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**The regulated firm - effects of  
regulation on competence  
development and sustainable  
competitive advantage**



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***Abstract***

Sustainable competitive advantage (SCA) is a central tenet in strategic management theory. The effect of regulation on sustaining competitive advantages is widely neglected in literature. The impact on competence development and SCA of the firm can be significant, if regulatory requirements and regulatory prohibitions as types of specific industry regulation are considered. In arguing that resource-based theory can be modeled analogous to complex system theory, the effect of regulation on competence development and SCA is illustrated. In explaining the effect of regulation on competence development and SCA, the paper contributes to close a gap in one of the central assumptions of attaining SCA resource-based theory.

***Keywords***

strategic management, resource-based theory, sustainable competitive advantage, competence development, regulation, open system

# 1 INTRODUCTION

Even though almost every firm is subject to some kind of regulation, strategic management theories have not been accounted for. In the last two decades, resource-based and competence-based theory dominated academic research in strategic management. Much is written about dynamic capabilities, core competences, resource allocation, exploration and exploitation strategies, and the sustainable competitive advantage of the firm (hereinafter referred to as SCA). Tushman & Anderson (1986: 439) state that “organizational outcomes are critically influenced by the context within which they occur” (1986: 439). Hambrick (1983a, 1983b), MacMillan & Day (1982), and Hansen & Wernerfelt (1989) show similar findings.

There is a huge amount of literature on the effects of technology and the dynamics of technological change on firm attributes and competitive advantage. While there has been sustained research on technological (e.g. Child 1972; Duncan 1972; Miles, Snow & Pfeffer 1974; Tushman & Anderson 1986) and market mediated (e.g. Duncan 1972; Yasai-Ardekani 1986) effects, there has been less significant work on the nature of regulatory effects on the firm, and particularly on competence development and attaining SCA. Reger, Duhaime & Stimpert state that “despite the pervasiveness of regulation and the critical role of strategic choice in determining firm performance, the intersection of strategic choice and regulation has been largely ignored” (1992: 189). From this, I derive the central research question - How does regulation affect competence development and SCA of the firm?

It is commonly agreed that the extent of (sustainable) competitive advantage is determined by the value the firm is able to generate and to capture (Nickerson, Silverman & Zenger, 2007: 221; Priem & Butler 2001: 29; Saloner, Shephard & Podolny, 2001: 39). I suppose that regulation can affect firm performance by restricting the generation and the capture of value. The impact of regulation on value capture (via price regulation etc.) is discussed in numerous studies (Makadok & Coff 2002: 10). The findings can easily be transferred to resource-based argumentation. But the fact that “value creation ... is a precondition for value capture“ (Priem 2007: 219) is widely unnoticed in literature. This is even more surprising, because the core of the resource-based argumentation is not on value capture, but on value generation. Firm competences are at the very heart of value generation. Altogether we don't know much about how regulation impacts value generation. In this paper, I focus on the effects of regulation on the value generation process of the firm.

A review of the last 10-20 years of research in organization and strategic management shows that literature has found a lot of answers. Notwithstanding the enormous advances in theory, however, I think that it is time to ask for the effect of regulation on competences and the SCA of the firm. Furthermore, I argue that the resource-based theory of the firm can be modeled analogous to complex system theory. The main objective of this research is to provide a reliable methodological approach and a causally closed reasoning of how regulation affects the SCA from a resource/competence-based perspective. I argue that even though regulation is fairly

neglected in organization theory as well as in strategic management literature, regulation can be the dominating factor in attaining or losing a SCA. Furthermore, in borrowing concepts from complex system theory, I suggest a promising way to operationalize the competence development of the firm. In doing so, I try to shed a new light on things we thought we already understood.

What I suppose is that in some circumstances the existing theoretical explanation of attaining or losing a SCA presented by the resource-based theory lacks in reasoning. By disregarding the regulatory factor, a satisfactory explanation of the phenomenon of SCA cannot be provided in all instances. For example, resource-based theory builds on resource heterogeneity that is substantiated due to imperfect strategic factor markets (Barney 1986). In resource-based theory, the assumption of imperfect or non-existent factor markets is taken for granted. Barney refers to information asymmetries that lead to diverging expectations concerning the future value of resources or simple “firm’s good fortune and luck” (1986: 1232). However, there is no explanation about one of the central assumptions of resource-based theory given. I argue that in creating response uncertainties (Milliken 1987, 1990) for the firm, regulation can be the source of information asymmetries that constitute imperfect factor markets. Consequently, regulation has an impact on resource heterogeneity and competence development.

With a concentration on resource/competence-based and organizational literature, I start with a short review of theoretical and empirical research on SCA and outline shortcomings of existing modeling. Furthermore, I explain basic terms such as competence development and regulation. In the main part of the paper, I present a model of the regulated firm. Finally, I demonstrate how the argumentation might contribute to future research.

