
# *Dynamics of competition and strategy*

Course Title: Strategic management of technology
Course Number: ETM 526
Instructor: Dr. Charles Weber
Term: Spring
Year: 2017
Author(s): Mohammadsaleh Saadatmand

ETM OFFICE USE ONLY
Report No.:
Type: Student Project
Note:

**Abstract**

This research covers and reviews the comprehensive literature in the models and frameworks of competition and strategy. Strategic management research is shaped around a core question that why some firms are more profitable than others; Several major lines of work have emerged in the strategic management field since its infancy. These include industrial organization, the resource-based view and dynamic capabilities. Also, Competition per se has been the focus of scholars of industrial economics and structural analysis, strategic groups and configurations, game theory, and competitive dynamics. In this research, I represent and summarize different perspectives of scholars in framing competition and strategy that is related to theory of the firm and differential firm performance; also, I show that there is a trend from static to dynamic frameworks of strategy and competition which have tried to find an answer to differential firm performance. Finally, I conclude by addressing the potential for utilizing new dynamic and systemic perspectives in relation to theorizing our ideas.

**Keywords:** competition, firm, strategy, dynamics, complexity

## Introduction

The question "why do some firms persistently outperform others" for a long time has been of great importance for researchers, investors, regulators, and managers. Hence, the field of strategic management is organized around this central question. This question does not assume that there will always be persistent performance differences between firms. Rather, it supposes that in some situations persistent performance differences will arise between firms and those differences cannot be explained by traditional economic models of the firm performance. According to these traditional models these differences should be unusual and if they exist, are most likely the result of anti-competitive collusive or monopolistic activities. Also, although economic theory predicts that differences among rival firms will be eliminated over time by competition, empirical evidence in strategic management research has shown this is not to be the case. So, some frameworks and models from different views have been proposed over time by researchers for describing competition and such performance differences.

First models of competition based on industrial organization (IO) economics were neo-classic models in a range from monopoly to perfect competition. Rooted in industrial organization (IO) economics and based on Mason-Bain approach, structure-conduct-performance (SCP) was proposed. SCP model argues that a highly concentrated market structure, dominated by a few large firms, will give rise to little rivalry and excessive prices and profits. On the other hand, a structure consisting of many small firms will produce a high degree of rivalry and low prices and profits. The S-C-P model focuses on factors driving intensity of rivalry; as such, this perspective has been very useful in understanding competition and competitive strategy.

The IO perspective and research tradition provide direct insights to how firms can obtain competitive advantage (in terms of IO, market power) through positioning in the industry structure and therefore pursuing strategies appropriate to that structure. However, the IO literature has limitations in producing a comprehensive theory of competitive advantage and differential firm performance. That theory is in the form of a mathematical model with an equilibrium solution which is an important limitation. Also the IO literature focused on industry as a unit of analysis and has suffered from a lack of attention to internal organizational factors and a general failure to measure conduct directly in empirical studies.

Whereas IO studies of the relationships between industry structure, conduct, and performance were intended to help develop public policies that promote competition, Michael Porter by taking a different point of reference pioneered the application of IO concepts to strategy formulation. More specifically, he viewed the SCP paradigm as giving managers a systematic model for assessing competition and developing profit-maximizing strategies. So he proposed a well-known Five – Forces model for finding attractive industries and the ways of positioning in those industries for gaining superior performance. Indeed, he tried to answer two questions: where to compete? and how to compete? By disaggregating business-unit profits into components capturing industry effects, corporate effects and market share effects, Porter following Schmalensee (1985) contend the importance of industry effects on firm performance. But, by extending Schmalensee ‘s approach, Rumelt (1991), McGahan and Porter (1997), and McGahan (1999) show that business effects were approximately twice as important for performance as industry effects. These results stimulated research interest in the slightly refined

question: “Why do firms in the same industry perform differently?” In answering to this question several frameworks and theories have been proposed. One problem with Porter’s model and IO economics in general, is that it tends to view industries as in equilibrium and competitive advantage as sustainable. However, in today’s fast-paced world, resting on the achievements of yesterday’s actions, even if they were successful, is sure to result in failure tomorrow. Today’s environment requires a dynamic action orientation, with constant updating and reassessment of position and strategy.

From internal point of view, the dominant framework in the strategy literature to address the question has been resource-based view (RBV) of the firm. According to RBV, firms in the same industry perform differently because, even in equilibrium, firms differ in terms of resources and capabilities they control (Amit and Schoemaker, 1993; Barney, 1986; Dierickx and Cool, 1989; Penrose and Pitelis, 2009; Peteraf, 1993; Wernerfelt, 1984). These frameworks have one feature in common that is not suitable for fast changing environment of today; they are all static and linear in nature. Hence, scholars started to propose more dynamic models and frameworks for strategy, competition and resulting differential firm performance. Strategy scholars have begun to acknowledge explicitly the importance of dynamic processes, including the acquisition, development, and maintenance of differential bundles of resources and capabilities over time (e.g., Dierickx and Cool, 1989; Galunic and Eisenhardt, 2001; Henderson and Cockburn, 1994; Iansiti and Clark, 1994; Kogut and Zander, 1992; Szulanski, 1996; Zander and Kogut, 1995). This perspective called dynamics capabilities is an extension of the RBV of the firm. One of the criticisms of the traditional resource-based view is that it largely ignores the external environment. Dynamic capabilities attempt to resolve this shortcoming:

Teece et al. (1997) define dynamic capabilities as “the firm’s ability to integrate, build, and reconfigure internal and external competencies to address rapidly changing environments”. This definition brings into play both the resource-based view and the notion of rapidly changing environments.

Competitive dynamics that its roots go back to Austrian economics is another research stream which considered competition to be a dynamic market process rather than a static market condition. The focus is on the process by which a market moves toward and away from equilibrium; it is this movement, not the equilibrium per se, that was taken to be of interest. Competitive dynamics is the study of inter firm rivalry based on specific micro competitive actions and reactions, their strategic and organizational contexts, and their drivers and consequences. Firms act and rivals respond, and these actions and reactions determine survival and long-term performance. In contrast to Porter’s approach that unit of analysis is industry level this stream of research has focused on micro and real competitive actions and reactions among competing firms.

One more dynamic approach to dynamic competition has been evolutionary economics. Nelson and Winter (1982) studied strategy, performance, and survival of companies over time using a variant of Darwin’s natural selection theory. In the short-term, firms may pursue objectives other than profit maximization, such as ‘‘satisficing’’ or striving for profits to be achieved above some acceptable level. However, any firm veering too far will be weeded out of the marketplace eventually. Firms are cognizant of this harsh natural selection process and tend to learn over time how better to adapt.

