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## Developing Core Competence Related Theory

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### Introduction

The increasing complexity of customer demands has forced corporate managers to identify the tools they possess that can enhance their firm's competitiveness. The Resource-Based View of the firm aids managers with its concept that firms possess various competitively useful resources. This view has emerged (Barney; 1991; Barney, 2001; Collis and Montgomery, 1995; Conner, 1991; Conner and Prahalad, 1996; Dierickx and Cool, 1989; Peteraf, 1993; Wernerfelt, 1984) because it has been noted that some firms are able to apply physical, legal, and knowledge resources to compete successfully over time in a variety of environments.

As discussed below, there is much research concerning an organization's knowledge resources in the form of core competencies, which are its employees' abilities that enable the firm to compete when utilized. According to von Krogh and Roos (1995), the result has been a greater intuitive, anecdotal familiarity with corporate employees' competencies rather than a systematic understanding of them. They point out that "the term competence is often used similarly to the way it is used in our daily speech; to code a broad range of our experiences related to craftsmanship, specialization, intelligence, and problem solving. As such, competence remains an experience-near concept which needs further conceptual clarification if it is to serve the purpose of theory building" (p. 62).

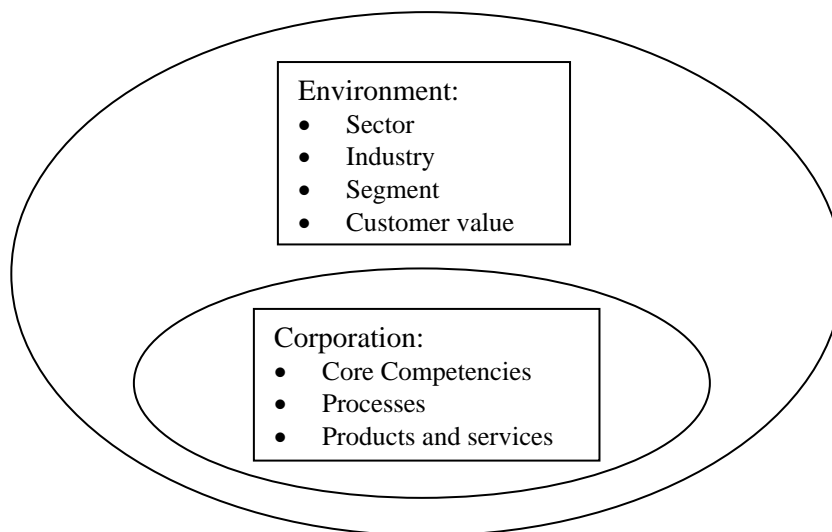
### Nomological Network: The Corporate Value Provision Situation

Rather than occurring alone, however, core competencies exist within a set of organizational phenomena. This set can be expressed in a nomological network of strategic concepts. Using this network to research core competencies can lead to a competence related theory, providing a systematic, rather than anecdotal, conceptualization of what core competencies contribute to corporate effectiveness.

Underlying such an argument for competence-related theory is the assumption that there are enduring social phenomena within and outside of the corporation which influence a core competence's contribution. Some of these phenomena occur within the corporation itself, while others occur outside of it.

The dynamic of this nomological network is that the corporation's core competencies are applied to operate its processes, which deliver its products and services. These in turn provide customer value, such as transportation or health care, to customer segments served by industries and economic sectors. Therefore, in this approach, the ultimate contribution of the corporate core competence, mediated through corporate processes, is its influence upon customer value and this value's impact upon the customer segments, industries, and sectors to which it is provided. As this occurs, this set of phenomena can be viewed as a *value provision situation*, as shown in Figure 1.

Figure 1. Value Provision Situation



Moving from the innermost to the outer circle of Figure 1, we now review the phenomena occurring within the value provision situation.

### ***Core Competence***

In the years since Prahalad and Hamel (1990) published their article entitled “The Core Competence of the Corporation,” much work has been done to develop the core competence construct. Researchers have proposed definitions of it from a variety of perspectives. The current state is an inconclusive literature with respect to understanding this important construct.

Perhaps the central problem of core competence definition has been one of balance: trying to include within the definition of core competence both the notions of *knowledge* (know-how) and *action* (skill application) simultaneously (Bogner & Thomas 1994; Fowler et al. 2000; Lei 2000; Leonard-Barton 1992; Pitt & Clarke 1999; Post 1997; Sanchez et. al 1996; Walsh & Linton 2001). Perspectives vary as to what people holding a competence know and what the competence enables them to do.

Emphasizing the knowledge a core competence embodies, one perspective holds that this kind of competence involves understanding of some intellectual discipline or topic (Bakker et al. 1994; Banerjee 2003; DeCarois 2003; Guimaraes et al. 2001; Gallon et al. 1995; Grandstrand et al. 1997; Hafeez et al. 2002; Henderson & Cockburn 1994; Petroni 1998; Prahalad & Hamel 1990; Walsh & Linton 2001). For example, Henderson and Cockburn (1994), in an extensive study of the pharmaceutical industry, found that research specialists in these firms often have in depth knowledge of disciplines such as molecular biology or biochemistry. The authors also found these specialists to have deep expertise in specific topics such as diseases.

A second perspective advanced by other studies states that a core competence involves knowledge of some specific phenomena (e.g. Gallon et al. 1995; Goddard 1997; Hafeez et al. 2002; Henderson & Cockburn 1994; Grandstand et al. 1997; Leonard-Barton 1992; Lorenzoni & Lipparini 1999; Meschi & Cremer 1999; Miyazakil 1999; Onyeiwu 2003; Prahalad & Hamel 1990; Walsh & Linton, 2001). Examples of these phenomena can include chemicals, steel, electronics, or engines.

A third perspective defines a core competence to include a technology, or a skill in using a technology (Bakker et. al 1994; Bogner & Thomas 1994; Drejer 2001; Drejer & Sorenson 2002; Daneels 2002; Day 1994; Duysters & Hagedoorn 2000; Grandstand et al. 1997; Gorman & Thomas 1997; Hafeez et al. 2002; Hamel & Prahalad, 1994; Klein & Hiscocks 1994; Leonard-Barton 1992; Petts 1997; Onyeiwu 2003; Torkkeli & Tuominen 2002; Walsh & Linton 2001; Wang et. al 2004). Examples of technologies can include computing, printing, or internal combustion.