## **2 THEORETICAL BACKGROUND**

### **2.1 Research into sustainable competitive advantage**

In 1986, Coyne wrote that SCA has been a central tenet in strategic thinking. Now, about 25 years later this, statement must strongly be supported. The issue of SCA is a central theme in various research approaches within strategic management. SCA is the precondition for appropriating rents from a well-adapted strategic positioning between market forces in the market-based literature (Porter 1980, 1995) that is rooted in the structure-conduct-performance paradigm (Bain 1956, 1968).

**Sustainable competitive advantage in resource-based theory.** The focus on firm-external factors such as the market-based view proposes has been superseded by a shift of

perspective. In the last decade the focus on firm-internal factors has dominated the strategic management literature. Particularly, the resource-based theory has triggered the explanation what constitutes SCA. By opening the 'black-box' of the firm, the resource-based approach has found great support in academic research and has become the predominant research stream in strategic management research today. The basic principles of resource-based logic that includes the traditional resource-based view and the capability-based view are outlined by Barney (1986, 1991); Dierickx & Cool (1989); Grant (1991); Mahoney (1995); Penrose (1952); Prahalad & Hamel (1990); Rumelt (1984); and Wernerfelt (1984). They suggest that the source of gaining and sustaining superior performance is found in the unique bundle of resources possessed or controlled by the firm. Whereas the traditional resource-based view argues that SCA relies on the assumptions of resource heterogeneity and resource immobility that are both substantiated due to inefficient or non-existent strategic factor markets (Barney 1986), the capability-based view suggests the distinctiveness of capabilities (dynamic capabilities, core competences etc.) as the source of SCA (i.a. Grant 1991: 119; Teece, Pisano & Shuen, 1997: 518; Ulrich & Lake 1990: 40). In order to achieve SCA, the firm must ensure that resources meet the well-known VRIN-conditions as sufficient condition. The necessary condition for appropriating sustainable rents is how the resource's value, respectively the processes of value generating and the value capture is shaped by the firm's environment (Combs, Ketchen, Ireland & Webb, 2011: 1099).

**Definitional and measurement problems.** Over the last decades, an increasing number of empirical studies have aimed at SCA (i.a. Fahy 2002; Hall 1993; Weerawardena 2003a, 2003b; Wiggins & Ruefli 2002, 2005). However, these efforts have only been modestly successful. Particularly, the confusion about the research findings can be attributed to definitional and measurement problems which plagues the concern what SCA is and what SCA is not, or in the words of Coyne (1986), it is not enough to know an SCA when you see it. The confusion may perhaps exist because an SCA is not always easy to identify and the meaning of SCA is not superficially self-evident. As Coyne suggests, the dictionary's definitions of the three words can bring forth the heart of the concept. Following this advice, the definition of SCA given by Barney is broadly agreed, as when a firm „is implementing a value creating strategy not simultaneously being implemented by any current or potential competitors *and* when these other firms are unable to duplicate the benefits of this strategy” (1991: 102; italics in the original). Some research ignored the last part of the definition persistently and simply interprets SCA as a competitive advantage that keeps going over time. However, to note that SCA is a concept difficult to operationalize quantitatively gives no rationale to ignore a central definitional part of SCA. The concept of SCA refers to unsuccessful efforts of competitive duplication and not to a period of calendar time (Barney 1991: 103; Barney & Arikan, 2006: 141). In this paper, I follow Barney's definition of SCA (see above) closely. To gain a competitive advantage, the firm's products must enable the creation of superior value to the customers and the strategy used

must resist duplicative efforts of competitors (value generation). Once SCA is attained, the firm receives rents indicated by above-average performance by given appropriation (value capture).

## **2.2 Competence development of the firm**

The set of static, dynamic, and creative capabilities (Collis 1994: 145) shapes the development of core competences (Hamel & Prahalad 1990; Leonard-Barton 1992) of the firm. Core competences appear in processes and products. The technological core is built up upon stocks of component and architectural knowledge (Henderson & Clark 1990). Generally, heterogeneity in productive resources and capabilities is a necessary condition for gaining SCA. A similar condition for attaining SCA is equifinality (i.a. Doty, Glick & Huber 1993; Eisenhardt & Martin 2000; Gresov & Drazin 1997; Hrebiniak & Joyce 1985; Jennings & Seaman 1994; Jennings, Rajaratnam & Barry 2003; Katz & Kahn 1966; Marlin, Ketchen & Lamont 2007; Miles & Snow 1978; Payne 2006; Porter 1980; Snow & Hrebiniak 1980). Dynamic capabilities can generate equal output solutions by using different input bundles of resources and capabilities. To attain SCA equifinality in resource and capability usage must be possible.

Competence development can be competence-enhancing or competence-destroying. Both types of competence development define the technological core of the firm. Tushman & Anderson (1986) show that the firm is permanently exposed to a continuum of competence-enhancing and competence-destroying technological discontinuities. Technological discontinuities can be defined as process or product innovations that shift the technological efficiency frontier within (competence-enhancing) or outside (competence-destroying) the established technological paradigm (Anderson & Tushman 1990: 604, 608; Tushman & Rosenkopf 1992: 318).

