
Guidelines for developing a k-strategy

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Keywords

Resources, Strategy, Competitive advantage, Sustainability, Core competences

Abstract

As companies start to engage with the knowledge economy, they have to shift their mindsets to understanding knowledge management more holistically and, more importantly, understand the role of knowledge management as it pertains to sustainable competitive advantage. It requires companies to think of age-old concepts in new ways, and necessarily requires deep insight into the enablers of business success within the company, and then creative insight is required to reveal the new possibilities. This paper, drawing on resource-based theory, provides some guidelines for companies to develop business strategies, critically dependent on knowledge management initiatives. A chain of sustainability is introduced and three insightful concepts are highlighted (complementary resource combinations, strategic architecture and pool of resources); however, they do not tell companies specifically what to do, but robustly explain what the requirements of a knowledge strategy are, if they want to attain, and sustain, competitive advantage.

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Introduction

The resource-based view of the firm initially came from the works of Chamberlin (1933), Selznick (1957) and Penrose (1959) who contended that firm heterogeneity can represent an important source of competitive advantage for a company. As early as 1933, Chamberlin argued that a firm's competitive advantage is achieved from the firm's unique assets and capabilities, i.e. technical know-how, reputation, brand awareness, and the ability of managers to work together.

According to Chamberlin (1933), heterogeneous characteristics of companies create imperfect competition that allows them to enjoy monopolistic competition. This monopolistic competition enables a company to gain competitive advantage, which leads to superior financial performance for a certain period of time (Barney, 1986a). Thus, in order to achieve the objective of the strategy, which is competitive advantage, a company should have a strategy to develop its idiosyncratic resources – in which know-how, learning, knowledge and experience are critical differentiating elements.

With the appearance of the concepts of "distinctive competence" (Ansoff, 1976; Hofer and Schendel, 1978; Snow and Hrebiniak, 1980; Hitt and Ireland, 1986, 1985), "core competence" (Hamel and Prahalad, 1990) and "competing on capabilities" (Teece *et al.*, 1991), the focus of attention changed from outside to inside the company. As described by Hamel and Prahalad, core competence was a capability that provided the thread running through a company's businesses, weaving them together into a coherent whole. Ulrich and Lake (1990) re-emphasised the strategic importance of identifying, managing, and leveraging core competencies rather than focusing only on products and markets in business planning (the focus of industrial organisation economics).

Some writers have equated the activities the company performs better than its competitors (and which are critical to its end products or services) with its "core competencies".

However, according to Long and Vickers-Koch (1995, p. 15), "by drawing attention to activities, activity-based management keeps us focused on the present. We end up rearranging the portfolio of current activities, instead of examining the potential the



underlying capabilities have for new activities, products and services". Thus, meaningful application of the core competence notion was difficult because of the generality of its level of analysis and the absence of specific prescriptions. The external environment received little, if any, attention, and what we had learned about industries and competitive analysis seemed to disappear from our collective psyche.

The management literature also suggests that a purely internal (competitive) approach may prove inadequate because issues of external (social) legitimacy (Bozeman, 1987; DiMaggio and Powell, 1983; Meyer and Rowan, 1977; Selznick, 1957) and reputation (Bowman and Faulkner, 1997; Gray and Wood, 1991; Westley and Vredenburg, 1991) are also extremely important. According to Long and Vickers-Koch (1995, p. 18), "each company needs to look inward to understand its own specific capabilities, and outward to identify its special opportunities in the world around it".

However, it has only been during the past decade that the bridging resource-based view (RBV), or resource-based theory (RBT), of the firm have re-emerged, articulating the dynamic relationships among company resources, capabilities, and competitive advantage, combining the internal analysis of phenomena within companies with the external analysis of the industry and the competitive environment (McWilliams and Gray, 1995).

Resource-based theory

RBT takes the "core competence" thinking one step further: it posits that competitive advantage can be sustained only if the capabilities creating the advantage are supported by resource combinations, and an environment that is not easily duplicated by competitors. In other words, company resources must raise the rare and non-substitutable "barriers to imitation", and bundles of these resources act as "isolating mechanisms" (Rumelt, 1984) – these barriers and mechanisms explain *ex post* the sustainable stream of rents a company enjoys and provide a rationale for intra-industry differences, and states of disequilibrium, among companies.