Emphasizing what people holding a competence can do, the fourth perspective suggests that a competence includes functional skills within an organization (Bogner & Thomas 1994; Bove et al. 2000; Davies & Brady 2000; De Carolis 2003; Gallon, et al. 1995; Goddard 1997; Hafeez et al. 2002; Harmsen et al. 2000; Javidan 1998; King & Zeithaml 2001; Klein & Hiscocks 1994; Knudsen 2000; Leonard-Barton 1992; Meyer & Utterback 1992; Moorman and Slotegraaf, 1999; Onyeiwu 2003; Petts 1997; Snow & Hrebiniak et al. 1980; Stuart et al. 1995; Thomas & Pollock, 1999; Torkkeli & Tuominen 2002; Walsh and Linton, 2001; Wang et. al 2004). Examples of these include marketing, manufacturing, distribution, or production scheduling.

A fifth perspective proposes that a core competence includes an integration of some kind, usually of technical or functional skills (Collis & Montgomery 1995; Gallon et. al 1995; Gorman & Thomas 1997; Grant 1996; Hamel and Prahalad, 1994; Hafeez et al. 2002; Henderson & Cockburn 1994; Petts 1997; Prahalad & Hamel 1990; Sanchez et. al 1996; Torkelli & Tuominen 2002; Wang et. al 2004). An example would be the Honda Corporation's ability to integrate the functions of engineering and manufacturing to create high quality small engines (Hamel & Prahalad, 1994, p. 204).

A sixth perspective describes a core competence to include more generalized organizational abilities, ones applicable across technologies or functions. Examples include quality management, new product development, collaboration, strategic thinking, foresight, or innovation (Baker et al. 1997; Bergenhenegowen et. al, 1997; Bonn 2001; Davies & Brady 2000; Harmsen et al. 2000; Henderson and Cockburn 1994; Koch 1997; Major et al. 2001; Meschi & Cremer 2001; Moorman and Slotegraaf 1999;

Nelson & Winter, 1982; Prahalad and Hamel 1990; Tucker 2001; Winter 2003). It should be noted that controversy exists about the extent to which such generally applicable organizational capabilities actually lie within core competencies or, instead, enable the competencies to develop.

In summary, multiple definitions of core competencies exist. Researchers have proposed that core competencies include knowledge of disciplines, technologies, and specific phenomena; specific skills; and general organizational abilities in strategic thinking and innovation. Some researchers suggest that these bodies of expertise must be integrated by the competence and even that the competence must include some knowledge specific to particular customers.

Examining four manufacturing firms, Edgar (2000) revealed the applicability of nearly all of these perspectives to core competencies. This study used content analysis of corporate documents and interviews with corporate professionals to reveal that the four firms had five competencies among them, all of which exhibited a similar structure. Three of these were based upon an understanding of communication networks, while the other two were found to be based upon understandings of documents and integrated circuits. For an example of a core competence based upon a communication network, see Figure 2.

The dynamic of the core competence is that individuals within the company possess an understanding of general technologies. This enables their thorough understandings of some core phenomenon and its related disciplines, which then supports their familiarity with product or service technologies and more specific sub-technologies. This in turn leads to their understandings of product and service classes that form the basis for their acquisition of certain functional and technological skills, which are ultimately integrated into a combined skill. It should be noted as well that, once these integrated skills develop, their component skills and understandings can influence one another iteratively. According to Edgar (2000), these understandings and skills were revealed as conceptual categories by content analysis, while the iterative dynamic between them was revealed by the interviews with the corporate professionals.

For instance, understandings of the general technologies of communication and networks led to an understanding of communication network core phenomenon and the related discipline of computer science. This familiarity led to understandings of numerous networking product technologies--such as switching and transmission--and their resulting product sub-technologies, such as optical switching or wireless transmission. This detailed knowledge provided a basis for understanding product classes, such as wireless transmitters, which in turn laid a foundation for functional skills, such as manufacturing them, and technological skills, such as actually transmitting data wirelessly.

