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The Emergent Knowledge-Based Theory Of Competitive Advantage: An Evolutionary Approach To Integrating Economics And Management

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This article explores the intersection of management and economics in the strategic management literature. Specifically, it examines knowledge-based advantages from management and economics perspectives to highlight differences in explanations of: (1) the source of an advantage, (2) determinants of sustainability of an advantage, and (3) the factors that predict rent appropriation patterns from a competitive advantage.

I conclude that both perspectives contribute to our understanding of why firms perform differently. Furthermore, the gradual or evolutionary integration that has occurred over time is effective and efficient for exploring the nature of strategic management problems. Finally, the dynamic competitive and technological environment will continue to yield new opportunities for integration of theoretical approaches. Copyright © 2003 John Wiley & Sons, Ltd.

INTRODUCTION

Economics and management come together at a fairly narrow question reflecting the domain of strategy, 'Why do some firms perform better than others?' (Rumelt *et al.*, 1991). This is depicted in the 'football' shape in the center of Figure 1. These fields also address other questions but the point of intersection is well defined.

The overarching question in this volume is whether the economics and strategic management literatures can and should be integrated. This essay specifically explores the portion of the intersection dealing with the role of knowledge in performance differentials. Both fields explain performance differentials using a mix of approaches linked to knowledge or information asymmetries. Over time, economic perspectives on these issues have been gradually integrated into the strategic management literature (Mahoney and Pandian, 1992). Accordingly, I argue that the integration of economics and strategic management has been an evolutionary process.

In describing the integration and compatibility of the tools, I explore three aspects of performance differentials: rent generation, sustainability, and appropriability. First, we must determine how and why a given firm might have a competitive advantage over others. Second, we must understand and predict how long such an advantage will persist. Finally, we need to know who reaps the gains produced by the advantage.

Indeed, we cannot predict variation in firm performance without understanding all three of these components—they are at the very core of the strategic management literature. Therefore, this exercise will explore the contributions of economic and management theory to enhancing our understanding in each of these areas.

Table 1 presents some selected tools from each area as they apply to the problem of

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knowledge-based competitive advantages. The tools are arrayed according to the key element of strategy it addresses. The next three sections explore the tools that can be brought to bear on each of these questions. How can these tools inform us to advance our study of the nature and sources of competitive advantage? Ultimately, these approaches have very different implications for the role of management in building a competitive advantage. These implications are examined in the concluding section.

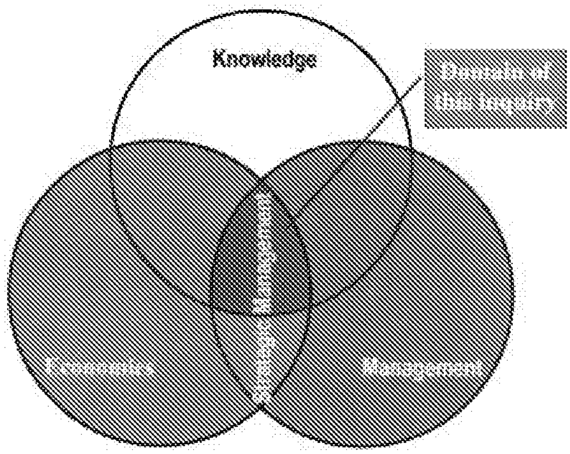

Figure 1. Where knowledge, economics, management and strategy intersect.

THE ROLE OF KNOWLEDGE IN RENT GENERATION

The strategy literature has borrowed liberally from economics to define the term rent as a key outcome variable. Indeed the forms of rent (Ricardian rents, quasi rents, etc.) described in the economics literature are primary sources of rent generation discussed in the strategy literature. That said, nature and sources of rent do differ somewhat in the literatures.