**Competence-destroying.** While competence-enhancing innovations are based on and reinforce existing capabilities and core competences, competence-destroying innovations make existing capabilities and core competences obsolete. On the one hand, the devaluation of core competence of the firm by competence-destroying discontinuities results in the loss of SCA and the rent-stream respectively. On the other hand, competence-destroying discontinuities facilitates impulses for new product classes, fundamental product improvements, strategic substitutes, process innovations and process substitutions as well as improved price-performance ratios (Tushman & Anderson 1986: 441p.). Competence-destroying discontinuities enforce the firm to switch to a new technological trajectory and to seek for new product market domains. Existing core competences must be unlearned and with focus on new product development, strategic substitutes or fundamentally changed process capabilities, a new stock of component and architectural knowledge has to be built up by the firm. While competence-destroying discontinuities can make significant contributions to the formation of new technological

paradigms by opening up new possibilities to define a new technological state of the art, the success of technological superiority is not guaranteed per se, but is contingent on external (not firm-controlled) factors.

**Competence-enhancing.** Contrary to competence-destroying discontinuities, competence-enhancing discontinuities build on existing know-how embodied in technologies that are to be replaced within existing product classes (Anderson & Tushman 1990: 609). Competence-enhancing discontinuities do not render existing capabilities obsolete. The technological core of the firm is not disrupted. In case of competence-enhancing process discontinuities, resource efficiency is increased significantly by leveraging existing core competences (Tushman & Anderson 1986: 443). Increased price-performance ratios are based on existing stock of component and architectural knowledge. While competence-enhancing discontinuities extend the scope of established core competences, the existing bundle of productive resources and capabilities is to be preserved accompanied with the well-known risk of becoming rigid (Leonard-Barton 1992: 118). In sum, the dominant design of a product market domain is consolidated across the industry population.

It must be emphasized, that the classification as competence-enhancing or competence-destroying depends only on the existing stock of capabilities and core competences of the firm and is irrespective of the incremental or radical character of the innovation (Gatignon, Tushman, Smith & Anderson 2002: 1107).

### **2.3 Firm-complexity and competence development**

The resource-based theory of the firm can be modeled analogous to complex system theory. Therefore, I consider the firm and its environment to be an open system. The open system perspective is legitimate because the closed system model follows perfect foresight about future events resulting in fully synchronized expectations so that no competitive advantage can be created. Closed systems tolerate no entrepreneurial behavior.

In modelling the resource-based theory of the firm analogous to the complex system theory, the competence development process and the process of establishing fit between firm-complexity and system-complexity can be understood as methodological equivalents. Firm-complexity means problem solution via variation-selection processes by using capabilities and competences to implement strategies, structures, and resources. Hence, in dynamic modelling the underlying process of adjusting firm-complexity corresponds to competence development. Because a static model can only determine the complexity differential induced by firm-specific capability and competence usage, SCA can merely be asserted. Dynamic modelling enables to understand the process of attaining SCA. From the perspective of the complex systems theory competition can be interpreted as rivalry of firms with heterogeneous firm-complexities. To attain SCA, two



conditions must be met. First, entrepreneurial behavior is enabled by heterogeneous ex post interfirm-complexities. Second, the process of minimizing a high ex ante complexity differential must be successful.

Logic dictates that there must be a complexity differential between the firm and its environment: if a boundary exists between an entity and the environment, then the environment has to consist of more elements and relations as the entity itself. Competence development is synonymous with shifting the complexity differential between the firm and its environment by adjusting firm-complexity (Ashby 1957: 207; Luhmann 1987: 49).

In system theory, complexity is measured by the variety of entities and their relations. When complexity is measured by the degree of variety, then novelty can be interpreted as the result of variety (Luhmann 1987: 41). Novelty corresponds to the emergence of variety. In the context of the firm novelty means innovations that are new to the firm. If the firm adapts to a changed complexity differential, then decreased (increased) firm-complexity corresponds to a decreased (increased) variety that can be indicated by novelty parameters as a decreased (increased) innovation rate, a decreased (increased) number of technological innovation directions, and a decreased (increased) innovation intensity.

## 2.4 Regulation

How does regulation influence organizational behavior and performance? I suggest that regulation must be the dominating factor in determining the expected future value of resources or competences and thus heterogeneity that finally allows for gaining SCA. If regulation creates a new competitive environment, then regulation dominates the building of expectations about the future value of resources and thus resource heterogeneity. Ashford (1983: 124) and Pfeffer & Salancik (1978: 203) admit the dominance of the regulatory factor in certain circumstances.

**Definitions of regulation.** Regulation is multidimensional in terms of intent, means, and outcome. In the theory of the firm, regulation constrains the discretionary conduct of the firm by law, enactments, or governmental directives (Picot 2008: 9). Regulation can be defined in a broad or a narrow manner. *Broadly* defined, regulation comprises governmental interventions with relevance to the majority of industries with the purpose of setting framework conditions. An example of a broadly defined regulation can be found in any publicly traded company. The Regulations Fair Disclosure mandates that independent of their industry affiliation all publicly traded companies release material information to investors and the public at the same time. Other broad regulations are intellectual property law, tax law, company law, or contract law. *Narrowly* defined regulation means governmental restrictions of firm conduct designed specifically to an industry. Specific industry regulation can include setting parameters and guidelines for anything

from market entry (concessions, authorization, licensing, production methods), market conduct (pricing, product attributes like quality standards, liabilities), to market outcomes (profits, monopoly control, provision of primary services). While regulations of market entry and market conduct have effect on the value generation of the firm, value capture is affected by regulations of market outcomes.