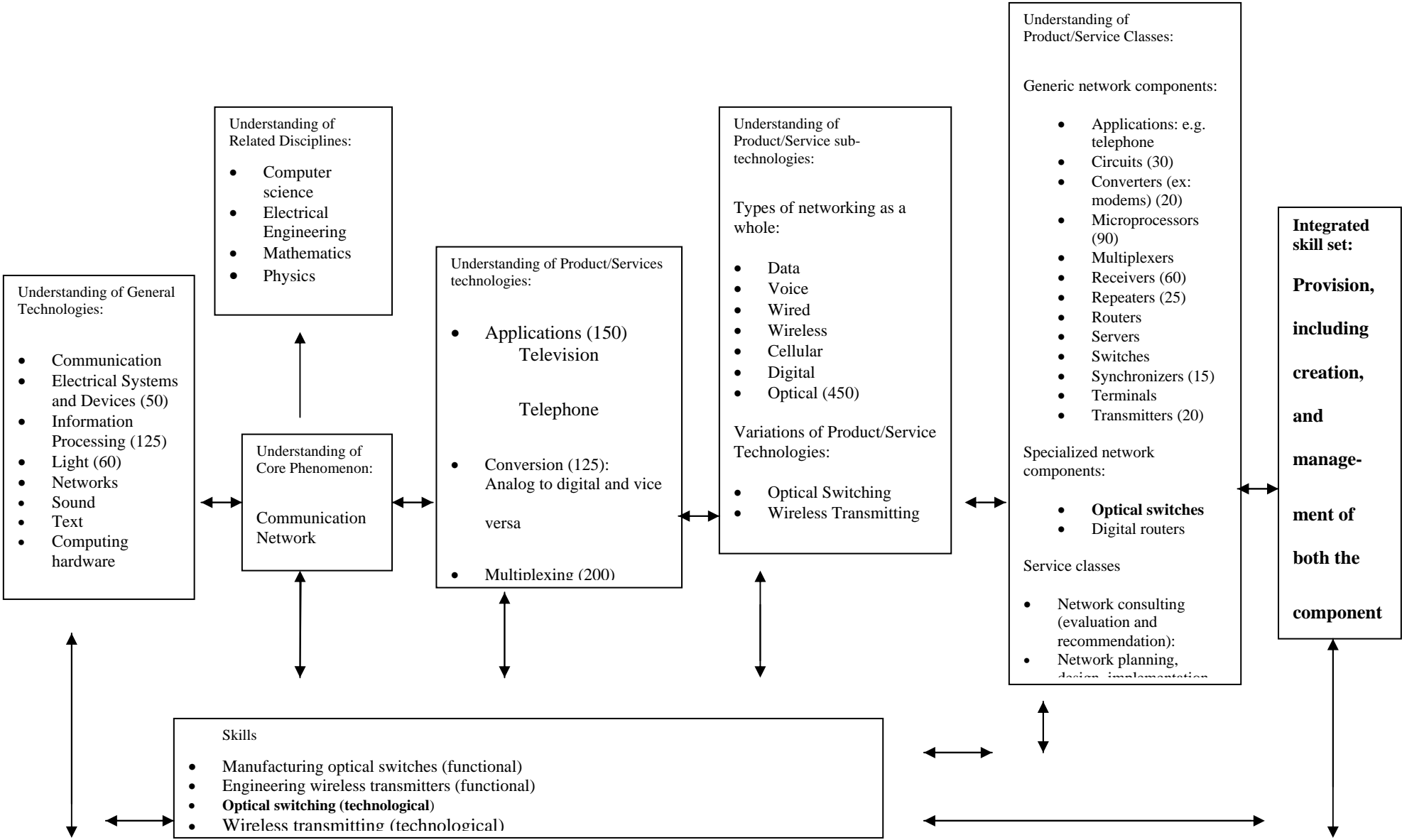
These component understandings and skills contribute to an integrated skill, held by people in several of the examined firms, in the creation and management of communication network components as well as communication networks themselves. Moreover, these components can influence each other iteratively, as occurs when using the skill of engineering transmitters deepens the understanding of transmission technology.

Edgar's (2000) results support several perspectives of core competencies: that they involve knowledge of phenomena, disciplines, and general and product technologies, along with the ability to act by applying singular and integrated skills. (However, the results' focus on the understanding of a specific core phenomenon, such as the communication network, suggests that core competencies do not include more generalized organizational capabilities such as organizational learning or quality management.)

### ***Core Competence Attributes: Breadth and Depth***

Based upon the core competence structure revealed by content analysis, interviews of corporate professionals, and an analysis of corporate patents, Edgar (2000) found that two strategically relevant attributes of the core competence can be described precisely: its *breadth* and *depth*. Competence breadth is the *number of members* of different categories of core competence components. More specifically, it is the number of understandings of different general technologies, core phenomena, related disciplines, product/service technologies and sub-technologies, product/service classes, as well as the number of individual and integrated skills within the core competence. If people within a firm have *any* one of these understandings or skills at all, then that understanding or skill is included in the core competence.

Theory Figure 2: Core Competence Dynamic



Therefore, whenever a company adds members to any of these categories, the breadth of its core competence increases. If a firm has a core competence based upon the core phenomenon of the communication network and it adds an understanding of the product/service technology of switching or the skill of manufacturing switches, then it has increased the breadth of its core competence. Conversely, if it loses this understanding or this skill, it has decreased the breadth of its core competence. This is depicted in Figure 2. Each understanding or skill is a bulleted item. Adding a new item would represent broadening the competence and vice versa.

In contrast, Edgar (2000) also found that the depth of a core competence consists of: 1) The extent to which people within a company have understanding of the components and sub-components of the competence's underlying general technologies, core phenomena, related disciplines, product/service technologies, product/service sub-technologies, or product/service classes; and 2) The extent to which they can perform the competence's functional, technological, and integrated skills.

To visualize this see Figure 2. In it, depth information is shown by indicating, in parenthesis next to it, the numbers of patents held by a firm in an understanding or skill. A greater number of patents in a specific area of understanding or skill indicates greater depth of the core competence in that understanding or skill. (Note that most of the understandings or skills did not involve any patents.) For example, with seventy patents based upon it, the corporate employees holding this competence have a reasonably deep understanding of the product/service technology of multiplexing.

### ***Process and Products***

When value provision situations (as depicted in Figure 1) occur, corporations apply core competencies to provide products and services. In doing so, they have found that the dominant mode of production in the industrial era, segmenting work into extremely small tasks, simply does not meet the dynamism, complexity, and variety of the customer needs within the emerging knowledge society. In their important book *Reengineering the Corporation*, Hammer and Champy (1993) synthesize how organizations are responding. Corporations are reorienting their work into processes, a critical link between core competencies and corporate products.

The opposite of functionally segmented work, processes are integrated combinations of land, buildings, money, equipment, materials, and people which work together repeatedly (Hammer and Champy, 1993, p. 4). Core competencies are applied to perform processes within corporations. As this occurs, core competencies enable processes, and in turn, processes make core competencies "come to life" by creating products or services of value to some customer.

Hammer and Champy delineate different types of processes. These include vendor payment, with activities from the placing of a product or service order to a vendor until final payment of that vendor; order fulfillment, with activities from the placing of an order by the customer until payment by that customer; sales, with activities from initial contact with a customer until placement of that customer's order; and customer service, with activities from notification of the company of a problem by the customer until final resolution of that problem (Hammer & Champy, 1993, p. 118). Other frequently performed corporate processes are research and development, product assembly, and engineering.

As they are performed, processes can vary in several strategically relevant characteristics: their *scale* and *variety*. For instance, order fulfillment can occur over the relatively small area of one building, such as a restaurant, or over the national operations of a major corporation. And processes can vary from the relatively standardized assembly of consumer products such as soaps, to the relatively diverse provision of specialized services, such as the engineering and construction of large buildings.