Management and Knowledge-based Advantages

The strategic literature has focused fairly heavily on the role of unique firm-level resources as a

Table 1. Predicting Performance from Knowledge-based Assets: Selected[a] Tools from Economics and Management

	Economic tools	Management tools
What are the sources of competitive advantage?	Transaction cost economics and agency theory analyze the firm's efficiency with respect to opportunism and asymmetric information. Game theoretic tools analyze/predict rivalry and competitor actions in the context of imperfect information. Real options apply financial economics tools to strategic investments in a volatile and uncertain environment. 5 forces and SCP frameworks help to analyze industry structure and identify opportunities or niches.	The resource-based view focuses on unique capabilities that may allow a firm to outperform rivals. Knowledge-based view focuses on efficiencies in knowledge creation as a determinant of the firm's scope. Structural contingency theory identifies factors (technology, environment, etc.) that determine the efficacy of alternative organizational forms. Strategic positioning (generic strategies, strategic groups, etc.) may afford competitive protection.
What makes an advantage sustainable?	Regimes of appropriability (patents, trademarks, etc.) may protect intellectual property. Barriers to entry and monopoly power may keep competitors out.	Resource-based view identifies strategic assets as rare, inimitable, and unavailable to rival firms. The knowledge literature focuses on impediments to transferring knowledge and capabilities.
Who gets the rent that is generated?	Agency and TCE theories suggest that bargaining power stems from asset specificity, monitoring costs, incentives, and ownership structure. Bargaining power among buyers and suppliers is inherent in the market structure.	Bargaining power arises from the ability to form coalitions, unique information, and switching costs. Network structures within and outside of the firm grant individuals political and social power.

[a] Shaded items are only peripherally related to analyzing competitive advantages arising from knowledge-based assets.

source of rent (Barney, 1986; Amit and Schoemaker, 1993; Peteraf, 1994). Firms may acquire and/or develop capabilities that grant them advantages over rivals. Porter (1980, 1996) reminds us that these capabilities must be embedded in a unique strategic position.

Put another way, the capabilities are valuable because they give the firm a lower cost structure or a basis of differentiation (Porter, 1980). A cost advantage might result from an efficient structure or operational system. For example, both structural contingency theory and transaction cost economics posit that organizational form follow from specific attributes of the technology or production system. If a firm is able to identify and adopt a particularly efficient form, it might enjoy a cost advantage. A differentiation advantage arises from similar logic. However, in this case, the structure or form grants the firm a capability for which customers are willing to pay a premium.

Knowledge is an important component of valuable capabilities or resources. That is, valuable organizational capabilities are increasingly the result of knowledge creation or recombination (Kogut and Zander, 1992). Real advances in productivity often arise from new technologies that enhance or assist knowledge creation and management.

Accordingly, the thorny problem of knowledge management is an important part of rent generation. Here, much of the knowledge management literature focuses on the difficulties in creating and transferring knowledge (Kogut and Zander, 1992; Nonaka, 1994). Even the older structural contingency theory focused on technology as a key determinant of structure because of the management challenges associated with knowledge. If a given firm can deploy these resources more efficiently and effectively than rivals, it may achieve a substantial advantage.

This brings us to assumptions about managerial cognition. The presumption of bounded rationality is at the very core of the management literature. Absent this limitation, most management problems would not exist. Arguably, a sustainable competitive advantage simply could not exist if managers were perfectly *rational*. Indeed, the notion of causal ambiguity presumes managers are boundedly rational. Thus, from this perspective, the focus is on acquiring and developing knowledge-based capabilities that rival firms lack.

Economics and Knowledge-based Performance Differentials

Much of the economics literature assumes a high degree of rationality (e.g., no limits on cognitive ability) that stands in stark contrast with the knowledge-management literature. However, the portion of economics that intersects with strategic management (notably transaction cost economics, agency theory, and human capital theory) explicitly assumes bounded rationality. Even game theoretic analyses explore issues of imperfect or asymmetric information (thus relaxing the assumption of rationality). Recent interest in real options theory reflects awareness that management may have very limited information in a turbulent or volatile environment. The tool is designed to facilitate investments in technologies that will ultimately yield an advantage (Kogut, 1991).