The broad and narrow definitions of regulation differ significantly in the impact that regulation unfolds on performance. In contrast to broad regulations with relevance to the majority of industries, specific industry regulation has the potential to “profoundly affect the economic environment that these policies may make a difference between profit or loss or between survival and disappearance“ (Pfeffer & Salancik 1978: 216). In this paper, I use a narrow definition of regulation that is synonymous with the definition of control rights in specific industries. Because of our interest in the impact of regulation on value generation, I focus on specific industry regulation with respect to market entry (productions methods) and market conduct (product attributes).

**Modes of regulation and research settings.** Regulation by requirements and by prohibitions exhibits the most pervasive impact on firm’s decision-making about the control of resources and product market domains. *Regulation by requirements* commands a mandatory activity, for instance in determining processes and/or product attributes. *Regulation by prohibition* commands an omission of an activity. These two regulatory modes can exert substantial influence on the value generating processes of the firm.

I focus on three different regulatory settings. In setting 1, the firm is exposed to regulatory requirements with determining provisions on processes and determining provisions on product attributes. This is the scenario with the lowest number of degrees of freedom in decision-making of the firm induced by regulation. If response uncertainty is defined as “lack of knowledge of response options/inability to predict the consequences of a response choice” (Milliken 1987: 137), then regulation creates no response uncertainties for the firm so that expectations about resource values are almost identical in the industry population. In setting 2, the firm is also exposed to regulatory requirements. Setting 2 is characterized by regulatory determined provisions on product attributes, but with non-determining provisions on processes. In setting 3, the firm is exposed to regulatory prohibitions with non-determining provisions on processes and non-determining provisions on product attributes. This is the scenario with the highest number of degrees of freedom in decision-making of the regulated firm. Response uncertainty caused by regulation is fairly high in setting 2 and 3 resulting in information asymmetries leading to different expectations about resource value. At this point, I provide a rationale for the central assumption of resource-based theory given by Barney (1986).

### 3 MODELING THE REGULATED FIRM

From the methodological perspective of complex system theory, the key to explain the SCA of the firm is to account for external and internal factors (Carmeli & Tishler 2004: 302; Fiegenbaum, Hart, & Schendel 1996; Hansen & Wernerfelt 1989; Snow & Hambrick 1980: 527). Duncan defines the environment of the firm as “the totality of physical and social factors that are taken directly into consideration in the decision-making behavior of individuals in the organization” (1972: 314). In a more focused definition, Dill (1958: 410p.) discriminates between the general and the task environment. While the broad definition of regulation belongs to the characterization of the general environment, the narrow definition of regulation specifies the task environment of the firm.

The task environment of the firm can be categorized by objects, attributes, and perceptions (Bourgeois 1980: 33). The objects of the task environment are derived by considering technology, market, and regulation as environmental factors that are outside the boundaries of the firm. Environmental factors exhibit great decision emphasis, but cannot be (fully) controlled by the firm. Particularly, environmental factors are of huge relevance in the process of defining corporate objectives and the achievement of tasks (Dill 1958: 410). Several authors (Bourgeois 1980: 33; Dill 1958: 424; Mahon & Murray 1981: 252; Pfeffer & Salancik 1978: 202p.; Smith & Grimm 1987: 363; Teece et al. 1997: 521p.) agree that regulation is an integral part of the task environment of the firm.

#### 3.1 Regulation of resources and strategies

The argumentation is in line with the resource definition given by Barney that „firm resources include all assets, capabilities, organizational processes, firm attributes, information, knowledge, etc. *controlled* by a firm that enable the firm to conceive of and implement strategies that improve its efficiency and effectiveness“ (1991: 101; italics by the author). Controlling resources is essential for creating economic rents and of particular importance for gaining SCA. Controlling resources by the firm means discretionary decision-making of the firm about the acquisition of productive resources as well as the process of developing idiosyncratic competences, the internal allocation of different resource categories, or the implementation of value generating bundles of productive resources and competences.

Using resources and pursuing strategies are two sides of the same coin. Resources are “the substance of strategy, the very essence of sustainable competitive advantage” (Collis & Montgomery 1998: 27). If a specific industry regulation controls the discretionary usage of resources by the firm in a certain manner, then regulation affects the firm’s strategies concurrently. By affecting the firm’s strategies, regulation has direct impact on the processes that

make competitive advantage sustainable. Hence, regulation affects value generation and value capture of the firm.

To achieve economic efficiency in a non-regulated world, the firm would only control those productive resources and capabilities to pursue firm strategies that are promising in attaining SCA. But in a regulated context, discretionary decision-making of the firm is influenced by externally defined control rights.