### ***Sector, Industry, Segment, Customer Value***

As depicted in the outer circle of Figure 1, the value provision situation encompasses the environment of the corporation. Recent economic changes in developed nations have diversified the products that must be delivered by corporate processes, greatly increasing the competitive pressures upon

them. As a result, organizations need a sense of *what* they are competing against, i.e., the competitive place in which they operate. With this in mind, they can find a competitive position within that place in which to thrive. This view has appeal because of the diverse examples of apparently stable competitive environments, such as those in automobiles or in aircraft manufacturing, which have existed for long periods.

Drawing upon strategic planning theories of a firm's opportunities and threats, strategy scholars (Porter, 1980, 1985, 1991, 1998; Tapscott 1996) have worked to conceptualize competitive place. Their work can be integrated into a classification in which human needs exist at different levels. At the first level exist needs shared by all people, such as ones for health care or transportation. These are met by large groups of organizations known as sectors (Tapscott, 1996, p. 9) of an economy (see Figure 1).

Usually addressed by specific products and services, the second level of needs exists within each first-level one. These are met by smaller groups of organizations (Porter 1980; 1985; 1991) known as industries (Figure 1). Within the first level need of transportation are several second level needs, such as the need to drive, fly, and take a train. Each of these needs (e.g. to drive) is met by a set of firms comprising an industry (e.g., the automobile industry).

Furthermore, like core competencies, industries exhibit strategically relevant characteristics (Porter 1985, 1991, 1998). One is their *permeability*, the ease with which an industry allows new competitors. For example, the automobile industry is relatively impermeable, since it costs a vast amount of money for a firm to enter. Strategic theory (Porter 1985) proposes that an relatively impermeable industry, one difficult to enter, is a structurally attractive one providing strong competitive positions within it for organizations to occupy.

Finally, at a level of aggregation below sectors and industries, there exist small sets of organizations (Porter 1985, 1991, 1998) serving individual customer segments (Figure 1). For instance, within the automobile industry are firms that serve segments of customers who want high performance sports cars as well as those who want safe, reliable family sedans.

It is at this lower level within industries that firms apply core competencies to processes to deliver products and services. When they do so, their customers realize the value, such as transportation, provided by the sector. As customer value is delivered, the industry and its segments become the environment in which an organization assumes a competitive position.

### **Theoretical Development**

Integrating the resource and position-based strategic perspectives, theoretical development related to corporate value provision situations can occur in a series of research stages.

#### ***Stages of Establishing Theory***

Research contributes to establishing theory in different ways. First, it describes phenomena and their attributes. Descriptive research, often the first type performed upon any phenomenon, lays the foundation for establishing theory but is limited because it usually does not try to propose relationships between characteristics of phenomena. This kind of research could develop definitions for phenomena within the value provision situation, such as core competencies or industries, and definitions for their attributes, such as a core competence's breadth and depth, or an industry's permeability.

Second, research explores relationships between these attributes. This develops predictive statements describing the pattern by which attributes vary in response to each other; it also develops explanatory, or causal, statements describing why they vary according to such a pattern. Since its result is initial theoretical statements, exploratory research is usually said to build theory. For example, it could develop a predictive statement specifying that broader and deeper core competencies held by firms within a specific industry tend to make that industry less permeable. The explanation may be that the extent of knowledge encompassed by competence breadth and depth is intellectually very difficult to imitate, preventing new firms from entering the industry.

Third, research can refine, or explain these relationships between characteristics in different settings. Since it results in verified theoretical statements, explanatory research is usually said to test theory. At this stage, explanatory research could test this theoretical statement relating competence breadth or depth, and industry permeability across multiple industries.

Explanatory research is in a sense the type toward which the other two types build because once theory has been tested in varied settings and found to describe reality consistently, that theory can be said to be verified. It is important to realize, however, that any theory, even one long established, can still be disproved by a test showing it does not describe reality in some setting.

The result of this theoretical development process is a set of statements predicting and explaining how each phenomenon with a set of them operates internally and interacts with others within the set. In terms of the core competence, established theory would predict and explain relationships between core competence attributes and those of other phenomena (e.g. industries or corporate processes) occurring within corporate value provision situations.

Theory relating attributes of phenomena within the value provision situation is unevenly developed. Some work has been done on stages one and two of theoretical development. For example, industries and their attributes have been examined (Porter 1985, 1991, 1998). However, relatively little research has examined characteristics of the core competence. Furthermore, few studies have addressed stages two and three of theoretical development: relating attributes of core competencies, such as their breadth or depth, to those of other phenomena within the value provision situation, such as industries' permeability.

### *Characteristics of Value Provision Situations*

As theoretical development occurs during these stages, phenomena related to the value provision situation can be usefully classified according to three aspects. The first is their dimensionality, indicating their complexity or simplicity. Complex phenomena, known as multi-dimensional constructs, consist of multiple sub-phenomena; conversely, simple, uni-dimensional, phenomena consist of only one phenomenon. The second aspect is the number of values the phenomena's characteristics can assume, indicating their variety or standardization. The third aspect is the specificity of the distances between the values their characteristics can assume. Phenomena whose attributes can assume quantitative, or numerical, values, have some degree of specific increment between these values, though it can be very high to very low. Conversely, phenomena whose characteristics can assume qualitative values have no increment between them. These values cannot be measured because they cannot be said to be increasing or decreasing.

The mechanism through which the core competence makes its contribution, the value provision situation, is itself an example of a complex social phenomenon. It is composed of a number of sub-phenomena: core competencies; corporate processes; products or services; customer value; and the corporation's environment, including its customer segments and industries. Moreover, most of these phenomena within the value provision situation can vary greatly. For instance, corporate processes can operate over vastly differing geographical scales, and the corporate competencies supporting them can vary in breadth, encompassing few or many understandings and skills. Finally, the values its phenomena can assume often differ in their specificity. For instance, the geographic scale of corporate processes can vary in discrete units, such as square miles. In contrast, the type of customer value is not specific at all, since the customer value of health care is not greater or less than that of transportation. Instead, these are qualitatively different from one another.

Variability across these three aspects means that no one research methodology is best for advancing theoretical understanding of the value provision situation. Instead, it is likely that multiple methods must be used, both within individual research projects and across multiple studies.