The underlying orientation of RBT considers a company as a unique bundle of linked, idiosyncratic, tangible and intangible assets and resources (Penrose, 1959; Wernerfelt, 1984; Hall, 1992). One of the central notions of RBT is that companies in the same industry compete with generally the same resources, but combine them in different and disparate ways (making them idiosyncratic combinations of resources) – because of their history, embedded processes and work-practices, management decisions, stage in organisational lifecycle, social complexity and organisational culture, employee skills and know-how, pools of cumulative experience, and knowledge transfer and knowledge embedding over time (April and Cradock, 2000).

Through RBT, new insight into the issue of sustainability of competitive advantage is achieved, in that companies that understand themselves better are able to identify and exploit specific, existing underlying resource bundles, as well as dynamically develop new and different processes, applications and capabilities through learning and capability accumulation and integration. Experience and knowledge are brought to the fore which enables reduction in cost and/or time required to create new resource combinations or extend existing ones, thereby generating the possibility of choice and commitment to long-term trajectories of capability development. Understanding, interpreting, and growing such resource combinations (absorptive learning capacity) are necessary components of k-strategy formulation and include the ability to access, internalise, develop and apply new knowledge quickly. Even if "bought" as part of an acquisition or merger, getting the old and new resource combinations to work together to produce an enhanced capability, i.e. resource combinatorial synergy, is itself dependent on the organisational capability to integrate two sets of resources post-acquisition, as well as the capacity, flexibility and speed of integrated learning within the company.

Resources combinations and organisational capabilities cannot be accumulated instantaneously and, unfortunately, the speed of development of new organisational capabilities are compromised by the stickiness (Tece *et al.*, 1991) of the current stock of resources, e.g. legacy systems, organisational infrastructures and business processes. This is

because resources, and the relevance of the current stock of know-how, may diminish in value or relevance over time, yet companies may be unwilling or unable to develop new ones or de-engineer (April *et al.*, 2000) their thinking – they become "prisons of strategic thinking" (Segal-Horn, 1997, p. 14).

Companies can get locked into thinking of their existing resources and capabilities as unique and fail to notice that what was once unique has been (and can be) copied by competitors, so that everybody can do it and the whole sector standard has moved on. In fact, in the knowledge economy, many of the resources and capabilities that once enabled a company to enjoy its competitive advantage, have become the industry standard ("qualifiers"). Penrose (1959, p. 77) argues that unused productive services of resources "shape the scope and direction of the search for knowledge".

Fundamentally, it is the resources of a company, and combinations thereof, which limit the management and leadership's choice and dominant logic (Prahalad and Bettis, 1986) regarding the markets to enter, and the levels of profits it may expect. Therefore, although RBT allows for the systematic assessment of these internal elements of strategy, it is important to stress that an analysis of the resources themselves, and the combinations which lead to capabilities, can only take place in the context of the company's current, and future, competitive environments. Amit and Schoemaker (1993), and Castanias and Helfat (1991), argue that uncertainty, complexity and conflict, both inside and outside the company, leave room for discretionary managerial or leadership decisions on strategy crafting. In other words, it is precisely such uncertainties that create the opportunity for heterogeneity between companies to develop, often as a result of better or worse wilful decision-making and actions by managers and leaders (Lado *et al.*, 1992; Bourgeois, 1984; Child, 1972; Smircich and Stubbart, 1985; Weick, 1979). These wilful choices, we all know, become better over time if the decision-makers are willing and able to learn from what has gone before, and what is required in the future.

Similarly, the company that understands what its business process enablers are may make better use of its human capital by correctly assigning workers to where they have higher productivity (Tomer, 1987), and are

able to maximise their relationship capital and connectivity (social networks) in and outside of the organisation. And, closely intertwined is the fact that the company may then make better allocations of financial capital toward high yield uses (Bower, 1970; Williamson, 1975). It therefore squarely places the responsibility of continuous learning, staying at the cutting-edge and relevant, continual environmental scanning of the business and competitive intelligence on the part of both management and leadership, as well as employees, of a company.

In sum, RBT focuses on the key success factors of individual company behaviour to achieve company specific advantages through a portfolio of differential core skills and routines, coherence across skills, and unique proprietary know-how and experience. This view, as a framework of analysis to strategy formulation, has gained, and is still gaining in popularity among strategy theorists.