### **3.2 Competence development of the regulated firm (resource-based perspective)**

Generally, enhanced or destroyed firm capabilities and competences are the result of technological or regulatory characteristics of the firm environment (Romanelli & Tushman 1986: 616). In a regulated context, the competence development of the firm is affected by regulation (Abernathy & Clark 1985: 18). I argue that regulation can prevent the firm to attain SCA even though a kind of competence development is conducted by the firm.

Regulatory requirements in settings 1 and 2 can foster the tendency to enhance existing competencies or to build up competencies in compliance with the regulation. Different effects on heterogeneity arise if the firm is exposed to setting 1 or to setting 2. The conditions in setting 1 do not allow for equifinality in resource and capability usage. To comply with the regulatory requirements, the task of dynamic capabilities is to create homogeneity in processes and products. The result is a substitutable resource configuration across the industry. The regulatory conditions in setting 1 lead to deterministic strategies and resource bundles - „good for ,more of the same“ (Mahon & Murray 1981: 256). The predictability of the technology argues for the use of highly specific slack resources with a small number of degrees of freedom. The value creation process is based on almost unaltered productive resources and capabilities, so competences are enhanced over time. Setting 1 can be described as *exogenous competence enhancing by homogenous compliance*.

Setting 2 allows for equifinal solutions. Different value creation processes accompany with heterogeneous resource bundles. The firm can pursue idiosyncratic strategies. Gaining advantages from efficiency is possible if the firm follows the previously established technological path and enhances its established competences. Setting 2 is characterized as *exogenous competence enhancing by heterogeneous compliance*.

Regulation by prohibitions contains the potential to destroy competencies. The dynamic competences are not aligned to regulatory determined equifinal solutions. Beyond the prohibition claims, the firm is not constrained in decision-making and can implement heterogeneous bundles of productive resources and capabilities. Just as setting 2, setting 3 requires slack resources with low specificity and a high number of degrees of freedom. Setting 3 can be described as *exogenous competence destroying by heterogeneous compliance*.

### **3.3 Competence development of the regulated firm (complex system perspective)**

From the perspective of complex system theory, regulatory impact in kinds of regulatory requirements or prohibitions can be interpreted as shifting the complexity differential. If regulation by requirements or regulation by prohibitions shifts the complexity differential between the firm and its environment, firm-complexity must be adjusted either way (Ashby 1957; Luhmann 1987). The underlying process of adjusting firm-complexity is competence development. If firm-complexity is not adjusted, the firm cannot attain SCA. But attaining SCA depends not only on the discretionary choice of the firm to adjust firm-complexity respectively competence development. In the following, I argue that regulation can deter the firm to attain SCA even though adjustment of firm-complexity is taken by the firm.

If we consider setting 1, then “firms either adapt, or are selected out“ (Lawless & Finch 1989: 355). Regulation in setting 1 creates no substantial ex ante complexity differential, so no competitive advantage can be generated. There are only minimal degrees of freedom for incremental product and process innovations, resulting in low innovation rates and no differences in innovation directions. Entrepreneurial behavior does not exist, because of homogenous ex post interfirm-complexities.

Slightly higher ex ante complexity differentials exist in setting 2 allowing for competitive advantages. High firm performance requires an increase in firm-complexity: low rates of incremental and radical product innovations but higher rates of incremental and radical process innovations. In comparison with setting 1, a higher number of innovation directions of process novelties are to be expected in setting 2. Therefore, I expect heterogeneous ex post interfirm-complexities.

Setting 3 shows the scenario with the highest ex ante complexity differential. To obtain superior performance, the firm has to increase firm-complexity significantly by much higher rates of radical than incremental product and process innovations as well as wide breadth of innovation directions. As well as in setting 2, setting 3 heterogeneous ex post interfirm-complexities are expected. In sum, the firm-complexity should be low in setting 1, moderate in setting 2, and high in setting 3.

### **3.4 SCA of the regulated firm**

The core of the resource-based model of the firm is the sequential task of (i) resource-picking (Ricardian perspective) as the mechanism to create economic rents through the formulation of expectations about the future value of particular resources, and (ii) capability-building (Schumpeterian perspective) as the mechanism for the creation of economic rents through the internal development of several types of capabilities (Makadok 2001: 388p.). The aim of resource-picking is on selecting potentially rent generating resources, while capability-building seeks for deploying these resources in a more effective way than rivals. Hence, performance

differences between firms are dependent on the control of the bundle of resources and capabilities with different productivity potentials. Therefore, the discretionary control of resources is essential for creating economic rents.

Regulatory conditions in setting 1 enforce that homogeneous resources result in homogeneous strategies. To comply with the regulatory requirements, the task of dynamic capabilities is to create homogeneity in processes and products. The result is a substitutable resource/competence configuration across the industry. Furthermore, setting 1 does not allow for equifinality in resource and capability usage. This suggests that from a pure resource-based perspective, no SCA can be attained in setting 1. Additionally, the conditions for SCA from the systems complexity theory are not met. The incentive to entrepreneurial behavior is restricted because of homogeneous ex post interfirm-complexities. Regulatory conditions do not generate a high ex ante complexity differential that has to be minimized.