## **Methodological Tradeoffs**

This section will examine the applicability to corporate value provision of three classes of research methodologies: field research, surveys, and unobtrusive research via a broad review rather than a more specific critique of each method's potential usefulness. Most of these have been used to study core competencies (Banerjee 2003; De Carolis, 2003; Drejer & Sorenson 2002; Granstrand et al. 1997; Guimaraes, et al., 2001; Hafeez et al. 2002; Henderson & Cockburn 1994; Javidian 1998; King & Zeithaml 2001; Lorenzoni & Lippanrini 1999; Meschi and Cremer 1999; Michalisin et al., 2000; Moorman & Slotegraff 1999; Petts 1997; Stuart et al. 1995; Tampoe, 1994; Walsh & Linton 2001; Yeoh & Roth, 1999).

### ***Field Research***

**Definition.** Involving relatively intensive researcher interaction with the phenomena being studied, field research examines social phenomena and their setting in great depth. Sometimes also called the case study, this class includes two methodologies that will be discussed here: in-person interviews and observation.

**Potential Contribution .** Field research is most effective for developing competence-related theory when the value provision situation operates according to certain conditions. Field research methods effectively capture the details of complexity quite well, and so are useful for studying the corporate value provision situation holistically. Interviews can be very effective in describing an entire set of phenomena within a complex value provision situation and the extensive interactions between them, e.g. those between core competencies and corporate processes. This is potentially very useful, since theoretical development related to core competencies is in its early stages.

Interviews and observation would both be effective for examining functional activities of corporate processes if those activities vary extensively. For example, if the activities within a corporate process could be done using relatively varied approaches, such as in engineering service, then these two methods could effectively capture this. Similarly, they can capture the reasons for the generality, or lack of a specific measure, when comparing the different types of customer value, such as transportation or health care, by describing the qualitative rather than quantitative differences between them.

Interviews of corporate employees would be applicable for discovering corporate processes if employees' reported activities correlate with actual activities. This might occur if employees have a very good understanding of the processes in which they participate. Moreover, observation of corporate processes would be useful in the opposite situation, when process participants' reported activities do not correlate with their actual activities.

Since observation can also effectively remove researchers from reliance upon subjects' perceptions, it would be useful for discovering the corporate competencies guiding activities of a process, if those competencies were relatively unclear to corporate employees. This could occur when a corporate competence included relatively many skills; it could occur when the competencies were based upon understandings of varied core phenomena; and it could occur when employees were less deliberate in developing their own individual competencies in light of the larger corporate competencies. In contrast, interviews of corporate employees could be effective in the opposite situation, when the competencies were clear to them.

Similarly, observation would also be more effective if the products, services, types of customer value provided by a firm (such as transportation, or health care), and the customer segments, industries, and sectors served by a firm were relatively heterogeneous and so less clear to corporate employees. Again, though, interviews of corporate employees would be useful in the opposite situation.

Though interviews can be used to study instances of phenomena occurring over long periods of time, human memory is notoriously unreliable, so they capture present reality best. Therefore, interviews are more useful for studying the contribution of core competencies when the processes enabled by the competence occur rapidly and customers use the resulting product or service quickly.

In-person interviews and especially observation are relatively physically and financially difficult to perform over large geographic areas, so they are likely more useful if the geographic area of the value provision situation is small, as might occur in a hospital. Finally, given the relatively high costs and physical obstacles involved doing them, in-person interviews and observation are also very effective when a smaller number of employees is studied, as would be true in if a smaller corporate process were being examined.

### *Surveys*

**Definition.** In many ways the opposite of field research, the second class of research methodologies is survey research. Often employing widely known tools such as the Likert scale, surveys present pre-established, open or close-ended questions that do not change during the course of the survey. Involving relatively little researcher interaction with the social phenomena being examined, surveys can be self-administered, where the respondent answers the survey without any contact with the investigator. They can also be researcher-administered, where the respondent answers questions posed face-to-face or over the telephone by the researcher. As defined here, the survey's researcher-respondent interaction is limited: the researcher asks and the respondent answers without further interaction between the two.

**Potential Contribution.** Surveys would be useful for building competence-related theory if the value provision situation operates according to certain conditions. Surveys, particularly remote ones with close-ended questions, often simplify what they examine and so must be used carefully when studying the complexity of the corporate value provision situation.

However, they can be effective. Surveys would be applicable for examining functional activities of corporate processes if those activities varied little. For instance, if the operations activities within a corporate process could be done using only relatively few, widely used approaches, such as an assembly line, then a survey could effectively capture that fact.

Surveys can be very useful for examining a specific value associated with a particular phenomenon within a value provision situation, such as the scale of a corporate process. This could be very helpful in the later, explanatory stages of theoretical development, once particular relationships between phenomena must be verified in a variety of settings.

Moreover, surveys would be useful for examining a corporate process if the process' reported activities correlate with actual activities. Some users might have a very good understanding of the process in which they participate, and so surveying them would bring an accurate description of its operation.

Since surveys rely upon human perception of those surveyed, they would be effective for discovering the core competencies guiding process activities, if those competencies were relatively clear to corporate employees. This could occur if a competence included relatively few understandings and skills; it could occur if the firm's core competencies were based upon understandings of similar core phenomena; and it could occur if employees were more deliberate in developing their own individual competencies in light of the larger corporate competencies. Similarly, surveys would also be more useful if the products and services, the types of customer value provided by a firm (such as health care), and the customer segments, industries, and sectors served were more homogeneous and so more clear to corporate employees.

Though surveys can be used to study instances of phenomena as they occur over varying periods of time, human memory is unreliable, so surveys capture present reality best. In other words, surveys would work best when each instance happened relatively quickly in terms of an individual's time frame, so that people's memory of events would be fresh. Therefore, surveys are more effective for studying the corporate value provision situation when the processes enabled by the core competencies occur rapidly and the resulting products and services are used quickly.

Surveys are relatively easy, both physically and financially, to disseminate, so they would probably be especially effective if the geographic area of the corporate value provision situation were large, as might occur in a major pharmaceutical corporation serving customers located throughout the world. Finally, given the relatively low financial costs and physical obstacles in doing them, surveys

would be very useful when many employees are questioned, which might be true if a large corporate process is being examined.