Overall, Strategy researchers are eager for dynamic theories that explain the evolution of performance differences among firms. Building and testing theories that explain

longitudinal patterns of performance differences among firms would be an enormous step forward where main stream strategy approaches have struggled. As Porter stated below: "while there has been considerable progress in developing frameworks that explain differing competitive success at any given point in time, our understanding of the dynamic processes by which firms perceive and ultimately attain superior market positions is far less developed" (Porter, 1991, p. 1). Other scholars have pointed to the same problem as well. "The challenge of fully incorporating dynamics into how we think about strategy is a major one, perhaps the biggest one that the field faces going forward" (Ghemawat and Cassiman, 2007, p. 535).

In this research by doing literature review I intend to show that models of competition in answering to differential firm performance in the field of strategic management have moved from static to more dynamic. From early days of research in strategic management it's been a multidisciplinary field which has been borrowing heavily from economics, psychology, sociology, political science, evolutionary biology, systems science. But main contribution originated from economics. In this paper economics approaches as the main contributor is adopted as well. I would find how each individual study has examined completion and strategy. Also, I would represent what the existing studies have in common, what the studies disagree about. I argue that, because of the integrative and multidisciplinary nature of strategy, it is imperative for researchers to adopt multiple frameworks represented by different theories for the advancement of the field.

**Two classic competition models: Cournot and Bertrand**

In 1838, Cournot proposed a model for competitive industries in which firms make decisions by acting rationally, trying to maximize profits, and strategically, taking into

account its competitors' decisions at the time of making their own. In such model, economists assume that Industries are such that, due to entry barriers, there is little scope for new entrants to undermine the competitive structure of the industry. Therefore, by setting their output to maximize profits, the market will determine prices higher than the perfectly competitive equilibrium price, and under this condition firms will benefit in a sustained manner. Fifty years later Joseph Bertrand reviewed Cournot's work and proposed an extension to Cournot's model where, instead of firms setting the quantities, they adjust the price of the goods produced. Bertrand pointed out that there was a shortcoming in Cournot's argument: even though the solution holds in equilibrium, if one of the producers were to reduce their price by an infinitesimal amount, that producer would attract all buyers, which would then mean that the competitor would have to reduce their price to below the competitor's price, and so on leading to a 'price spiral' until the firms would be charging the cost of production. It is interesting that even though the Bertrand and Cournot competition models have very similar assumptions, they produce vastly different outcomes: in the Cournot model, firms make profits, whereas in the Bertrand model, firms do not.

**Theories of the firm**

Economic thought has had a profound influence on thinking in the field of strategy. In particular, theories of the firm provide a perspective for thinking about organizational objectives and a framework for analyzing important firm and competition research problems. The main question regarding firms in the theory of the firm is that if markets are the efficient forms of exchange "why firms exist?" and also "what are their boundaries and scope?" Here, I demonstrate the assumptions underlying of several

economic theories of the firm for tracing the background in competition and strategy research.

**Neo-classical perfect competition**

In this view firm exist to combine resources to produce a product; Firm is assumed like a black box with some inputs which its output is a joint product of multiple inputs. In this neo-classical model two main inputs are labor and capital. Perfect competition generally assumes that optimum input can be confirmed, all parties in competition have complete information and resources are completely mobile and divisible. In this model since firms assumed to be identical, objective of each individual firm in maximizing profit yields the whole market to equilibrium and thus zero economic returns for each firm.

**Mason/Bain IO**

At the heart of this view is this assumption that firm exists to hinder output through the monopoly power or collusive behavior with other firms. firms want to restrain output so that market price goes up and therefore successful firm will make profit from the difference between this artificially high market price and its costs. From the economic point of view, these above-normal returns reflect the nefarious firm behavior that occurs at the expense of consumers.

In this approach major focus has been empirical testing of "structure-conduct-performance" hypothesis articulated by Bain (1950, 1951, 1954). In this hypothesis industry structure determines firm conduct (strategy) which in turn determines economic performance. because firm conduct is supposed to be determined by industry structure, it is often neglected and the association between structure and performance has been examined.

In this view motivation for expansion is increasing monopolization, or alternatively, preventing another firm from gaining monopoly control. Bain idea was that the notion of "perfect competition" sets the standard for traditional industrial organization and provides the foundation for the premise that firms earn above-normal returns primarily by exercising monopoly power (Bain, 1951).

But, a big departure from perfect competition view is that this view encompasses richer concept of firm heterogeneity; although perfect competition predicts that there is no persistent performance differentials when the market is in equilibrium, Mason/Bain IO holds an opposite approach. Assumption is that persistent above-normal profits are based upon long-lasting although limited types of heterogeneity between firms; based on different studies these heterogeneities come in the forms of dominance in firm size, market share and collusion in and between industries.

**Chicago tradition**

The implicit theory of the firm in this tradition is that firms exist to enhance efficiency in production and distribution. From theory of the firm's point of view in Chicago approach, when firms act together as a monopolist in an industry their combined profits are maximized. However, Stigler (1964) figures out that an effective collusion requires costly control and enforcement, given that each party has an incentive to chisel on the agreement. Because of these high costs Chicago school of thought holds that effective collusion is not likely to persist. So observed large size and above-normal returns is due to the firm's efficiency differential in production and distribution in comparison to competitors. Chicago perspective applies main concepts of neo-classical price theory – in particular profit maximizing and competition – while neglecting other central

assumptions of perfect competition. One paramount role in this perspective is the entry of new competitors in imposing an imperative efficiency on incumbent firms and on determining long-run earnings potential. Although this view holds that efficiency based profits "need not be eliminated soon by competition" (Demsetz, 1973), in the long-term imitative entry will drive the firm's profits to zero.

**Coase/Williamson transaction cost theory**

Ronald Coase was the pioneer in this view who notes firms and market are alternative methods for coordinating production. Hence, question to be answered in realizing the existence of firms is the basis for choosing between alternatives. The core of Coase's (1937) analysis is that operation of market cost something and by forming an organization and allowing some authority (an entrepreneur) to direct the resources, certain costs are saved. In this view what is particular important is the cost of negotiating contracts for inputs. Thus, firms exist to economize on the costs of conducting the same exchange between contractors.

One framework in this approach called "market failures" framework (Williamson 1989) which is based on Coase's work challenges the traditional assumptions of the theory of the firm. From this perspective, the form of organization that develops in an exchange situation depends on the efficiency of that form for completing necessary transactions. This framework assumes decision-makers are opportunistic with bounded rationality. The fundamental characteristics of transactions between firms and consumers which impact how exchange process will be conducted are "asset specificity, uncertainty, and frequency" (Williamson, 1981, 1985). The most critical factor of these is asset specificity because, investment in assets which are specific in a transaction make a commitment for

both parties of transaction for some period of time. When the productive assets are non-specific, a market contracting process is efficient. Thus this framework provides good insights about issues of firm existence and boundaries. Overall, this view considers the firm as a governance structure which is crafted to economize on transactions costs. Economies of scope (Teece, 1980) work and the role of asset specificity in producing benefits from technological innovation (Teece, 1986) are important examples of how combination of this view with strategic management can extend knowledge in both fields.