Regulation has no direct impact on the composition and use of productive resources and capabilities in the settings 2 and 3. The firm can develop heterogeneous (firm-specific) bundles of resources and capabilities. Non-determined resources and capabilities in settings 2 and 3 allow for heterogeneous strategies. From equifinality follows that regulatory conditions in settings 2 and 3 generate high numbers of degrees of freedom in implementing resources and capabilities. Hence, in these scenarios, gaining SCA is possible. Furthermore, the conditions for attaining SCA from the complex systems theory are also met. Regulation allows for heterogeneous ex post interfirm-complexities, encouraging entrepreneurial behavior. Regulatory conditions in settings 2 and 3 generate significantly high ex ante complexity differentials. A successful (competitive) process of minimizing the complexity differential is possible.

## **SUMMARY**

“Organizational outcomes are critically influenced by the context within which they occur” (Tushman & Anderson 1986: 439). A huge amount of literature in strategic management is dedicated to effects of technology and technological change on competitive advantage and performance outcomes of the firm. The intersection of regulation and strategic decision-making has largely been ignored in strategic management research. Therefore, concentrating on resource-based theory as the predominating approach in strategic management today, the central research question in this paper was formulated as: How does regulation affect the competence development and the SCA of the firm?

Capabilities and core competences are at the very heart of value generation. Competence development can be either competence enhancing or competence destroying. I suggest that the resource-based argumentation can be modeled analogous to complex systems theory. Therefore, competence development (resource-based perspective) and adjusting firm-complexity (complex

system perspective) can be seen as complements. From the resource-based perspective, equifinality and resource heterogeneity are ex ante preconditions to attain SCA. From the perspective of complex systems theory, to attain SCA two conditions must be met. The process of adjusting the ex ante complexity differential must be successful, and entrepreneurial behavior must be enabled by heterogeneous ex post inter-firm complexities.

The most pervasive impact of regulation on firm outcomes is observed, if regulation appears in kinds of regulatory requirements or regulatory prohibitions designed specifically to an industry. Because the core of the resource-based theory is on value generation, I focused on the effects of specific industry regulation on value generation processes of the firm. Regulation can be the dominating factor in determining, if the firm competences are enhanced or destroyed. Three settings describe different modes of regulatory impact on competence development and performance outcome. In setting 1 (exogenous competence enhancing by homogeneous compliance), the conditions for attaining SCA specified by resource-based theory and complex system theory are not met. In setting 2 (exogenous competence enhancing by heterogeneous compliance) and setting 3 (exogenous competence destroying by heterogeneous compliance), the conditions specified by resource-based theory and complex system theory can be fulfilled by the firm.

The modes of regulation presented in this paper can dominate the building of expectations about the future value of resources. In creating substantial response uncertainties for the firm, regulation can be the source of information asymmetries that constitutes imperfect factor markets. Hence, an explanation for the existence of imperfect factor markets can be found. Thus, regulation has an impact on resource heterogeneity as precondition in attaining SCA.

## REFERENCES

- Abernathy, W. J., & Clark, K. B. 1985. Innovation: Mapping the winds of creative destruction. *Research Policy*, 14: 3–22.
- Anderson, P., & Tushman, M. L. 1990. Technological discontinuities and dominant designs: A cyclical model of technological change. *Administrative Science Quarterly*, 35: 604–633.
- Ashby, W. R. 1957. *Introduction to cybernetics*. London: Chapman and Hall.
- Ashford, N., & Heaton, G. R. 1983. Regulation and technological innovation in the chemical industry. *Law and Contemporary Problems*, 46(3): 109–157.
- Bain, J. S. 1968. *Industrial organization*. New York: Wiley.
- Bain, J. S. 1956. *Barriers to new competition. Their character and consequences in manufacturing industries*. Fairfield: Kelley.
- Barney, J. B. 1986. Strategic factor markets: Expectations, luck, and business strategy. *Management Science*, 32: 1231–1241.
- Barney, J. B. 1991. Firm resources and sustained competitive advantage. *Journal of Management*, 17: 99–120.
- Barney, J. B., & Arikan, A. M. 2006. The resource-based view: Origins and implications. In M. A. Hitt, R. E. Freeman, & J. S. Harrison (Eds.), *The Blackwell Handbook of Strategic Management*: 124–188. Oxford: Blackwell Publishing Ltd.
- Bourgeois, L. J. 1980. Strategy and environment: A conceptual integration. *The Academy of Management Review*, 5: 25–39.
- Carmeli, A. , & Tishler, A. 2004. Resources, capabilities, and the performance of industrial firms: A multivariate analysis. *Managerial and Decision Economics*, 25: 299–315.
- Child, J. 1972. Organizational structure, environment and performance: The role of strategic choice. *Sociology*, 6: 1–22.
- Collis, D. J. 1994. Research note: How valuable are organizational capabilities? *Strategic Management Journal*, 15(S1): 143–152.
- Collis, D. J., & Montgomery, C. A. 1998. *Corporate strategy: a resource-based approach*. Boston: McGraw-Hill/Irwin.
- Combs, J. G., Ketchen, D. J., Ireland, R. D., & Webb, J. W. 2011. The role of resource flexibility in leveraging strategic resources. *Journal of Management Studies* 48: 1098–1125.
- Coyne, K. P. 1986. Sustainable competitive advantage - What it is, what it isn't. *Business Horizons*, 29: 54–61.