### ***Unobtrusive Research***

**Definition.** The third class of research methods, those involving unobtrusive research, contains a variety of tools, including content analysis, the analysis of existing statistics, and the historical method. This discussion will focus on the first two, the analysis of textual, verbal, or even image content items and the analysis of previously gathered statistics. . In content analysis, recorded communication is categorized by codes indicative of the phenomena being studied, and then the occurrences of the codes are analyzed. Analysis of statistics is similar to content analysis because it involves systematic examination of numerical rather than textual, verbal, or visual evidence of a phenomenon.

What unobtrusive research methodologies have in common is that they are used to learn about social phenomena by minimizing the interaction between the researcher and the phenomena being studied. This can have the effect of preventing the researcher from influencing the examined phenomena.

**Potential Contribution.** This class of research methodologies is located to some extent between surveys and field research in its capabilities. What is learned using unobtrusive research depends upon the content or statistics being analyzed. Such material might be self-reports of human participants in a phenomenon, such as workers' perceptions of a corporate process, or might be evidence created by the phenomenon itself, such as statistics describing the process' performance.

Its enormous flexibility makes unobtrusive research useful for studying the complex nature of corporate value provision situations. Therefore, unobtrusive research methods can be of use in all three stages of theoretical development, from defining the phenomena within corporate value provision situations to verifying specific relationships between these phenomena within a variety of settings. For example, content analysis can be effective when examining multiple phenomena within a value provision situation, such as core competencies and the processes they enable, or when examining one phenomenon, such as an industry.

Statistical analysis would be effective for examining functional activities of corporate process if those activities were relatively standardized or varied. For instance, whether the activities within a process were done using only relatively few approaches, such as an assembly line, or using relatively many approaches, such as an engineering service, then process metrics could be analyzed. Similarly, content analysis could be used to examine specific differences across phenomena, such as differing scales of a corporate process, or non-specific differences across them, such as types of customer value.

Moreover, as an intellectual compromise between field research and surveys, unobtrusive methods can be used to examine phenomena within the value provision situation across a wide variety of conditions and can provide a rich, robust understanding of a phenomenon. They would be useful for discovering corporate process if the process' reported activities correlate highly or very little with actual activities. For instance, some employees might have only a partial understanding of the processes in which they participate. Analysis of their self-reports might somewhat reflect process activity but also need to be balanced by analysis of process metrics.

Since unobtrusive methods may or may not rely upon human perception of participants, they would be effective for discovering the corporate competencies guiding the activities of a process, regardless of the competencies' clarity to corporate employees. A firm's core competencies might be clear to its employees because they include relatively few understandings of technologies or skills; they are based upon understandings of similar core phenomena; and the employees are very deliberate in developing their own individual competencies in light of the larger corporate competencies. In this case, content analysis of internally developed corporate product catalogs would likely identify the company's core competencies. However, content analysis of external documents, such as trade journal articles on the corporation's products, could do so in the opposite situation as well, when a firm's core competencies were not as clear to its employees.

Similarly, the unobtrusive method of analyzing internal corporate marketing plans would be useful for discovering the environment of the corporation if the products and services, types of customer value provided by a firm (e.g. transportation, or health care), and customer segments, industries, and sectors it served were relatively homogeneous and thus clear to corporate employees. Again, however, content analysis could do all this in the opposite situation, by analyzing external documents, such as consultants' reports.

Unobtrusive methods can be applied to study instances of phenomena occurring over varying periods of time, but because they necessarily involve some record that has already been done, they capture past reality best. Therefore, documentary and statistical analysis is useful for studying corporate value provision whether the corporate processes occurred rapidly or slowly and whether the resulting products and services were used soon or long after they are provided.

It is relatively physically and financially easy to gather documents or statistics from geographic areas of varying size, so these methods can be applicable whether the geographic area of the value provision situation is large or small. Finally, depending upon what textual or numerical data is analyzed, unobtrusive research methods are very useful when a large or small number of employees participate in the phenomena being studied.

### **Methodological Issues**

Using the construct of the value provision situation to establish theory related to core competencies raises a number of methodological issues. The first is that the interviews, observation, and the content or statistical analysis of field and unobtrusive research can support examining the complexity, variety, and generality of the corporate value provision situation. As a complement to them, surveys can be used to examine one or two phenomena in these situations, particularly when these occur in standardized, specific ways, e.g. in a corporate assembly process usually operated on a large scale.

The second methodological issue involves human perceptions regarding core competencies, processes, and the corporation's environment. The balance here must be between utilizing the internal familiarity with a firm held by its employees as well as the external objectivity regarding a firm held by outsiders, such as journalists or consultants. Here, interviews and surveys of corporate employees can supply the intimate internal corporate perspective of core competencies and processes, while observation and content analysis of independently produced documents can bring the external perspective of knowledgeable outsiders.

The third issue involves human memory regarding the operation of value provision situations. The longer such situations take to occur, the more difficult it is for people to remember events accurately, and vice versa. To address this, interviews, surveys, and observation are more useful if value is provided rapidly to customers, while documentary and statistical analysis are more helpful if it takes a long time for value to be provided by applying core competencies to corporate processes.

Roughly approximating the physical effort and cost required to use a methodology, the fourth and fifth methodological issues involve the geographical area over which the value provision situation occurs and the number of employees holding its competencies and operating its processes. In general, the less expensive, remote methods--surveys, and documentary or statistical analysis--serve best if the geographical area and number of employees is large. In contrast, the more expensive, in-person methods--interviews and observation--are better if this area and number are small.

### **Conclusion**

Providing value to corporate customers through the application of core competencies involves the interactions of a series of phenomena that can be expressed in a nomological network. Encompassing organizational resources and a corporation's competitive environment, the value provision situation represented by such a network is an enormous social phenomenon, and a number of different methodologies can be used to study it. With field research at one end, unobtrusive research in the middle,

and surveys at the other end, these methods exist along a continuum relative to their ability to address a number of methodological issues inherent to corporate value provision.