**Behavioral theory of the firm**

This view in analyzing firms rejects assumption of rationality of "economic man". The main focus of behavioral theory of the firm is to predict price, output and resource allocation decisions but with an explicit emphasis on the actual process of organizational decision making (Cyert and March, 1992). One of the critics of traditional microeconomics view is Simon (1957) who mentions the goal of an organization is not profit maximizing but 'satisfying' level of profits. He viewed organizations as a system of individuals with multiple goals who operate in a defined structure. Simultaneously, managerial decision making is limited because they cannot build comprehensive models of the world and also their information processing is limited: hence optimum (maximizing profit) is impossible since managers are characterized by "bounded rationality" when the encounter "uncertainty" and thus "behavioral rules" replace optimization.

Overall, the essential difference between behavioral theory of the firm and more orthodox theories lies in the treatment of rationality and uncertainty. In the determination of prices,

outputs and resource allocation, the decision making process is adaptively rational, with multiple objective and organizational learning.

**Industrial organization (IO) perspective**

The traditional industrial organization paradigm is one of the foundations in strategy thinking and research. Let's take a look at earliest strategy frameworks and find their connections with IO. One of the earliest proposed frameworks in strategy field is: Learned, Christensen, Andrews, and Guth (LCAG) framework that has become the foundation of business policy (Andrews, 1971). This framework defined strategy as a means of how a firm attempts to compete in its environment with considering important choices of different internal and external aspects of business. It also took into account macro factors such political and social factors. Indeed LCAG suggested general and logical tests in determining firm's policies. In this framework successful firm was one that created and found a position in its industry where took into account internal and external factors. Since early business strategy literature subsequent to LCAG was largely translated basic paradigms of LCAG and extensions into sequence of general analytical steps. (e.g., Ansoff, 1965)

The essence of IO and subsequently proposed frameworks based on this paradigm (e.g. Bain/Mason) is that a firm's performance in the market depends critically on the structural characteristics of the industry environment in which it competes. It means, industry structure determine the behavior/conduct (strategy) of firms and the collective conduct then determine the collective performance of the firms in the industry (Bain, 1968). In the view of economist have dimensions such as allocation efficiency, technical efficiency, and innovativeness. Since structure is the prior cause of conduct and conduct

itself is cause of performance, in this chain conduct could be neglected and consider directly industry structure in trying to explain performance.

An important branch in IO research is oligopoly theory; it's the study of the consequence of competitive interactions in market where firm's actions affect its competitors (Scherer, 1970). This theory wanted to make clear the link between structure and inter-firm rivalry and provide difficulty determinants firms were facing in the market competition. It filled the gap of bipolar cases of pure competition and pure monopoly in the economist's view. Also, one influential framework for analysis of competitive interactions was born, "game theory" (Schelling, 1960; Van Neumann & Morgenstern, 1953). Game theory took its place in IO as a part of oligopoly theory. Although these theories were so important in the strategy research and suggest systematic frameworks for assessing competition in an industry, but they essentially attempt to focus on just one aspect of LCAG framework: external factors (opportunities and threats).

IO economic paradigm has had highest impact in forming foundations of strategy thinking and research but strategy practitioners have been skeptical of IO. Porter (1981) outlines some of the most important ones: Frames of reference are different between practitioners and IO perspective; former is interested in the issues of an individual and unique company, latter focus on industry as a unit of analysis. Some research also explained that even in an industry firms perform differently. IO assumption was that all firms in an industry are identical. Hence, IO was not able to provide answer for differential firm performance in the same industry. In addition, IO perspective was static. Although static model is useful in analysis of competition, most fundamental strategic problems for firms in competition are not solely structure but structural changes (such as

dynamics of concentration, entry barriers and so on). The main unanswered question in IO (Bain/Mason) perspective was "what's the path to such structure and what a strategist can do about changes in this structure?" Moreover, traditional IO considered industry structure as the sole determinant of firms conduct and performance. Thus firms are under the shadow of their industry structures and there is no room for change and innovation. But practical strategists on the other hand, know that firms can change the structure of their industries through their actions. It was evident in the real world that there are often game changers that change the rules of industries. Furthermore, oligopoly theories were abstract and most of the concepts were based on abstract experimental situations and not actual industries. All in all, these reasons and some others made business strategists uncomfortable about embracing IO.

**Austrian school of thought**

Although traditional industrial organization economics has been one of the cornerstones of strategic thinking and research, many of its assumptions have come under widespread criticism. Some scholars have questioned the utility of IO concepts because of an inadequate theoretical foundation. IO largely neglects change, uncertainty, and disequilibrium in the dynamic world of business. But there was another school of thought in economics that these characteristics were fundamental building blocks of it: "Austrian economics". In this school emphasis is on "the dynamics market process" and "entrepreneurial discovery" which are critical concepts for strategy research.

The concept of "the market process" tends to distinguish Austrian school. Unlike neo-classical theory that concentrates on equilibrium with the static snapshot of the nature of competition, Austrian economists view markets as processes of discovery that mobilize

dissipated information. They assume that earned profits of firms are through the entrepreneurial discovery. Austrians argue that for economy to be in equilibrium, innovations must be discontinuous (i.e. appearing only in discrete clusters). They view innovation as a continuous process. Therefore, the market is never in equilibrium. Market imperfections or inefficiencies allow a market to be out-of-equilibrium and are responsible for profit opportunities. In this sense, the entrepreneur acts as an arbitrager. The entrepreneur sees an opportunity between what the resource market has to offer and what customers will be willing to pay. By exploiting this market imperfection, the entrepreneur receives the economic profits from the arbitrage.

Indeed, their main focus is on entrepreneur motivated by the desire for above-normal returns, as a motive for promoting discovery and catching opportunities in a constantly changing (disequilibrium) market. So, because competitors quickly imitate known strategies to generate above-normal returns till their return premium is vanished, these above-normal returns achieved by discovery are just temporary. This means that empirical modeling of business performance to find strategies (business laws and regularities) that firms can execute to achieve abnormal profits will be largely unsuccessful. Thus, because the returns to a given strategy dissipate, firms must adapt and respond to changing conditions. As such, flexibility becomes a critical strategic factor.

Indeed, business success is based on time and firm specific unobservable factors. This school sees profits not as the consequence of monopoly power but rather as the result and incentive for discovery and innovation. Under this perspective, the goal of strategy formulation is not on limiting competitive forces but rather on the entrepreneurial

discovery. Gluck, Kaufman, and Walleck (1980) maintained that the essence of strategy is avoiding competition through an indirect approach.