- Dierickx, I., & Cool, K. 1989. Asset stock accumulation and sustainability of competitive advantage. *Management Science* 35: 1504–1511.
- Dill, W. R. 1958. Environment as an influence on managerial autonomy. *Administrative Science Quarterly*, 2: 409–443.
- Doty, H. D., Glick, W. H., & Huber, G. P. 1993. Fit, equifinality, and organizational effectiveness: A test of two configurational theories. *The Academy of Management Journal*, 36: 1196-1250.
- Duncan, R. B. 1972. Characteristics of organizational environments and perceived environmental uncertainty. *Administrative Science Quarterly*, 17: 313–327.
- Eisenhardt, K. M., & Martin, J. A. 2000. Dynamic capabilities: what are they? *Strategic Management Journal*, 21: 1105–1121.
- Fahy, J. 2002. A resource-based analysis of sustainable competitive advantage in a global environment. *International Business Review*, 11: 57–77.
- Fiengenbaum, A., Hart, S., & Schendel, D. 1996. Strategic reference point theory. *Strategic Management Journal*, 17: 219-235.
- Gatignon, H., Tushman, M. L., Smith, W., & Anderson, P. 2002. A structural approach to assessing innovation: Construct development of innovation locus, type, and characteristics. *Management Science*, 48: 1103–1122.
- Grant, R. M. 1991. The resource-based theory of competitive advantage: Implications for strategy formulation. *California Management Review*, 33(3): 114–135.
- Gresov, C., & Drazin, R. 1997. Equifinality: Functional equivalence in organization design. *The Academy of Management Review*, 22: 403–428.
- Hall, R. 1993. A framework linking intangible resources and capabilities to sustainable competitive advantage. *Strategic Management Journal*, 14: 607–618.
- Hambrick, D. C. 1983a. High profit strategies in mature capital goods industries: A contingency approach. *The Academy of Management Journal*, 26: 687–707.
- Hambrick, D. C. 1983b. Some tests of the effectiveness and functional attributes of Miles and Snow's strategic types. *The Academy of Management Journal*, 26: 5–26.
- Hambrick, D. C., MacMillan, I. C., & Day, D. L. 1982. Strategic attributes and performance in the BCG Matrix - A PIMS-based analysis of industrial product businesses. *The Academy of Management Journal*, 25: 510–531.
- Hamel, G., & Prahalad, C. K. 1990. The core competences of the corporation. *Harvard Business Review*, (May-June): 2–15.
- Hansen, G. S., & Wernerfelt, B. 1989. Determinants of firm performance: The relative importance of economic and organizational factors. *Strategic Management Journal*, 10: 399–411.

- Henderson, R. M., & Clark, K. B. 1990. Architectural innovation: The reconfiguration of existing product technologies and the failure of established firms. *Administrative Science Quarterly*, 35: 9–30.
- Hrebiniak, L. G., & Joyce, W. F. 1985. Organizational adaptation: Strategic choice and environmental determinism. *Administrative Science Quarterly*, 30: 336–349.
- Jennings, D. F., Rajaratnam, D., & Lawrence, F. B. 2003. Strategy-performance relationships in service firms: A test for equifinality. *Journal of Managerial Issues*, 15: 208–220.
- Jennings, D. F., & Seaman, S. L. 1994. High and low levels of organizational adaptation: An empirical analysis of strategy, structure, and performance. *Strategic Management Journal*, 15: 459–475.
- Katz, D., & Kahn, R. L. 1966. *The social psychology of organizations*. New York: Wiley.
- Lawless, M. W., & Finch, L. K. 1989. Choice and determinism: A test of Hrebiniak and Joyce's framework on strategy-environment fit. *Strategic Management Journal*, 10: 351–365.
- Leonard-Barton, D. 1992. Core capabilities and core rigidities: A paradox in managing new product development. *Strategic Management Journal*, 13: 111–125.
- Luhmann, N. 1987. *Soziale Systeme. Grundriss einer allgemeinen Theorie*. Frankfurt/Main: Suhrkamp.
- Mahon, J. F., & Murray, E. A. 1981. Strategic planning for regulated companies. *Strategic Management Journal*, 2: 251–262.
- Mahoney, J. T. 1995. The management of resources and the resource of management. *Sustainable Competitive Advantage*, 33: 91–101.
- Makadok, R. 2001. Toward a synthesis of the resource-based and dynamic-capability views of rent creation. *Strategic Management Journal*, 22: 387–401.
- Makadok, R., & Coff, R. 2002. The theory of value and the value of theory: Breaking new ground versus reinventing the wheel. *The Academy of Management Review*, 27: 10–13.
- Marlin, D., Ketchen, D. J., & Lamont, B. 2007. Equifinality and the strategic groups - Performance relationship. *Journal of Managerial Issues*, 19: 208–232.
- Miles, R. E., & Snow, C. C. 1978. *Organizational strategy, structure, and process*. New York: McGraw-Hill.
- Miles, W. E., Snow, C. C., & Pfeffer, J. 1974. Organization-environment: Concepts and issues. *Industrial Relations*, 13: 244–264.
- Milliken, F. J. 1987. Three types of perceived uncertainty about the environment: State, effect, and response uncertainty. *The Academy of Management Review*, 12: 133–143.
- Milliken, F. J. 1990. Perceiving and interpreting environmental change: An examination of college administrators' interpretation of changing demographics. *The Academy of Management Journal*, 33: 42–63.