Definitions of resources and capabilities

Because of the varying levels of understanding of concepts within the discipline, a number of definitions are made explicit for the purposes of this paper.

Pool of assets/resources

Assets or resources come in many forms, from common factor inputs that are widely available and easily purchased in arm's length transactions, to highly differentiated assets, like people skills and organisational knowledge – and can be classified into two broad categories: tangible assets or resources and intangible assets or resources.

- (1) *Tangible assets or resources*. These are easiest to value and often are the only resources appearing on company balance sheets – include real estate, actual computer hardware, software packages, among others. Although tangible assets may be essential to a company's strategy, because of their standard nature they rarely are a source of competitive advantage – since they can, very often, be purchased by a company's competitors. There are, of course, notable exceptions. The twisted copper telephone and coaxial cable wires that link people's houses to the outside world are now highly prized as the on-ramp to the information super

highway (Collis and Montgomery, 1997), or real estate locations adjacent to popular tourist sites are also one kind of asset that may support unusual profits.

- (2) *Intangible assets or resources*. These include such things as organisational cultures, technological knowledge, know-how shared among employees, patented processes and designs, trademarks, and accumulated learning and/or knowledge, as well as experience. These assets or resources, which grow in use and are not consumed in usage (Davenport and Prusak, 1998), often play critical roles in competitive advantage, or disadvantage, and firm value. Even if a company can market its intangible assets effectively, it could not disentangle them from the skills and knowledge of the employees (April and Cradock, 2000) and managerial team (Nelson and Winter, 1982).

Set of complementary resource combinations (CRCs)

A company's set of CRCs (April and Cradock, 2000) results from bundles, or combinations, of certain assets and resources which exhibit complementarity in deployment or application (Barnard, 1938).

Complementarity represents an enhancement of resource value, and arises when a resource produces greater returns in the presence of another resource than it does alone, e.g. an electronic data interchange (EDI) system that only marginally improves performance under ordinary conditions, but produces sustainable advantages when combined with pre-existing supplier trust (Powell and Dent-Micallef, 1997). CRCs are not factor inputs like tangible and intangible assets. They are complex combinations, or configurations, of resources – people, technology, and business processes, with specific and sophisticated networks of inter-relationships, that companies use to transform inputs to outputs. Many of these configurations are a blend of hard tangible ("collect") assets, such as computer systems, infrastructural hardware, software packages, people, training manuals, and soft intangible ("connect") assets, such as how well teams work together and share knowledge, and the relationships between the people in those teams, the internal culture – which simply cannot be recreated by another company. Finely-honed CRCs, a source of competitive advantage, enable a company to

take the same factor inputs as competitors and convert them into products and services, either with greater efficiency and flexibility in the process or with greater quality in the output. While the pool of assets or resources are the source of a company's set of CRCs, CRCs are the main source of its competitive advantage.

Strategic architecture

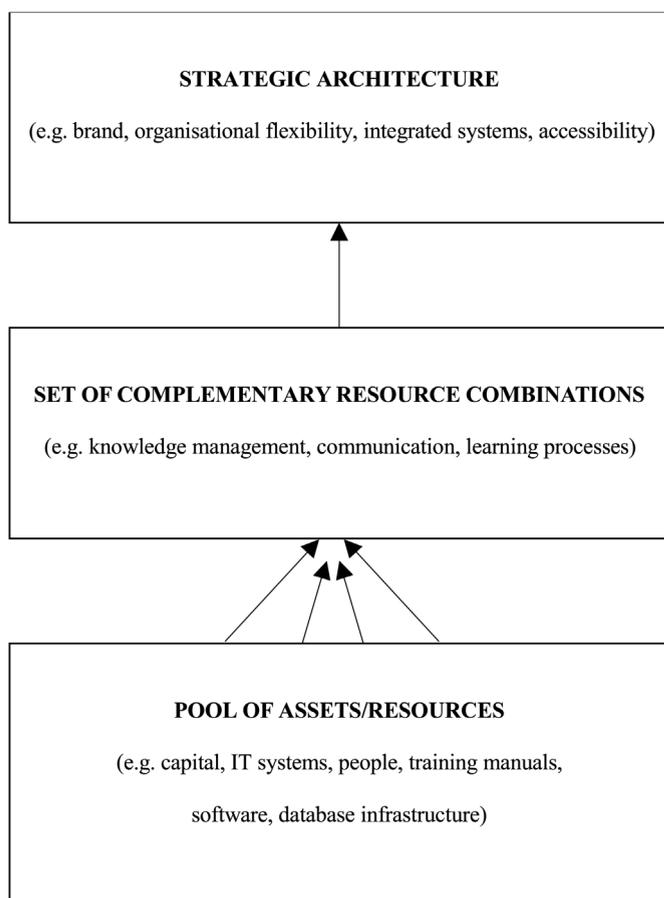
Strategic architecture is defined as the company's capabilities, when applied in the marketplace – external focus. But, not the actual company's perspective of what it thinks the marketplace sees or wants, rather, it is the customer's perspective of the company's capabilities (i.e. internal remuneration and internal culture of the company is of no concern to the actual customer, and therefore does not qualify as part of the strategic architecture). However, these capabilities, depending on their ability to generate returns and depending on how they are deployed in those industries, will be termed "key capabilities" and "core capabilities" – specifically defined here:

- Key capabilities refer to capabilities that are merely necessary for the company to be a player in their market or sector and ensure competitive parity (i.e. "commodity capabilities", "threshold capabilities", "order qualifiers"). These include services to support internal customers (human resources, legal, accounting skills and processes, for example) as well as those skills and systems that are conditions for doing business in the company's industry. Under conditions of competitive parity, though no one company obtains a competitive advantage, companies do increase their probability of economic survival (McKelvey, 1982; Porter, 1980). This is not to say that they cannot make a huge difference in a company's success, depending on how well they are used. However, they are typically not the capabilities that account for the company's real competitive advantage in its chosen field.
- Core capabilities, on the other hand, refer to capabilities that are valuable and profit-producing in the marketplace, and are those capabilities that a company relies on for its competitive advantage (i.e. "differentiators", "critical

capabilities", "order winning capabilities" the capabilities that set the company apart from its competitors). The list of core capabilities includes a set of abilities describing efficiency and effectiveness – faster, more responsive, more flexible, higher quality, and so forth – that can be found in any one of the company's activities, from product development, to marketing, to service, to client company interface capability.

A company's CRCs serve as the bases for developing these key and core capabilities, and once bundles of these CRCs are brought to bear on particular value-added tasks they serve as the bases for a company's competitive advantage today, as well as tomorrow's competitive advantage. Figure 1 shows how a company's pool of assets or resources combine to make a set of CRCs, and it is these CRCs that serve as the bases for competitive advantage when companies compete strategically on core capabilities in the marketplace.

Figure 1 The interlinking of assets or resources, complementary resource combinations, and the strategic architecture of a company



Defining sustainability of advantage

A company is said to have a competitive advantage when, based on its strategic architecture and CRCs, it is able to implement a k-strategy that generates returns and benefits in excess of those of its current competitors – who simultaneously are implementing strategies, similar or otherwise, because of the perceived value in the marketplace. The definition therefore also depends on what the company, its management and its stakeholders define as the required returns and benefits them (because even though many would list them as financial, clearly this does not apply to all companies, or all returns). One could reasonably expect, though, that companies within similar sectors, would define similar variables as the required returns and benefits.

A company is said to have a sustained competitive advantage when it is implementing a value-creating k-strategy, which generates returns and benefits at a level not enjoyed by current competitors and when these other companies are unable to reach an "equilibrium level" with the company enjoying the advantage (inadequate competitive duplication or substitution). Lippman and Rumelt (1982), Rumelt (1984) and Barney (1991) use similar arguments. They all claim that a competitive advantage is sustained only if it continues to exist after efforts to duplicate that advantage have ceased. In this sense, the definition of sustained competitive advantage adopted here does not imply that it will "last forever", and does not depend upon the period of time during which a company enjoys a competitive advantage.