Thus, from an economic standpoint, competitive advantages arise from management's ability to: (1) make competitive moves that rivals cannot respond to effectively, (2) acquire and manage human capital in imperfect markets, (3) design the most efficient production process, and (4) develop technologies that position the firm well in a turbulent environment.

Integrating Perspectives on Rent Generation

Interestingly, all of the economic tools relevant to competitive advantage described above reflect organizational responses to bounded rationality, imperfect information, and opportunism. These same assumptions pervade the management literature. In this way, the economic assumptions about rent generation are inherently compatible with those in the management literature.

However, the literatures do offer different explanations and prescriptions. First, if we examine the approaches to strategizing, we see that economic approaches involve estimating payoffs that rivals would face in order to predict their response to the firm's actions. In contrast, management approaches focus on acquiring and managing valuable, rare and inimitable resources. There is no clear reason why combining these approaches would not yield greater insight and likelihood of generating an advantage.

Similarly, the approaches to efficiency are different but complementary. Agency and transaction cost economics involve selecting incentives, monitoring, and ownership structures in accordance with asset specificity and the nature of the transaction. The management literature explores efficiencies in knowledge creation and the management of technology associated with different organizational forms. Again, these approaches are clearly complementary and can be pursued in concert. Over time, these approaches have been integrated into the strategic management literature to develop a fairly rich theory of rent generation.

KNOWLEDGE AND SUSTAINABILITY OF ADVANTAGES

The durability of an advantage is the second critical question in studying and evaluating competitive advantage. In many ways, the strategy literature has focused primarily on advantages that could be maintained over time as opposed to a temporary gain that will be lost in the next battle. Both the management and strategy literatures offer approaches and explanations for why an advantage might be more or less durable. While these approaches are somewhat different, they are compatible. The management literature identifies the attributes of knowledge that hinder knowledge transfer and therefore imitation. In contrast, economics approaches tend to focus on the structure of the industry or intellectual property rights.

Management and Knowledge as a Barrier to Imitation

From a strategic management standpoint, the management challenges embodied in knowledge-based assets are actually fortuitous. The lack of a competitive factor market is perhaps the most critical explanation of why knowledge-based assets are a source of sustained advantage (Barney, 1986). Such assets cannot be traded easily because they tend to be firm-specific and/or socially complex (Barney, 1991). The lack of a competitive market means that rivals cannot acquire the resource even once it is clear that it may lead to rent generation.

A second source of sustainability may be that rivals cannot figure out what resources are critical. In some cases, knowledge-based assets may be causally ambiguous in that managers cannot identify and confirm a causal link between the assets and the firm's performance (Lippman and Rummelt, 1982). Again, the knowledge management dilemmas prove to be fortuitous as they prevent rivals from eroding the advantage.

An underlying assumption here is that an advantage can be preserved to a greater extent if it is tacit in nature. For example, socially complex or causally ambiguous knowledge is especially difficult to convey. This fact prevents rivals from obtaining it and thereby eroding the advantage.

ECONOMICS AND REGIMES OF APPROPRIABILITY

Most of the economic tools focused on sustainability focus on the industry structure. This is tangentially related to knowledge because the nature and dispersion of knowledge in an industry may determine the degree of differentiation among firms and/or the fragmentation of the industry.

While, the industry structure literature tends not to focus much on knowledge it is clear that knowledge or technology can form the basis of a barrier to entry. A firm might have a first mover advantage on a given technology and maintain that advantage over time if the conditions are right.

Indeed, the economics literature does focus some attention on the institutional environment that might allow a knowledge-based advantage to endure. Specifically, (Teece, 1988) describes how regimes of appropriability determine whether an advantage can be sustained. He refers to patent and intellectual property protection that may be associated with the institutional environment as well as the nature of the knowledge itself.