- Nickerson, J. A., Silverman, B. S., & Zenger, T. R. 2007. The `problem' of creating and capturing value. *Strategic Organization*, 5: 211–225.
- Payne, T. G. 2006. Examining configurations and firm performance in a suboptimal equifinality context. *Organization Science*, 17: 756–770.
- Penrose, E. T. 1952. *The theory of the growth of the firm*. Oxford: Oxford Univ. Press.
- Pfeffer, J., & Salancik, G. R. 1978. *The external control of organizations. A resource dependence perspective*. Stanford, CA: Stanford Business Books.
- Picot, A. 2008. Theorien der Regulierung und ihre Bedeutung für den Regulierungsprozess. In A. Picot (Ed.), *10 Jahre wettbewerbsorientierte Regulierung von Netzindustrien in Deutschland. Bestandsaufnahme und Perspektiven der Regulierung*: 9-36. München: Beck.
- Porter, M. E. 1980. *Competitive strategy : techniques for analyzing industries and competitors*. New York: Free Press.
- Porter, M. E. 1995. *Competitive advantage. Creating and sustaining superior performance ; with a new introduction*. New York: Free Press.
- Prahalad, C. K., & Hamel, G. 1990. The core competence of the corporation. *Harvard Business Review*, 68(3): 79-91.
- Priem, R. L. 2007. A consumer perspective on value creation. *Academy of Management Review*, 32: 219–235.
- Priem, R. L., & Butler, J. E. 2001. Is the resource-based "view" a useful perspective for strategic management research? *The Academy of Management Review*, 26: 22–40.
- Reger, R. K., Duhaime, I. M., & Stimpert, J. L. 1992. Deregulation, strategic choice, risk and financial performance. *Strategic Management Journal*, 13: 189–204.
- Romanelli, E., & Tushman, M. L. 1986. Inertia, environments, and strategic choice: A quasi-experimental design for comparative-longitudinal research. *Management Science*, 32: 608-621.
- Rumelt, R. P. 1984. Toward a strategic theory of the firm. In R. B. Lamb (Ed.), *Competitive strategic management*: 556–570. Englewood Cliffs, NJ: Prentice-Hall.
- Saloner, G., Shepard, A., & Podolny, J. M. 2001. *Strategic management*. New York: John Wiley.
- Smith, K. G., & Grimm, C. M. 1987. Environmental variation, strategic change and firm performance: A study of railroad deregulation. *Strategic Management Journal*, 8: 363–376.
- Snow, C. C., & Hambrick, D. C. 1980. Measuring organizational strategies: Some theoretical and methodological problems. *The Academy of Management Review*, 5: 527–538.
- Snow, C. C., & Hrebiniak, L. G. 1980. Strategy, distinctive competence, and organizational performance. *Administrative Science Quarterly*, 25: 317–336.

- Teece, D. J., Pisano, G., & Shuen, A. 1997. Dynamic capabilities and strategic management. *Strategic Management Journal*, 18: 509–533.
- Tushman, M. L., & Anderson, Philip 1986. Technological discontinuities and organizational environments. *Administrative Science Quarterly*, 31: 439–465.
- Tushman, M. L., & Rosenkopf, L. 1992. Organizational determinants of technological change: towards a sociology of technological evolution. *Research in Organizational Behavior*, 14: 311–347.
- Ulrich, D., & Lake, D. 1990. *Organizational capability. Competing from the inside out*. New York: Wiley.
- Weerawardena, J. 2003a. Exploring the role of market learning capability in competitive strategy. *European Journal of Marketing*, 37: 407–429.
- Weerawardena, J. 2003b. The role of marketing capability in innovation-based competitive strategy. *Journal of Strategic Marketing*, 11: 15-35.
- Wernerfelt, B. 1984. A resource-based view of the firm. *Strategic Management Journal*, 5: 171-180.
- Wiggins, R. R., & Ruefli, T. W. 2002. Sustained competitive advantage: Temporal dynamics and the incidence and persistence of superior economic performance. *Organization Science*, 13: 81-105.
- Wiggins, R. R., & Ruefli, T. W. 2005. Schumpeter's ghost: Is hypercompetition making the best of times shorter? *Strategic Management Journal*, 26: 887–911.
- Yasai-Ardekani, M. 1986. Structural adaptations to environments. *The Academy of Management Review*, 11: 9–21.



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