Schumpeter (1934, 1942) discussed the critical roles of entrepreneur and innovation in business success. He contended that economic development occurs when firms implement new products. Production processes, and organizational techniques. In his view, the entrepreneur disrupts the market and moves it away from its equilibrium. Innovations come into the market and innovator out-competes rivals and earns profits. These abnormal profits provide the incentive but are short-lived. As innovations are imitated, economic profits dissipate and eventually vanish. Market returns to equilibrium until another innovation take place. This process is called “creative destruction”. The profits achieved by innovation give the firm a time window to pursue new innovations. Thus, the forces of dynamic competition destroy any firm that merely attempt to maintain status quo. The Schumpeter’s notion that sometimes market is in equilibrium separates him from Austrian mainstream.

**Evolutionary economics**

Evolutionary approaches have had a long history in economics, but they have never shaped a formal position in the mainstream of economics. In part, this has been due to the diversity of evolutionary views in theorizing in range of individuals to aggregates. It is also a issue of what it means to say that a theory is "evolutionary" in the first place: is it make sense the use of analogies to central concepts from evolutionary biology, or is it something altogether different? And if so, what is the status of such analogies (Penrose & Pitelis, 2009)?

On a general level, the type of evolutionary theory that applies to the field of strategy provides analogies to the biological concepts of variation, heredity and selection. It tries to give a real-time entity of social and economic phenomena in terms of processes of change. Indeed, process is a crucial element of the evolutionary approach. Within this evolutionary view, firms have primarily been conceptualized as possessing path-dependent knowledge bases (routines). The notion of routines provides a rationale for the relative rigidity that is necessary for the successful application of selection arguments. There has been little interest per se in the strategies that individual firms articulate on the basis of these knowledge bases.

Nelson and Winter (1982) criticized IO because of its lack of attention to dynamic environment brought about by technological change. The profits from successful innovation are disequilibrium phenomena that come from lead times over competition. The equilibrium analysis of IO does not depict anything about innovation and entrepreneurship. Nelson (1976) contended that if change, uncertainty, disequilibria, and institutional complexity are important issues of what is going on, then implications derived from the traditional theory must be viewed by suspicious.

But in economic terms, the Nelson and Winter theory is primarily, like its neoclassical counterpart, a theory of industries, with less emphasis on the firm, due primarily to the importance it places on the selection environment. Indeed, evolutionary theory in the management context until recently has dealt with understanding the evolution of industries (Hannan and Freeman 1977).

In addition, there is a lack of attention in evolutionary view to firm behavior which is the suitable level that analogies to heredity should be found. Concepts like adaptation,

learning, search and path-dependence are mainly relate to the level of the firm. Some number of attempts has been made to utilize evolutionary perspective to firm-level analysis. Some of these are depicted in the increase in publications regarding firm-level technology strategy from evolutionary perspective. The increasing interest that Williamson's version of transaction cost theory has generated among evolutionary theorists is further evidence. Finally, one should mention Richard Nelson's (1991) in which the perspective has become more firm-oriented. The fact that industry-perspective remains dominant in the realm of evolutionary view is due to the narrow description of the firm and its resources.

**Five forces framework and strategic groups**

After reviewing different types of economic formal frameworks and models related to competition and strategy, I focus now on more recently developed frameworks of competition and strategy. One of the most influential contributions to the field of strategy and competitiveness was the work of Porter (1979, 1980). In Porter's seminal work which its roots go back to industrial organization and in particular, Structure-Conduct-Product paradigm (Bain, 1956), the main task of a strategist is to find the answer for two questions: where to compete (which industry)? How to compete? (defendable position in that industry). Indeed, Porter used IO concepts but from the frame of reference of strategist. Although in IO the purpose of economists was how to grow competition, Porter reversed the point of view of that purpose and proposed a model under which how managers and firms could limit competition for higher returns. His Five Forces model asserts that there are five determinants that ascertain the attractiveness of an industry. The Five Forces are as follows: the bargaining power of the firms supplying the industry; the

bargaining power of buyers; the threat of new firms potentially entering the market; the threat of substitute products; and the intensity of competitive rivalry.

In Porter's view, strategy means "positioning". Firms need to develop their strategies through a mixture of competitive dimensions, such as branding, pricing policy, higher product quality, better logistics, etc. these are enablers through which firms could gain an achievable and defendable position in an industry. This position enables the firm to gain above-average profits in the industry. Indeed, the meaning of strategy in this view is finding a defendable position that protects the firm's competitive advantage from actions of five forces that shape competition in the industry. Perhaps due to the influential effect of Porte's work in 1980s, the basis of economics within strategy field has appeared to be unquestioned.

In spite of strong features of this model, it has also been criticized because of its static nature. Hamel and Prahalad (1989: 64) described this analysis as: a snapshot of a moving car. By itself, the photograph yields little information about the car's speed or direction – whether the driver is out for a quiet Sunday drive or warming up for the Grand Prix.

In addition, Porter (1980: 131) introduced the concept of strategic groups that followed the works of Hunt further developed by McGee and Thomas (1986). In this concept firms that were in seemingly oligopolistic markets could be grouped into classifications. These firms remarkably follow similar strategies. Porter looked to the IO literature to provide explanation for this grouping of firms. In strategic groups framework firm are depicted on two dimensional axes by their strategic attributes. One limitation of the strategic groups framework is that it considers the positioning of firms within this strategy space at one moment in time, and does not take into account the dynamics of the changes of position

over time, changes that can be as a result of the reactions of one firm's positioning affecting the subsequent positions of firms over time.

**Game theory and co-opetition**

The concept of rational decision makers who can make decisions that maximize their utility is the basis of game theory. Game theory is about understanding reactions of competitors to your actions. If we think from the competitor's point of view we are able to make decisions that are better than when we think in isolation as a stand-alone player. The application of game theory in strategy and management has been widespread (Ghemawat, 1995) whereby more than one player interacts with other players by playing certain strategies; outcomes of plays are depicted in "payoff" matrices. The crucial aspect of game theory is that your payoff depends on the strategies of your competitors. There are central assumptions in game theory: the competitor will behave rationally and will try to win; the competitor is independent in relationship to other competitors; competitors are aware of the interdependencies and the actions that competitors could do. To benefit from game theory, strategists need to put themselves in the position of their competitors; they need to take an informed view on the likely competitor actions, and choose the best course of action.

Also, Brandenburger and Nalebuff (1997) applied the concept of game theory to business under the name of 'Co-opetition'. They simultaneously considered competitors in an industry competitor and cooperator. They assert that if firm are seen of this view this may benefit all firms in the industry.