Interestingly, these processes are related to the knowledge management literature in some interesting ways. In order to achieve patent protection, the knowledge must be fully and completely codified so rivals cannot use the knowledge. If the knowledge is only partially codified, rivals may find ways to use the knowledge without violating the patent. Thus, regimes of appropriability can provide protection for knowledge that is explicit and codifiable whereas, the knowledge literature focuses on protection due to tacit knowledge.

Integrating Perspectives on Sustainability

Both economics and management identify tacitness as a source of sustainability. However, the economics literature also involves the study of institutional and regulatory means to preserve intellectual property. Thus, it is possible to sustain an advantage from codified or explicit knowledge as well. The management literature also offers other sources of sustainability such as firm specificity, social complexity, and causal ambiguity. Clearly the strategy literature would do well to focus on all of these sources of sustainability.

KNOWLEDGE AND RENT APPROPRIATION

The third and final question is that of who gets the rent once it is generated. This is critical because virtually all measures of firm performance measure some residual after one or more classes of stakeholders have already appropriated their portion of the rent. As such, measures of firm performance are not independent of who gets the rent. While both the economics and management literatures have something to offer, this last question is under-researched from all perspectives.

Economics and Rent Appropriation

Since the term rent appropriation arises from the economics literature, it is clear that this question stems more from that line of inquiry. The industry structure, agency, and transaction cost economics literatures especially offer much in this respect.

The industry structure literature offers a perspective on rent appropriation within an industry as opposed to within the firm (Porter, 1980). Here, buyers and suppliers may be able to bargain away rents depending on their degree of bargaining power. For example, rents may flow outside of the firm if buyers or suppliers are able to exercise monopoly power. While this is not directly linked to knowledge-based assets, there are indirect links between bargaining power and knowledge. For example, suppliers may have power based on the lack of alternatives for their services. Still, this does not address rent appropriation within the firm.

In contrast, agency theory focuses on managerial rent-seeking behavior that may be against the interests of shareholders (Jensen and Meckling, 1976). This might include a variety of actions from direct appropriation such as compensation to altering the firm's strategic direction to suit management preferences. In these ways, rent arising from a competitive advantage might be diverted away from shareholders so it is difficult to observe in measures of firm performance (Coff, 1999).

In general, the agency literature focuses on the incentives and degree of monitoring that are appropriate to minimize agency costs. The general assumption is that if agency costs are minimized, more rent will flow to shareholders and thus the firm will exhibit greater performance. It is worth noting that the risk of agency problems is greater when there is asymmetric information (e.g., like that associated with knowledge). This raises monitoring costs and provides opportunities for agents to act opportunistically using information that is not available to others (in particular the principal).

The transaction cost economics literature offers a similar perspective in that individuals are assumed to act opportunistically to appropriate rents where possible (Williamson, 1975). In particular, this literature seeks to answer the question of how a given transaction should be governed and, in particular, who should own the critical assets. The focus here is primarily on transaction specific rent-producing investments. For example, the choice of whether or not to vertically integrate the firm may be determined by the extent to which a supplier will be able to hold up the firm and thereby appropriate rent (Klein *et al.*, 1978).

Thus, the transaction cost economics posits that the risk of rent appropriation increases with asset specificity and information asymmetries. The often-prescribed remedy is some form of ownership so that some other owner of the asset cannot hold up the firm. The assumption is that if the firm adopts efficient governance structures, it will exhibit stronger performance.

Interestingly, the situations which agency theory and transaction cost economics apply the greatest are those involving firm specific assets and information asymmetries. *Indeed, this is precisely the setting that is associated with knowledge-based assets.* As such, these tools are particularly useful for predicting rent appropriation arising from a knowledge-based advantage. Nevertheless, some management scholars criticize the economics literature as focusing only on problems of opportunism (Connor and Prahalad, 1996).

Management and Rent Appropriation

Ironically, the vast majority of the management literature also views individual motivation as an outcome of self-interest (Vroom, 1964). Thus, the assumptions about motivation are quite compatible across these two domains for the most part. Admittedly, the focus in the strategic management literature has not been on problems of opportunism in the way that this topic has proliferated the economics literature.