"Empirically, sustained competitive advantage may, on average, last a long period of calendar time (Porter, 1985; Jacobsen, 1988). However, it is not this period of calendar time that defines the existence of a sustained competitive advantage, but the inability of current and potential competitors to duplicate that strategy that makes a competitive advantage sustained" (Barney, 1991, p. 103). By looking at a well-established industry, such as the university situation in the UK, one can further understand these definitions. The fact that other universities in the UK have managed to increase their student intake, get world recognition and publish high quality research

does not necessarily mean that Oxford University has lost its competitive advantage in the university education marketplace. As a result of the perceived value of this institution's capabilities and CRCs in the marketplace, it is still able to extract returns and benefits that are in excess to its competitors, e.g. research funding levels from businesses and government, quality of student intake, quality of faculty that they are able to attract, recruitment of their graduates by sort-after employers, salary possibilities of graduating students, etc. However, the sustainability of the advantage is questioned, and ceases, when other institutions are able to equal ("reach equilibrium") or exceed the level of returns and benefits previously enjoyed by Oxford University, resulting from the perceived value of its capabilities and CRCs in the marketplace.

What is important from an k-strategy perspective is whether there is any evidence to suggest that a company's current capabilities and CRCs, which enable or limit the company's ability to strategise, can cause it to maintain an advantage in the future. Unanticipated changes in the economic structure of an industry – "Schumpeterian Shocks" (Barney, 1991; 1986a; Rumelt and Wensley, 1981; Schumpeter, 1934; 1950) – may nullify or render what was, at one time, a source of sustained competitive advantage mere key capabilities, or weaknesses ("sticky") or simply irrelevant (strategic disadvantage) in the evolving knowledge economy. Continuous innovation and entrepreneurship, which lead to rent or benefit generation, are often sources of these structural revolutions in the market. The literature, as well as Oxford University example, seem to suggest that companies may, in time, have to think about ways to create new CRCs when other companies are able to encroach on its advantageous position – this, clearly, puts the spotlight on the issue of resource complementarity (new combinations), continuous learning, constant reinvention and the issue of sustainability within the company. The difficulty, and hence the reference to managerial and leadership choice earlier, is in deciding which "sticky" or irrelevant pool of assets and CRCs to retain, since some of them may once again, in the future, be sources of sustained competitive advantage.

K-framework: a sustainability chain

RBT suggests that, in a company's search for competitive advantage sustainability, a better start would be to look internally, rather than focus its major, or all its, attention on the external environment. To that end, this body of theory already contributes some promising insight into conditions leading to sustainable competitive advantages (Wernerfelt, 1984; Rumelt, 1984; Barney, 1986a,b,c; Dierickx and Cool, 1989; Conner, 1991; Grant, 1991; Peteraf, 1993; Collis and Montgomery, 1997). Figure 2 sets out the chain of sustainability that exists within the company.

It is argued here that companies need to develop and build their idiosyncratic bases for sustaining competitive advantage through understanding and implementing certain "characteristics" (April and Cradock, 2000).