Game theory created high expectations in the field of strategy as an analytical tool for analyzing the dynamics of interaction between firms. But, this early promise has not been

entirely come into reality with strategy work. There are several reasons for this issue. First, in order to make game theory models relevant, the firms under consideration should be the same size. Second, there are only a limited number of strategies that firms can play. Third, the focus is on the equilibrium outcome, although contemporary game theory research on repeated games addresses this problem (Mailath and Samuelson 2006). However, these recent developments largely have been in economics world and not strategy field. In Porter's paper 'Towards a Dynamic Theory of Strategy' (1991: 106), he mentions that although game theory may be seen as dynamic, in that there is a sequence of actions made by firms, this is not a dynamic theory: 'by concentrating sequentially on small numbers of variables, the models fail to capture the simultaneous choices over many variables that characterize most industries. The models force homogeneity of strategies. Yet it is the trade-offs and interactions involved in configuring the entire set of activities in the value chain that define distinct competitive positions. Finally the models hold fixed many variables that we know are changing.'

Moreover, most of game theory models rest on the assumption that the players are perfectly rational: it means the predictability of competitor's actions and thus playing optimal strategies. In addition, much of the research in game theory is used to determine Nash equilibrium: where no one player has an incentive to deviate from their equilibrium strategy. However, it should be asked whether such assumptions can provide a suitable methodology for analyzing problems in the real world of business or for the competitive system which often is not in equilibrium.

**Limitations of classical economic-based approach**

The formalization of economic models is actually based on explicit nature of model that brings a certain amount of rigor to the formulation process. However, there are important limitations when economic view is used, particularly in the way that equilibrium is an assumption of this framework. Also, when firms in an industry are supposed to be homogenous and the emphasis is on stasis. These limitations are significant in using this framework in strategic management.

It's crystal clear that most industries are not in an idealized form of equilibrium and the notion of how to deal with "turbulent" and maybe "hyper-competitive" environments is an active area of research.

Economic models introduced earlier essentially assume equilibrium outcomes. This thought that competitors finally will settle down into an stasis can only be applicable in an idealized competition where there is nothing more than pushing and knocking out competing firm out of equilibrium. One of the core tenets of neo-classical economics also is assumed in many models, "rationality". According to this assumption actors (such as firms) will behave in a way that maximizes their utility under the given constraints. But, actors in the real world such as strategists do not always behave rationally - they may follow 'boundedly rational' behavior (Simon 1957) and not optimize their utility functions. Simons contends that firms follow to get a level of "satisfaction" in their objectives and don't necessarily maximize their utility. Indeed, Porter himself (1991: 98) notes: "it is well known that [industrial organization] models are highly sensitive to the assumptions underlying them and to the concept of equilibrium that is employed".

Moreover, while game theory was seen as a potential field for modeling dynamics of strategy and competition, the involving of more than two firms into the market poses

additional problems. One firm among many of firm may move and perturb the entire competitive system.

In addition, economic models suppose that the world jumps immediately to an equilibrium. But one main point that is not considered is the path to equilibrium. Also, this equilibrium assumption means there are not any space for innovation and no incentive for firms to change strategies. It seems these models are considered to exist in isolation, where there are no environmental shocks, or indeed external environment does not have any effect on the system for pushing it out of equilibrium. Knott (2003) introduces the problem: 'the goal of strategy is persistent profits – in short, to overcome the microeconomic equilibrium of homogeneous firms with zero profits'. More specifically, this equilibrium is rather the equilibrium of the model than we observe in the real world.

One more problem in using microeconomic approach in modeling strategy issues is its over-emphasis on homogeneity of firms. This assumption eliminates the possibility of analyzing the impact of differences between firms on their performance in an industry. More recent theoretical approaches in formulating competition and strategy such as resource-based view (RBV) of the firm (Barney 1986, 1991) and the dynamic capabilities perspective (Teece et. Al, 1997; Eisenhardt and Martin, 2000), are specifically focused on realizing how interfirm heterogeneity leads to differences in firm's strategies and performance.

**Resource-based view of the firm**

Another main attempt to explain differences between firms, their heterogeneity, came from the resource-based view of the firm. Scholars such as Wernerfelt (1984) and Barney

(1991) see resources as being the most important components of a firm. Wernerfelt (1984) developed the notion of the resource-based view of the firm, building on the work of Penrose that perceived a firm as a bundle of resources. The work of Penrose is considered a very influential one as basis in this framework. Other notable contributions include Lippman and Rumelt (1982), Teece (1980), Nelson and Winter (1982), Rumelt (1984), Barney (1986), Dierickx and Cool (1989), and Conner (1991).

Like early strategy scholars, these authors are primarily interested in differences across firms. What differentiates them is their use of economic reasoning, notably the economics of Ricardian and Paretian rents. In particular, the question of why some firms earn supernormal profits has

received careful consideration. While theoretical and empirical research in industrial organization economics has shown that a firm's profits are related to its choice of industry (Schmalensee 1985; Wernerfelt and Montgomery 1988), resource-based reasoning examines this question from the perspective of inter-firm differences.

The central assumption underlying resource-based theory is heterogeneity of resources. It means resource bundles and capabilities of production are heterogeneous across firms (Barney, 1991). This concept implies that since resources are heterogeneously distributed across firms and these resources are not in unlimited supply and are scarce, firms with superior resources will earn rents. It’s the know Ricardian rent. The crucial notion is that the supply of “superior” resources remains limited. So, efficient firms with superior resources can sustain this type of competitive advantage only if their resources can’t be expanded freely or be imitated by competitors. What distinguishes monopoly profits from

Ricardian ones is that monopoly profits result from a restriction of output rather than an inherent scarcity of resource supply.

In resource-based view, sustained competitive advantage requires that the condition of heterogeneity be maintained. If it's a short-lived phenomenon, profits will be ephemeral as well. Since firms are primarily looking for consistent and long term rents, condition of heterogeneity must be durable to add value. So there must be mechanisms which limit competition for those rents. Rumelt (1984) introduced 'isolating mechanisms' which protect individual firms from imitation and preserve their rent streams. Another notion is causal ambiguity (Lippman and Rumelt, 1982). This means the uncertainty regarding the causes of efficiency differences among firms. there are very important contributions for isolating mechanisms and defying imitation in the literature including Rumelt (1987), Rumelt (1984), Caves and Porter's (1977), Bain's (1956), Ghemawat (1986), Dierickx and Cool (1989), (Teece, 1986).

Despite its considerable progress, the resource-based view suffers from a number of weaknesses. A case in point is that it's often difficult to recognize which resource or combination of resources account for firm's successful performance in the real world. This difficulty in assessment is likely due to the fact that it is impossible to measure them in isolation. As Porter noted, resources are valuable only if they "allow firms to perform activities that create advantages in particular markets" (1991: 108). Another important contextual factor is the issue of resource complementarity. It means resources are contingent to other resources so the system of resources is matter. Furthermore, value of resources change over time.