Additionally, given the relatively undeveloped theoretical understanding of corporate value provision, triangulating methods will be vital. One approach for advancing theoretical development would be to use field research first, then to move on to unobtrusive methods, and finally to use surveys. Observation and interviews would do the early, descriptive research, providing further definition to value provision phenomena and their attributes. Unobtrusive methods, especially content analysis, could then be used for exploratory research, proposing relationships between such attributes. Finally, surveys could be used for explanatory research, extensively verifying the proposed relationships.

It is likely, too, that each class of methods could aid in adjacent steps of establishing theory. For example, unstructured interview and documentary analysis methods can be used together in the same study (e.g., Edgar & Lockwood, In Press) for both description and exploring theoretical statements. Utilized over time, all of these methods, with their inherent methodological tradeoffs, can establish the competence related theory called for by Von Krogh and Roos (1995), providing a systematic understanding of how core competencies contribute to their parent firms.

## References

- Baker, J.C., Mapes, J., New, C.C., & Szejczewski, M. (1997). A hierarchical model of business competence. Integrated Manufacturing Systems, 8(5), 265-272.
- Bakker, H., Jones W., & Nichols, M. (1994). Using core competencies to develop new businesses. Long Range Planning, 27(6), 13-27.
- Banerjee, P. (2003). Resource dependence and core competence: Insights from Indian software firms. Technovation, 23(3), 251-263.
- Barney, J. (1991). Firm resources and sustained competitive advantage. Journal of Management, 17(1), 99-120.
- Barney J.B. (2001). Is the resource-based 'view' a useful perspective for strategic research? Yes. Academy of Management Review, 26(1): 41-56.
- Bergenhengouwen, G.J., ten Horn, H.F.K., & Mooijman, E.A.M. (1997). Industrial and Commercial Training, 29(2), 55-61.
- Bogner, W.C. & Thomas, H. (1994). Core competence and competitive advantage: A model and illustrative evidence from the pharmaceutical industry. In: Hamel, G. & Heene, A. (1994). Competence-based Competition. John Wiley & Sons: New York, 111-144.
- Bonn, I. (2001). Developing strategic thinking as a core competency. Management Decision, 39(1), 63-71.
- Bove, K., Harmsen, H., & Grunert, K.G. (2000). The link between competencies and company success in Danish manufacturing companies. In: Advances in Applied Business Strategy, 6(c), Greenwich: Conn.: JAI Press, 23-43.
- Collis, D. J., & Montgomery, C.A. (1995). Competing on resources: Strategy in the 1990s. Harvard Business Review, 73 (4), 118-128.
- Conner K.R. (1991). A historical comparison of resource-based theory and five schools of thought within industrial economics: Do we have a new theory of the firm? Journal of Management, 17(1): 121-54.
- Conner K.R., & Prahalad, C.K. (1996). A resource-based theory of the firm: Knowledge versus opportunism. Organization Science, 7(5): 477-501.
- Day, G.S. (1994). The capabilities of market-driven organizations. Journal of Marketing, 58(4), 37-52.
- Davies A, & Brady T. (2000). Organisational capabilities and learning in complex product systems: Toward repeatable solutions. Research Policy, 29(7-8): 931-953.
- De Carolis, D.M. (2003). Competencies and imitability in the pharmaceutical industry: An analysis of their relationship with firm performance. Journal of Management. 29(1), 27-50.
- Dierickx, I., & Cool, K. (1989). Asset stock accumulation and sustainability of competitive advantage. Management Science, 35 (12), 1504-1513.
- Drejer, A. (2001). How can we define and understand competencies and their development? Technovation, 21(3), 135-146.
- Drejer, A., & Sorensen, S. (2002). Succeeding with sourcing of competencies in technology-intensive industries. Benchmarking, 9(4), 388-408.
- Duysters G., & Hagedoorn J. (2000). Core competencies and company performance in the world-wide computer industry. Journal of High Technology Management Research, 11 (1): 75-91.

- Edgar, W.B. (2000). Corporate library resource selection and corporate core competencies: Exploring the connections. Doctoral Dissertation. The School of Library and Information Studies. The University of Alabama: Tuscaloosa, Alabama.
- Edgar, W. B. & Lockwood, C.A. (In Press) Organizational competencies: clarifying the construct. Journal of Business Inquiry.
- Fowler, S.W., King, A.W., Marsh, S.J. & Victor, B. (2000). Beyond products: New strategic imperatives for developing competencies in dynamic environments. Journal of Engineering Technology Management, 17, 357-377.
- Gallon, M R., Stillman, H, M., & Coates, D. (1995). Putting core competence thinking into practice. Research Technology Management, 38 (3), 20-28.
- Goddard, J. (1997). The architecture of the core competence. Business Strategy Review, 8(1), 43-52.
- Gorman, P., & Thomas, H. (1997). The theory and practice of competence-based competition. Long Range Planning, 30(4), 615-620.
- Grandstrand, O., Patel, P., & Pavitt, K. (1997). Multi-technology corporations: Why they have 'distributed' rather than 'distinctive core' competencies. California Management Review, 39(4), 8-25.
- Grant, R.M. (1996). Prospering in dynamically-competitive environments: Organizational capability as knowledge integration. Organization Science, 7(4), 375-387.
- Guimaraes T.A., Borges-Andrade J.E., Santos Machado M., & Maia Vargas M.R. (2001). Forecasting core competencies in an R&D environment. R&D Management, 31(3): 249-255.
- Hafeez, H., YanBing, Z., & Malak, N. (2002). Core competence for sustainable competitive advantage: A structured methodology for identifying core competence. IEEE Transactions on Engineering Management, 49(1), 28-35.
- Hamel, G., & Prahalad C.K. 1990. The core competence of the corporation. Harvard Business Review, 68(3), 79-92.
- Hamel, G., & Prahalad, C.K. (1994). Competing for the future. Boston: Harvard Business School Press.
- Hammer, M., & Champy, J. (1993). Reengineering the corporation: A manifesto for business revolution. New York: Harper Business.
- Harmsen, H., Gurnert, K.G., & Bove, K. (2000). Company competencies as a network: The role of product development. Journal of Product Innovation Management, 17(3), 194-207.
- Henderson, R., & Cockburn, I. (1994). Measuring competence? Exploring firm effects in pharmaceutical research. Strategic Management Journal, 15: 63-84.
- Javidian, M. (1998). Core competence: What does it mean in practice? Long Range Planning, 31(1), 60-71.
- King, A.W., & Zeithaml, C.P. (2001) Competencies and firm performance: Examining the causal ambiguity paradox. Strategic Management Journal, 22, 75-99.
- Klein, J.A. & Hiscocks, P.G. (1994). Competence-based competition: A practical toolkit. In: Hamel, G. & Heene, A. (1994). Competence-based Competition. John Wiley & Sons: New York, 183-212.
- Koch, A.J. (1997). Definition and evaluation of competence, capability and skill gaps in international business. Journal of Marketing Practice, 3(2), 119-136
- Knudsen, M.P. (2000). Demarcation of technological competence groups. In: Advances in Applied Business Strategy, 6(c), Greenwich: Conn.: JAI Press, 255-285.