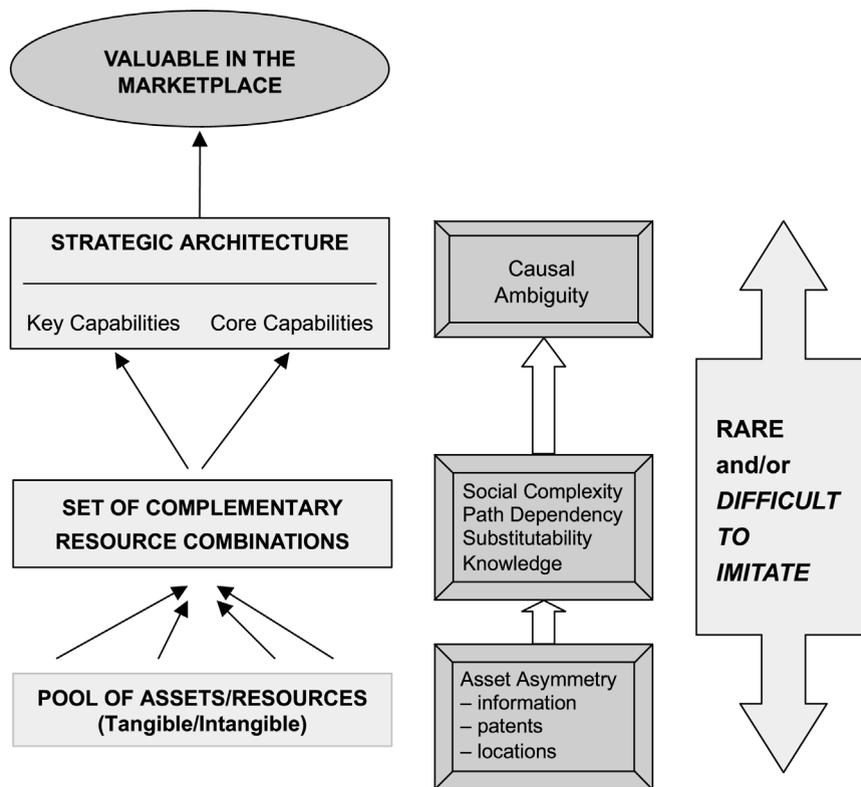
Rare/difficult to imitate

In moving from basic assets or resources, through to CRCs, and eventually to key and core capabilities, the company wants it all to be rare and difficult to imitate. Barney (1991, p. 105) makes the point that "it must be rare among a company's competitors". The rarity depends on the combination of physical rarity in the factor market and/or the rarity of the perceived value in the marketplace. That is, they must not be widely distributed within the company's sector, as well as not be widely distributed in the entire marketplace – since competitors are not necessarily only going to evolve out of the company's sector or industry. They must also be closely identified with a given company, making them difficult to transfer or trade (e.g. a brand image or an exclusive alliance arrangement or partnership). Such immobility, or imperfect mobility, is a key requirement for sustainable advantage. The notions of rarity and difficult imitation must be disseminated throughout a company developing a k-strategy, so that all employees can keep it at the "top of their minds" in all that they do, design, implement, talk and learn about.

Asset asymmetry

Asset asymmetry is when the company may be either "lucky" in acquiring rare assets, or has worked hard to make those assets rare. Examples of the "lucky" assets could be the co-optation of a sole raw material source (the company exclusively owns a raw material that

Figure 2 Chain of sustainability



gives it an advantage, e.g. De Beers and diamonds) and locations (the company owns prime real estate that gives it a competitive advantage, e.g. a hotel that owns land on the waters edge of a beachfront development). Typically, most companies would not own "lucky" assets, and thus it rarely is a source of competitive advantage. Examples of assets that companies have worked hard to make rare include: specific information (the company has private information that is difficult for its competitors to acquire, e.g. Coca-Cola's secret formula), the company has information that it acquired before its competitors (e.g. financial institutions which have, and have used, capabilities for acquiring relevant information on customers such as demographic data, behavioural information, customer likes and dislikes, customer needs, etc., before their competitors), patents or licences (the company owns patents or licences that give it an advantage), etc. Again, most companies rarely own private information like Coca-Cola, often do not own patents, and "first-mover information" typically do not provide sustainable competitive advantage, as competitors, over time, acquire it – they therefore typically only provide short-term competitive advantage. Companies are therefore discouraged from

developing k-strategies to dedicate too many resources and time in seeking competitive advantage from asset asymmetry.

Social complexity, path dependency, substitutability and knowledge

Social complexity is when the source of advantage is known, but the method of replicating the advantage is unclear, e.g. corporate culture (Barney, 1986c; Teece, 1987; Winter, 1987), the interpersonal relations among managers or employees in a company (Marchand, 2000; Hambrick, 1987) or trust between management and employees (April and Cradock, 2000; Amit and Schoemaker, 1993). These CRCs exist in a complex web of social interactions and may even depend critically on particular individuals.

Socially complex resource combinations (SRCs) depend upon large numbers of people or teams engaged in co-ordinated action such that few individuals, if any, have sufficient breadth of knowledge to grasp the overall phenomenon. The necessary work of k-strategists is getting to grips and understanding those SRCs – in order to develop them, nurture them, and grow them. This is also part of the work of the human capital function in a company – human

resource professionals who are internal business consultants to the company, and understand the social complexities of human capital that enable the strategic architecture of the company. These HR professionals are trained in business and do not partake in old style HR administration, payroll and data capture activities. Instead, they add value by analysing the CRCs and SRCs of the company as it relates to the people issues, and play significant roles in developing business k-strategies (at all levels of the company) – they are also therefore, necessarily, part of governance structures, senior management and executive management committees.