In addition, resource-based view theory of the firm uses both equilibrium and process concepts, although inconsistencies between these are rarely acknowledged. Indeed resource-based view roots go back to neo-classical theory which is clear in the equilibrium concept of sustainable competitive advantage (Barney, 1986). On the other hand, many of the more practical contributions (Wernerfelt 1989) deal explicitly with process. So there is a need for further research regarding more precise definitions of resources and capabilities and also solving the conflict between dual concepts of equilibrium and process taken in this theory.

**Dynamic capabilities**

One of the criticisms to resource-based view of the firm is that it neglects the external environment. Also, the notion that the distribution of resources remains stable over time does not provide a realistic notion of interfirm competition in high turbulence times when the resources that may have been the source of competitive advantage in the past may now not be of use. Moreover, there is much confusing terminology, sometimes conflicting, within the area of resource-based view of the firm. Indeed, Teece et al. (1997) in their key work on dynamic capabilities go so far as to say 'we do not like the term ''resource'' and believe it is misleading'. So scholars extended resource-based view of the firm and proposed the notion of dynamic capabilities. The same as resource-based view, terminology definition in dynamic capabilities is also difficult. Dosi et al. (2000) describe the 'terminological anarchy' of the resource-based view: 'the term ''capabilities'' floats in the literature like an iceberg in a foggy Arctic sea, one iceberg among many, not easily recognized as different from several icebergs nearby'. Makadok (2001) uses the rather obvious definition of resources: 'organizationally embedded non-

transferable firm-specific resource whose purpose is to improve the productivity of the other resources possessed by the firm'.

Teece et al. (1997) define dynamic capabilities as 'the firm's ability to integrate, build, and reconfigure internal and external competencies to address rapidly changing environments'. This definition considers both the resource-based view which and the notion of rapidly changing environments. Teece asserts that 'capabilities cannot easily be bought; they must be built'.

Although resources can be 'picked' in order to bring them within the firm, capabilities are different: they are built not acquired – capabilities are embedded within the organization whereas resources are not.

Winter (2003) distinguish between 'ordinary' organizational capabilities and dynamic capabilities. Putting his definition on his earlier work with Nelson (Nelson and Winter, 1982), organizational capabilities are defined as a 'high-level routine (or collection of routines) that, together with its implementing input flows, confers upon an organization's management a set of decision options for producing significant outputs of a particular type', basing the concept on routines: 'behavior that is learned, highly patterned, repetitious, or quasi-repetitious, founded in part in tacit knowledge – and the specificity of objectives'. What makes dynamic from ordinary capabilities is that dynamic capabilities are concerned with change and learning. The concept is that dynamic capabilities govern the rate of change of organizational capabilities.

Eisenhardt and Martin (2000) contend that dynamic capabilities are of several types: firms may use dynamic capabilities to create, integrate, recombine, and release resources from the firm. They also distinguish between dynamics capabilities in 'high velocity' and

stable markets situations: in high velocity environments, dynamic capabilities are experiential (i.e. not analytic), iterative (i.e. non-linear), and are inherently simple in nature. In markets that are moderately dynamic, they suggest that dynamic capabilities become efficient and robust routines become embedded in cumulative, existing knowledge within the firm. In other words, effective dynamic capabilities enable a firm to adapt to a changing and turbulent environment. They assert that although dynamic capabilities are idiosyncratic, 'they exhibit commonalities or 'best practice' across firms. Their broad structural patterns vary with market dynamism, ranging from the robust, grooved routines in moderately dynamic markets to fragile semi-structured ones in high-velocity ones. They evolve via well-known learning mechanisms.' They finally conclude that lies in resource configurations, not dynamic capabilities. Teece et.al (1997) suggest that 'Further theoretical and organizational work is needed to tighten the framework, empirical research is critical to helping us understand how firms get to be good, how they sometimes stay that way, why and how they improve, and why they sometimes decline.'

**Dynamic environments and environmental turbulence**

Turbulent competitive environment is precisely the opposite of stable landscape. In such industries, the roles of different competitors are blurred. They rely on more complex and diverse combination of competitive dimensions at the time of designing their competitive strategies. This makes prediction rather difficult, and in some conditions misleading. These landscapes require new ways of thinking about competition and industry dynamics. The dynamic capabilities approach mentioned earlier has been an attempt to respond to the challenges posed by turbulent competitive environment. As we saw in Teece et al.'s (1997) seminal definition of dynamic capabilities, firms may have to deal with rapidly

changing environments. This concept has been used by diverse words: turbulence, high velocity environments, hypercompetitive environments (D'Aveni 1994).

D'Aveni (1994, 1995) depicts the notion of 'hyper-competition' – a state that is defined (1995:46) as: '[resulting] from the dynamics of strategic manoeuvring among global and innovative combatants. It is a condition of rapidly escalating competition based on price-quality positioning, competition to create know-how and establish first-mover advantage, competition to protect or invade established product or geographic markets, and competition based on deep pockets and the creation of even deeper pocketed alliances . . . the frequency, boldness, and aggressiveness of dynamic movement by the players accelerates to create a condition of constant disequilibrium and change . . . in other words, environments escalate toward higher and higher levels of uncertainty, dynamism, heterogeneity of the players, and hostility'.

D'Aveni (1994:215) assumes that there is a new type of competition – 'hyper-competition', completely different from the traditional notion: 'in the old days of stable environments, companies created fairly rigid strategies designed to fit the long-term conditions of the environment'. D'Aveni's idea is that competitive equilibrium was in the past where "less dominant firms accepted their secondary status because they were given the opportunity to survive by a leading firm that avoided competing too aggressively".

One major reason to focus on turbulent environments has been the static nature of strategy and competition frameworks but dynamic nature of environment. Teece et al. (1997) assert that existing models for analyzing strategy have not proved useful at understanding sources of competitive advantage in times of rapid change. If we observe that the business environment in real world is dynamic and complicated, it's not

reasonable consider models developed under concepts of equilibrium, stability and linearity.

Hence several scholars suggested different concepts for making strategy in turbulent environment. Hamel and Prahalad (1989) propose the concept of "strategic intent" for guiding strategy. According to their idea, strategic intent is the overall direction of a company that captures the essence of winning, is stable over time, and sets a goal that deserves personal effort and commitment. This thought brings into mind a stable and systematic pattern that take the company toward a valuable and determined target. Bourgeois and Eisenhardt (1998) suggest the "imitation" strategy for surviving in turbulent environment. In this strategy follower go towards the position of leader. Brown and Eisenhardt (1998) assert that such movement should be made incrementally. Rivkin (2000) suggests the imitation of complex strategies. He applies NK model in his analysis and assume that there is interconnectedness between strategies. Overall, these studies show that the ability of rapid and continuous change is a crucial capability in high-velocity markets.