- Lei, D.T. (2000). Industry evolution and competence development: The imperatives of technological convergence. International Journal of Technology Management, 19(7/8), 699-738.
- Leonard-Barton, D. (1992). Core capabilities and core rigidities: A paradox in managing new product development. Strategic Management Journal, 13, 111-125.
- Lorenzoni, G. & Lipparini, A. (1999). The leveraging of interfirm relationships as a distinctive organizational capability: A longitudinal study. Strategic Management Journal, 20, 317-338.
- Major, E., Asch, D., & Cordey-Hayes, M. (2001). Foresight as a core competence. Futures, 33, 91-107.
- Meschi P., & Cremer E. (1999). Competence building and corporate renewal. Business Strategy Review, 10(2): 43-51.
- Meyer, M.H. & Utterback, J.M. (1992). Core competencies, product families and sustained business success. Cambridge, MA: MIT Sloan School of Management International Center for Research on the Management of Technology, Sloan WP# 3410-92.
- Michalisin, M.D, Kline, D.M, & Smith, R.D. 2000. Intangible strategic assets and firm performance: A multi-industry study of the resource-based view. Journal of Business Strategies, 17(2): 91-117.
- Miyazakil, K. (1999). Building technology competencies in Japanese firms. Research Technology Management, 42(5), 39-45.
- Moorman C., & Slotegraaf, R.J. (1999). The contingency value of complementary capabilities in product development. Journal of Marketing Research, 36: 239-257.
- Nelson, R.R., & Winter, S.G. (1982). An evolutionary theory of economic change. Cambridge, Mass: Belknap Press.
- Onyeiwu, S. (2003). Some determinants of core competencies: Evidence from a binary-logit analysis. Technology Analysis and Strategic Management, 15(1), 43-63.
- Peteraf, M.A. (1993). The cornerstones of competitive advantage: A resource-based view. Strategic Management Journal, 14, (3), 179-191.
- Petroni, A. (1998). The analysis of dynamic capabilities in a competence-oriented organization. Technovation, 18(3), 179-189.
- Petts, N. (1997). Building growth on core competencies--a practical approach. Long Range Planning, 30(4): 551-561.
- Pitt, M., & Clarke, K. (1999). Competing on competence: A knowledge perspective on the management of strategic innovation. Technology Analysis & Strategic Management, 11(3), 301-316.
- Porter, M.E. (1980). Competitive strategy: Techniques for analyzing techniques and competitors. New York: Free Press.
- Porter, M.E. (1998). Competitive strategy: Techniques for analyzing industries and competitors. New York: Free Press.
- Porter, M. E. (1985). Creating and sustaining superior performance. New York, NY: Free Press.
- Porter, M.E. (1991). Towards a dynamic theory of strategy. Strategic Management Journal, 12, 95-117.
- Post, H.A. (1997). Building a strategy on core competences. Long Range Planning, 30 (5), 733-740.
- Prahalad, C.K. & Hamel, G. (1990). The core competence of the corporation. Harvard Business Review, 68(3), 79-92.



- Sanchez, R., Heene, A., & Thomas, H. (1996). Introduction: Towards the theory and practice of competence-based competition. In: Sanchez, R., Heene, A., & Thorn, H. eds. Dynamics of Competence-based Competition: Theory and Practice in the New Strategic Management. Tarrytown, NY: Pergamon, 1-35.
- Snow, C.C. & Hrebiniak, L.G. (1980). Strategy, distinctive competence, and organizational performance. Administrative Science Quarterly, 25, 317-336.
- Stuart, R., Thompson, J.E., & Harrison, J. (1995). Translation. From generalizable to organization-specific competence frameworks. The Journal of Management Development, 14(1), 67-80.
- Tampoe, M. (1994). Exploiting the Core Competencies of Your Organization. Long Range Planning, 27(4): 66-77.
- Tapscott, D. (1996). The digital economy: Promise and peril in the age of networked intelligence. New York: McGraw Hill.
- Thomas, H., & Pollock, T. (1999). From I-O economics' S-C-P paradigm through strategic groups to competence-based competition: Reflections on the puzzle of competitive strategy. British Journal of Management, 10: 127-140.
- Torkkeli, M. & Tuominen, M. (2002). The contribution of technology selection to core competencies. International Journal of Production Economics, 77, 271-184.
- Tucker, R.B. (2001). Innovation: The new core competency. Strategy & Leadership, 29(1), 11-16.
- Von Krogh G., & Roos, J. (1995). A perspective on knowledge, competence, and strategy. Personnel Review, 24(3): 56-76.
- Walsh, S.T., & Linton, J.D. (2001). The competence pyramid: A framework for identifying and analyzing firm and industry competence. Technology Analysis & Strategic Management, 13(2): 165-177.
- Wang, Y., Lo, H., & Yang, Y. (2004). The constituents of core competencies and firm performance: evidence from high-technology firms in China. Journal of Engineering and Technology Management, 21(4), 249-280.
- Wernerfelt, B. (1984). A resource-based view of the firm. Strategic Management Journal, 5, (2), 171-180.
- Winter, S.G. (2003). Understanding dynamic capabilities. Strategic Management Journal, 24, 991-995.
- Yeoh, P., & Roth, K. (1999). An empirical analysis of sustained advantage in the U.S. pharmaceutical industry: Impact of firm resources and capabilities. Strategic Management Journal, 29: 637-653.