Although physical and financial resources may produce a temporary advantage for a company, they often can be readily acquired on factor markets by competitors or new entrants. Conversely, a unique path through history (path dependency) may enable a company to obtain unusual and valuable resources, and idiosyncratic resource combinations, that cannot be easily acquired or imitated by competitors. Time compression diseconomies are when the CRCs and SRCs of the company were developed over a long period of time and cannot be duplicated, and may depend on the history of the use of resources in an extremely complex, path dependent process. Path dependency within a company is contingent upon preceding levels of learning, investment, asset and resource stocks, managerial choice and decision, organisational infrastructure, and development activity.

Barney (1991, p. 107) asserts that "... companies' ability to acquire and exploit some resources depends upon their place in time and space. Once this particular unique time in history passes, companies that do not have space and time dependent resources cannot obtain them, and these resources are imperfectly imitable" (e.g. Oxford University). Competitors cannot just go out and buy these CRCs and SRCs instantaneously – instead, they must be built over time in ways that are difficult to accelerate: through learning, experience, firm specific knowledge, trained proficiency in certain skill sets, team and inter-employee trust, as well as employee-managerial trust. Would be imitators are thwarted by the considerable lag involved, by the continuation of imperfect factor markets, by the difficulty of discovering, repeating and

funding the recreation of specific combinations, and by the developmental process of finding new combinations of resources. The longer lasting CRCs and SRCs are (durability), the more "rungs" it adds to its path dependency and, hence, the more difficult it becomes for competitors to imitate it. In order for CRCs and SRCs to be durable, they must be difficult to substitute. The lesson for companies engaged in knowledge management initiatives is that they put in place CRCs and SRCs in "the time and space given" (half-lives of which are continuously shortening), otherwise they will find it extremely hard, maybe impossible, to obtain them in the near future. What is going to be evident in the marketplace, in the near future, are incumbents which do not have the necessary CRCs and SRCs acquiring small start-ups, merging and creating alliances with companies that do have them, insourcing with partners and vendors, hiving off departments and starting "garage incubators" to develop these resource combinations, and putting the necessary resources (highly competent people, capital, new knowledge management-aligned IT systems, etc.) in place in order to quickly grow these CRCs and SRCs.

Tacit resource combinations are skill-based and people intensive, and many now argue that knowledge, and particularly tacit knowledge, is strategically the most significant resource of the firm (Toffler, 1990; Quinn, 1992; Grant, 1996a,b; 1991; Spender, 1996; Schendel, 1996; Spender and Grant, 1996; Davenport and Prusak, 1998; Marchand, 2000). Tacit knowledge is when the knowledge of the company routines cannot be fully articulated by employees in the competitive company – usually defined as that which cannot be written down or specified, and is embedded in the interactive routines, rituals and behaviours of individuals within their companies. Such CRCs are intangible, based upon learning-by-doing that are accumulated through experience and refined in practice, and often also are immobile and thus bound to the company (Itami, 1987; Polanyi, 1962). Companies thus have to find ways to identify their tacit knowledge, embed the tacit knowledge internally, and grow and nurture that tacit knowledge.

In conjunction, effective leaders need to develop people and knowledge networks

(social capital), as well as technological networks both internally and externally, get knowledge management initiatives off the ground and develop new knowledge configurations. Grant (1996a) has argued that the primary role of the company is the integration and, of course, utilisation of knowledge. Important also for k-strategists to understand are the relationships between CRCs and SRCs with their company's specific absorptive capacity ability (Cohen and Levinthal, 1990) which closely relates to its ability to reconfigure and grow existing knowledge, as well as absorb and use new knowledge. According to Van den Bosch *et al.* (1999), absorptive capacity comprises evaluation, acquisition, integration, and the commercial utilisation of new inside knowledge. Other recent publications (Cohen and Levinthal, 1990, 1994, 1997; Lane and Lubatkin, 1998; Van den Bosch *et al.*, 1999) suggest that absorptive capacity is an important moderating factor for companies in assimilating new knowledge. It may enable or restrict the level and range of "exploration adaptations" and therefore the necessary "dynamic agility" required of companies in the knowledge economy. Companies confronted with changing knowledge environments should aim to constantly reconfigure their component knowledge (Van den Bosch *et al.*, 1999). Component knowledge types are distinguished below:

- knowledge related to internal relationships within the company;
- knowledge related to products and services;
- knowledge related to business processes and business units;
- knowledge related to specific projects and project implementations;
- knowledge related to customers;
- knowledge related to the marketplace.