**Organizational ecology**

Until now I reviewed broadly the economic models in analyzing competition and strategy. I also noted some advantages and disadvantages of such models. One more model is called "organizational ecology". This dynamic framework is interested in the evolution of a system of interacting companies, in particular, how population of them changes over time. The use of organizational/population ecology models (Hannan and Freeman, 1977) in strategy and competition is a clear example that how techniques and models from other disciplines might be useful.

In this perspective, based on Darwinian concept of the "survival of the fittest" it proposes models that certain firms take positions that possess higher fitness than others in the population of firms. The premise here is that fittest firms will survive and others go out of business. The evolution of an industry can be modeled by considering how diverse types of firms compete over time, and how some population of firms survive longer than others. Behind organizational ecology is the notion that only limited resources are available in a market. This approach goes beyond industry analysis and suggests that certain positions within an industry can still be attractive even when there are dominant incumbents. This perspective provides the opportunity for the analysis of smaller firms and also the fact that some firms may fail.

Although organizational ecology try to consider that firms are in certain types and therefore assumes that there is heterogeneity among firms, but this characteristics is not modeled explicitly. Moreover, there is high degree of formalization in this perspective where mathematical relationships between variables are modeled. Also, there is problem of translation from natural science definition of genotypes to firms as constituents of population. Other problem is the fitness optimization that can be viewed as an analogy of utility maximization from within economics, and as I noted earlier there are common problems associated with maximization (e.g. "satisfaction" proposed by Simon) approaches within management science.

**Competitive dynamics**

The research stream of competitive dynamics which its intellectual roots go back to Schumpeter's concept of creative destruction has progressed in recent years in the mainstream literature of research on strategy and competition. The focus of this view is

on dynamic processes by which firms act upon and react to one another in the pursuit of market opportunities. Firms act and competitors respond, and these interactions determine survival and long-term performance. Similarly, the Austrian school of economics (Jacobson, 1992; Mises, 1949; Young, Smith, & Grimm, 1996) considered competition to be a dynamic market process rather than a static market condition. The core is the process by which market moves. It's this movement and not equilibrium that is taken to be of interest. Also based on this school of thought, since market is in disequilibrium advantage is a limited temporal window for exploitation so it is transient (Chen, 2009; D'Aveni, Dagnino, & Smith, 2010).

According to definitions, competitive dynamic is the study of inter-firm rivalry based on specific "competitive actions and reactions", their strategic and organizational context, and their motives and outcomes (Baum & Korn, 1996; Smith et al, 1992). The intent of this perspective has been mainly to address more fine-grained questions regarding competition: how do firms act and rivals react when they compete? Why some firms compete in a particular ways? How do competitive interactions influence performance and vice versa (Ketchen, Snow, & Hoover, 2004; Smith, Ferrier, & Ndofor, 2001)?

In the field strategic management, seminal works of MacMillan, McCaffrey, & Van Wijks's (1985) and Bettis and Weeks's (1987) used this frame of reference. They were the beginning of competitive dynamics research in the realm of strategy. Other works followed these earlier studies. Main premise in this stream of research is that it can provide a useful integrative framework for strategy by bridging micro-actor and macro-competitive viewpoints. Chen (2012) outlined five research themes in this field: "(1) competitive interaction: action-level studies; (2) strategic competitive behavior and

repertoire: business-level studies; (3) multimarket and multi-business competition: corporate-level studies; (4) integrative competitor analysis; and (5) competitive perception. " There are also some studies in integrating competitive dynamics and RBV frameworks (Sirmon, Gove, & Hitt, 2008; Ndofor, Sirmon, & He, 2011; Tsai, et al, 2011). However, there are several gaps in this stream of research that one of the most important for example is integrating micro and macro perspectives. (Miller & Droge, 1986).

**Delta framework**

It is evident in the literature of strategy that Porter's industry analysis and the resource-based view (RBV) of the firm have the highest impact and attention. From these perspectives firms should either find an attractive industry and position accordingly or excel on unique resources and capabilities. Although these frameworks have often been considered conflicting rather complementary, Hax and Wilde (2002) focused on complementarity of views and propose model called "Delta"( Delta is a Greek letter means transformation and change). But they contend that one missing piece in both of these frameworks is the "customer". Hax and Wilde (2002) mention that "If you take Porter literally, the customer is represented by the "Buyer" – one of the Five Forces – whose bargaining power we should resist or diminish. In that respect, the customer constitutes an additional element of the rivalry that we need to overcome. In the Resource-Based View of the Firm, there is no explicit mention of the customer." They assert that in the internet era, linking customer and enterprise through using network technology creates new sources of strategic options.

Hax and Wilde (2002) contend that their Delta model is integrative of two prior main frameworks in strategy. They say: “ Porter’s framework and the Resource-Based View differ in explaining he sources of profitability. Porter associates it with monopolistic rent that flows

from industry structure. The Resource-Based View of the firm ties it to the corporation’s internal capabilities. They share the perspective that business is akin to war and that designing business strategy is akin to playing a zero-sum game. Profitability accrues to those who are superior to their competitors. The Delta Model takes issue with this almost obsessive focus on competition.”

It is also clear that at the heart of Delta model is customer. They explain it this way: “We believe that a firm owes itself to its customers. They are the ultimate repository of all the firm’s activities. At the heart of management and, certainly, at the heart of strategy, resides the customer. We have to serve the customer in a distinctive way if we expect to enjoy superior performance. The name of the game is to attract, to satisfy, and to retain the customer.” They put the “customer bonding” concept at the center of strategy formulation.

According to their view they propose three strategic options for firms: “system-lock in” under which firms make proprietary platforms that lock-out other competitors, “total customer solutions” that based upon firms reduce customer costs or increase their profits, “best product” which options are low-cost or differentiation.

Finally they suggest their winning formula as follows (Hax and Wilde, 2002):

"• Concentrate on the customer. Start with a careful segmentation of your customer base and develop as much knowledge as possible of the customer economics. Remember that the primary objective is to seek customer bonding.

• Select the most appropriate strategic positioning among the three key options – Best Product, Total Customer Solutions, and System Lock-In – that will result in a customer value proposition with the highest possible bonding.

• Define the strategic agenda that determines the action program to implement your desired strategic option. Assure the proper alignment with the three adaptive processes – Operational Effectiveness, Customer Targeting, and Innovation.

• Design the proper metrics and rewards to facilitate the strategy development."

**Toward the economics of complexity**

I have reviewed several models from different perspectives in earlier sections. What is clear is that most of them are based on paradigms of equilibrium, linearity, rationality, optimization, etc. we may need more systematic views which are based on disequilibrium, nonlinearity, behavioral rules, networked interaction and so forth. One promising area that might address such phenomena in the analysis of competition and strategy is complexity science, and in particular, economics of complexity.

