capability to do so if they choose.

These forces conspire to determine the rivalry among existing competitors in the industry, and they thus determine overall industry profitability. The threat of rivalry refers to the competitive intensity within an industry, which can range from cut-throat to genteel. Competitive intensity is determined by how hard existing firms fight among themselves to gain market share from each other, or to capture a significant amount of industry growth. Competitive weapons include price discounting, product and service differentiation, and advertising spending. The stronger the rivalry in the industry, the lower the industry profitability, because intense competition leads to lower prices (and thus lower revenues) and greater costs, squeezing out profitability in the industry.

On the other hand, firms may prefer nonprice competition and compete on advertising and innovation, thus avoiding head-on competition. These are companies that provide products and services (or competencies) that add value through complementing the original product offering, because when these two products (or competencies) are used in tandem they provide more value to the customer (2005).

In sum, the stronger a competitive force, the greater the threat it represents. On the flip side, the weaker the competitive force, the greater the opportunity it presents. The strengths (or the weakness) of the forces together determine overall industry attractiveness. While a useful model to understand industry profitability, an important caveat is that the Five Forces Model is static, and thus it provides only a snapshot of moving target. One cannot use it to determine the speed of change in an industry or the rate of innovation. Moreover, the strength of each competitive force changes throughout the industry life cycle. Thus, managers need to repeat the Five Forces analysis over time to create a more accurate picture of their industry. In addition, both external and internal industry factors can alter industry structures. These factors include change in external environment discussed above, but also innovation or firm strategy can change the structure of an industry, and thus the Five Forces. Finally, identifying attractive industries does not imply that one can easily enter them. Perhaps even more important is the fact that the Five Forces Model cannot say much about inter-firm differentials, because it is a model of industry profitability, not a model of predicting why one firm outperforms another in the same industry. Thus, the Five Forces Model cannot explain why Southwest Airlines is outperforming the legacy carriers like Delta, American, or Continental, because they all compete in the same industry. To overcome this shortcoming to some extent, scholars offer the Strategic Group Model, to which we turn next.
3.2. Strategic Group Model

Companies often use a different positioning in their strategy in terms of technological leadership, product quality, pricing policies, market segments served, distribution channels, and customer service. As a consequence of differences along such important strategic dimensions, it is often possible to identify groups of competitors in an industry, where group members pursue a similar strategy that results in a similar positioning, while at the same time that group is different from other groups of firms. In many industries such strategic groups can be identified along a fairly small number of dimensions. While belonging to the same industry, different rates of performance are generally observed in different strategic groups (Nair & Kotha, 2001; McNamara, Deephouse, & Luce, 2003).

The concept of strategic groups has several implications for competitive advantage. One immediate insight is that the opportunities and threats companies face in an industry will differ based on the strategic group to which the firms belong. The threats of new entry, bargaining power of buyers and suppliers, substitutes, and rivalry among established firms are mediated by membership in a specific strategic group. A company’s direct competitors are the ones within its own strategic group, because of their similar strategic positioning. Given the existence of different strategic groups, one also realizes that the strength of the different competitive forces discussed above changes based on the strategic group to which a firm belongs. This implies that each strategic group, even though they belong to the same industry, differs along the opportunities and threats they are facing. Another implication of the existence of strategic groups is that some groups are more attractive than others, given the impact of the competitive forces discussed. Thus, there exists performance heterogeneity across strategic groups in the same industry. For example, companies in the proprietary drug group tend to outperform companies in the generic drug group. So, why are firms not moving from a lower performing group to higher performing groups? The answer is that strategic groups are generally separated by mobility barriers (Caves & Porter, 1977). These are industry specific factors that inhibit movement from one group to another.

Discussion Questions:
1) How does one perform external advantage?
2) How does one perform internal advantage?

Block 4. Drivers of Economic Profitability

Objective:
To identify and understand the factors that drive economic profitability

We are now in a position to put together the pieces that drive economic profitability (or overall firm performance). We realize that firm performance is a function of industry and firm effects. Industry effects, and thus the attractiveness of different markets, can be understood with the Five Forces Model and the Strategic Group Model. Firm-level competitive advantage, on the other hand, depends on the firm’s value and cost positions (which are an outflow of its competencies) relative to its competitors. A firm’s strategy allows managers to choose attractive industries and build the competencies necessary to gain and sustain competitive advantage.
Strategy in Technology Intensive Industries

Today, technological innovation is in many industries the most important driver of competitive advantage. Reasons for the increasing importance of innovation in many industries include deregulation, globalization, rapid technological progress (e.g., advances in IT, biotechnology, and nanotechnology), and accelerating diffusion rates for technology-based products. These factors combine to increase the competitive intensity of almost all industries. Even in industries that are thought of as mundane, like the steel industry, technology has become one of the key differentiating factors in determining firm performance. In general, traditional industries, once considered low tech, are increasingly becoming technology intensive industries. One could argue that technology intensive industries like the software industry change so rapidly and in such unpredictable fashion, that strategic planning is not necessary and thus a futile exercise. Nothing could be further from the truth. The opposite holds. Strategy becomes even more important in technology intensive industries (Example of Microsoft’s strategy for marketing Xbox). The final strategic plan is decided upon, however, only after detailed scrutiny by top management, including Bill Gates and Steve Ballmer.

Asking the “what if” questions, is imperative. Since the only constant in technology intensive industries is change, sustained competitive advantage can only be accomplished through continued innovation. Innovation works simultaneously to raise the overall value created and to lower the cost required to create the product or service; thus, profits margins widen and firm profitability increases. Continued innovation creates a string of the so-called Schumpeterian rents based on temporary monopolies. The extent of how long these competitive advantages can be enjoyed depends on the speed of imitability by competitors, which is often determined by the technological and engineering difficulty of the underlying innovation (small vs. large science), the IP protection of the innovation (see Chapters 3–5), and the strategic decisions about how to appropriate returns from invention (see Chapter 1).

Discussion Questions:

1) How do you protect your Competitive Advantage?
2) How does one formulate/implement strategy?