Component knowledge, consisting of both tacit and explicit knowledge (Nonaka, 1994; Boisot, 1998) can reside within the company itself, within the company's traditional knowledge environment, and within knowledge environments that have yet to be explored – both inside and outside of the company. Outside sources of knowledge are critical to the innovation process in general. According to Van den Bosch *et al.* (1999, p. 52): "reconfiguring existing component

knowledge builds on the distinction made by Henderson and Clarke (1990) between four types of innovations: (1) incremental, (2) modular, (3) architectural, and (4) radical innovation". K-strategists therefore have to make informed decisions as to the type of innovation they are wanting to implement, which has consequences on the sorts of knowledge reconfigurations and new knowledge configurations that would be possible, as well as the future knowledge absorption capability of the company. Five dimensions of knowledge absorption required in the knowledge economy are defined below:

- (1) *Efficiency* of knowledge absorption refers to how companies identify, assimilate, and exploit knowledge from a cost and speed perspective.
- (2) *Effectiveness* of knowledge absorption refers to the use, and correct and relevant application, of component knowledge in adding value to CRCs in enabling the strategic architecture of the company.
- (3) *Scope* of knowledge absorption refers to the breadth of component knowledge a company draws on – both internal and external component knowledge.
- (4) *Flexibility* of knowledge absorption refers to the extent to which a company can access additional, and reconfigure existing, component knowledge.
- (5) *Scalability* of knowledge absorption refers to the extent to which a company can grow and develop relevant component knowledge.

New knowledge is often the product of a company's combinative capabilities to generate new applications from existing knowledge components (Kogut and Zander, 1992). The knowledge reconfiguration and new knowledge configuration consequently serve as platforms for producing adapted and new CRCs – and thus affect the way in which a particular company is able to compete in the knowledge economy. The challenge to create new knowledge configurations within the company implies that the absorption of different types of new component knowledge becomes a critical ability to master for a company's management and leadership. Consequently, according to Van den Bosch *et al.* (1999), the ability of the company to evaluate, assimilate and utilise outside knowledge for commercial ends is of crucial strategic importance.

Causal ambiguity

Casual ambiguity refers to uncertainty regarding the causes of efficiency and effectiveness differences among companies, and a company's competitors are not sure which resource combinations are enabling specific capabilities, that are earning the profits. Barney (1991, pp. 108-9) defines it as follows: "Causal ambiguity exists when the link between the [capabilities] controlled by a company and a company's sustained competitive advantage is not understood or understood only very imperfectly".

Sometimes it is difficult to understand why one company consistently out performs other companies, and this is the challenge for companies – to initially understand, for themselves, what these clusters of CRCs are that are driving and enabling their strategic capabilities to generate profit and, once understood, to build in more casually ambiguous components and then embed that understanding within the business processes and thinking (therefore k-strategy) within the company.

Competitors are thwarted because it is impossible to disentangle either what the valuable CRCs are that serve as bases for a company's core capabilities, or how to recreate it, and imitating companies cannot know the actions they should take in order to duplicate the strategies of companies with sustained competitive advantages. Peteraf (1993) stresses that such uncertainty, coupled with non-recoverable costs, may limit imitative activity – thus preserving the condition of heterogeneity. Collis and Montgomery (1995, p. 120) make the point that "if a [capability] is inimitable, then any profit stream it generates is more likely to be sustainable".

Conclusion

In sum, resource-based approaches point to the characteristics which are likely to be particularly important determinants of the sustainability of competitive advantage for a company in the knowledge economy. This should be the theoretical basis from which a company, wishing to succeed in the future, designs its k-strategy. An important point to remember is that for a company to sustain its advantage, it usually needs to draw on combinations of complementary resources

from any, and every part, of the organisation – it thus extends strategic k-thinking into human resource management and organisational behaviour, financial management, organisational development and infrastructure, IT and e-business, mobile commerce, marketing, R&D and technology development and implementation, and so on.

It will take tough, hard thinking on the part of everyone in twenty-first century companies, about how to craft relevant k-strategies that could lead to competitive advantage sustainability – it is relatively easy to get in the game of knowledge management, it is even relatively easy to create short-term advantages in the game, but the difficult, demanding and challenging bit is ensuring the sustainability of competitive advantage. Finally, what is needed is for companies to critically think through what is their right to be in business!

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