That said, rent appropriation is an area that must be dominated by assumptions of self-interest, if not opportunism. The management literature does offer some different frameworks to predict rent appropriation. First the bargaining power and negotiation literatures identify power as stemming from: the ability to form coalitions, access to information, and switching or hold up costs that each party would experience (Hickson *et al.*, 1971).

We can use these determinants to predict that knowledge-based assets influence the ability to form coalitions, access to information and the switching costs that each side might experience. Thus this existing framework is very applicable to predicting rent-appropriation in the context of knowledge-based assets (Coff, 1999).

Integrating Perspectives on Rent Appropriation

Like the other aspects of performance economics and management offer complementary but distinct perspectives on rent appropriation. Much of the economics literature that addresses rent appropriation focuses on bargaining power that might arise from asset ownership, asset specificity, monitoring costs, and incentives.

In contrast, the management literature explores the implications of coalition formation, unique information, switching or exit costs, network structure, and political power. Again, we can gain better explanatory power using models that integrate these sources of bargaining power than relying on one approach or the other.

The underlying assumptions behind economic and management analyses are quite similar and compatible for the most part. Both rest on the assumptions of bounded rationality and asymmetric information. In addition, both traditions assume that individuals will act to appropriate rent if it is within their power to do so.

That said, the management literature has focused primarily on rent generation and how it is driven by bounded rationality. In contrast economics literature has focused much more on rent appropriation and how it is driven by problems of opportunism.

Given the importance of knowledge in exploring firm performance differentials, it is clear that problems arising both from opportunism and bounded rationality must be considered. One cannot explore rent production without studying rent appropriation as well. The later absolutely requires an assumption of opportunism even if the former does not. In this way, it is clear that both approaches are necessary and should be applied in concert.

DISCUSSION AND CONCLUSION

Throughout this essay, I have made assumptions about what is *management* and what is *economics*. However, many of the insights in the management literature have benefited greatly from the interaction with economics. In some cases it is hard to identify where a given insight belongs—the line is arbitrarily drawn (Mahoney and Pandian, 1992). Accordingly, it should be apparent to the reader that a great deal of integration has already taken place. The real question is whether further integration is desirable and/or needed.

The management toolbox is replete with tools at varying degrees of sophistication and development—many of which actually represent competing perspectives or theories. This diverse toolbox stems, in part, from the multi-disciplinary nature of the capstone requirement from which strategy emerged.

In contrast, most of the tools of economics are well developed and well grounded. Indeed, the diversity of management paradigms may hinder coordination in the development of theory and empirical tests. At a minimum, it requires the mastery of multiple languages of inquiry. For this reason, some suggest that management could be advanced most by adopting some common theoretical ground or, as it has come to be known, 'Pfefferdigm' (Pfeffer, 1993).

However, the diversity of tools and perspectives adds to our explanatory power. If we view our predictive power as a function of the tools provided, it is easy to see that adding a tool (management or economics) adds to our model —the R^2 goes up. However, to extend the metaphor, we must look at the adjusted R^2 and the incremental improvement in the model's fit. In other words, does each approach add sufficiently to our predictive abilities to justify the degrees of freedom used?

Again, as (Pfeffer, 1993) argued, we need to be aware of the costs as well as the benefits associated with the diversity of perspectives. This article has outlined some of the similarities and differences in the approaches to strategic management. It should seem clear that economics and other management disciplines contribute to our understanding of competitive advantage and firm performance.

Indeed, I would argue that the benefits outweigh the degrees of freedom lost through the lack of paradigmatic clarity. For example, the continued discourse and interaction has lead to the recent application of real options theory. This tool promises to help explain competitive advantage in very dynamic or volatile environments.

I would characterize this as theoretical development in response to a changing landscape. Such changes in the competitive and technological environment continue to pose challenges for theories. Accordingly, the most constructive and conservative approach is to nurture variation so we have access to a full toolbox when new theoretical problems arise.

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