Complexity has emerged as a new unifying and systematic theory to understand the nature of commonalities and change across a variety of disciplines ranging from mathematics, physics, biology, economics, social science, etc. complexity takes a systemic approach under which nonlinear interactions among agents (constituents of system) in micro level will result in macro and emergent behaviors that cannot be understood just by studying agents itself. Complexity builds on some assumption:

Heterogeneous agents; means agents are intrinsically heterogeneous by character. Local information; means knowledge of agents is local and no one can have the information of the whole system. Non-linearity; interactions among agents are non-linear in nature. Systemic interdependence; outcome of the behavior of each agent is strictly dependent on the web of interactions in the system. Phase transition; small changes in the parameters of the system change the behavior and outcomes as system goes from change its phase. Non-ergodicity; means a little trigger at a particular point in time impacts the long-term dynamics of a system. Emergent properties; properties of a system that arise at the aggregate level; simply put, means whole is greater than sum of the parts. A core aspect of complexity is how interacting agents produce system-level patterns that those agents in turn react to. This leads to the emergence of aggregate properties and structures that are not observable at lower levels.

There is review of applications of the complexity theory to economics in Rosser, (1999, 2003); Arthur (2014); Beinhocker (2006); Epstein (2006b); Miller & Page (2006); Kirman (2011). It has been asserted (Saari, 1995) that complexity is ubiquitous in economic problems. Based on equilibrium concept and reductionist approach in classical economics, aggregation is simply the sum of parts. It means dynamics of a system is only simple sum of the dynamic of constituent parts. This view clearly does not consider interdependencies and positive/negative feedbacks in the interaction of parts. What classical models fail to realize is correct view toward aggregation where concept of "emergence" enters the scene. (Schelling, 1978) notion of emergence means spontaneous formation of self-organized patterns at different levels of a hierarchy (Crutchfield, 1994). Simon (1969) explain a complex system in this form: "Roughly, by a complex system I

mean one made up of a large number of parts that interact in a non- simple way. In such systems, the whole is more than the sum of the parts, not in an ultimate metaphysical sense, but in the important pragmatic sense that, given the properties of the parts and the laws of their interaction, it is not a trivial matter to infer the properties of the whole. In the face of complexity, an in-principle reductionist may be at the same time a pragmatic holist."

From the perspective of complexity, ABM (agent-based modeling) can be used as a bridge between micro and macro. In ABM models aggregate outcomes (the whole, e.g. the differential firm performance) are estimated as the sum of individual characteristics (its parts, e.g. firm's size). However, system level behavior can often be recognized from the behavior of agents which make up the whole, leading to the discovery of emergent properties. (Dosi, Fagiolo, & Roventini, 2010; Gallegati et al., 2010) In this view, whole is greater than the sum of parts. Also it might happen in a way that seems system follow a distinct logic, with its objectives and means. ABM provides a technique that allows systematic analysis of dynamics and emergent properties at macroscopic level. The ABM methodology introduced by complexity stream of research uses bottom-up approach and is focused on the interaction of many heterogeneous agents, which may produce a statistical equilibrium. (Miller & Page, 2006; Epstein, 2006; see also Batten, 2000; Wooldridge, 2001; Gilbert & Troitzsch, 2005). ABM allows making models with heterogeneous (e.g. heterogeneous firm in competition) agents based on simple behavioral rules and interactions (e.g. competitive behaviors) between them, where the resulting systemic and macro dynamics and empirical regularities (e.g. statistical equilibrium, maybe we can call it, differential firm performance) are not known and

deductible from behavior of agents. (Nicolis, G., & Nicolis, C., 2007) This system doesn't always need to be in equilibrium (assumption of most economic models) and based on interactions could change its phase and goes from one equilibrium to another. What is surprising in this perspective is that it has both views of IO and Austrian schools in itself. It is dynamic processes (Austrian) that give rise to emergent (e.g. creative destruction) properties and simultaneously system can sometimes be in equilibrium (IO view). So I assert that these prior perspectives in modeling competition are not contradictory but each one of them only point to one aspect of the problem.

Complexity perspective and in particular ABM provide as significant potential to model and understand the dynamics of competition and strategy. Identification of the advantages of such approach has been highlighted in social science has been highlighted in the literature as well. (Gilbert and Terna, 2000; McKelvey, 1997,1999)

**Conclusion**

There are many frameworks and models of competition and strategy that have made significant steps towards unifying and integrating different aspects of competition. While most of them are based on economic paradigms and models, some of them adopted views from other fields of science such as sociology, systems science, psychology, biology, etc. after reviewing different frameworks of competitive behaviors and strategy in the literature I contend that models have used different perspectives and frames of reference in response to the differential firm performance within and across industries but all of them are trying to answer the original issue in strategy realm. There exist both commonalities and contradictions among proposed frameworks. Most of them are based on economic theories of the firm but some applications from other fields of study are

evident. Fundamental issues such as rationality, unit of analysis, used research methods, equilibrium, level of aggregation and dynamics require further research in the field. But one thing is evident from the evolution of strategy frameworks that models proposed intended to be more dynamic. For further research I suggest scholars pay attention to different frameworks systematically and attempt to unify and integrate these fragmented perspectives. Strategy researchers must approach interdisciplinary research with rigor, with a firm grounding and understanding of the relevant theories and techniques from other fields which they seek to integrate with strategy. Because the final goal of strategy is to find a systematic and dynamic theory which can consider different features of competition and strategy in a unified mode (consider internal and external), and also could explain differential firm performance and competitive advantage. Although because of complex and dynamic business idiosyncrasies in time and space, such natural laws of strategy may not be guaranteed. We can be hopeful to find some patterns on macro levels that are useful.

**Reference**

Amit, R., & Schoemaker, P. J. H. (1993). Strategic assets and organizational rent. *Strategic Management Journal*, *14*(1), 33–46.

Andrews, K.R. *The concept* of *corporate strategy.* New York: Dow Jones-Irwin, 1971.

Ansoff, I. *Corporate strategy.* New York: McCraw-Hill, 1965.

Arthur, W. B. (2014). *Complexity and the Economy* (1 edition). Oxford ; New York: Oxford University Press.

Bain, J. S. (1950). Workable Competition in Oligopoly: Theoretical Considerations and Some Empirical Evidence. *The American Economic Review*, *40*(2), 35–47.

Bain, J. S. (1951). Relation of Profit Rate to Industry Concentration: American Manufacturing, 1936-1940. *The Quarterly Journal of Economics*, *65*(3), 293–324.

Bain, J. S. (1954). Economies of Scale, Concentration, and the Condition of Entry in Twenty Manufacturing Industries. *The American Economic Review*, *44*(1), 15–39.

Bain, J. (1956). Barriers to New Competition, Cambridge MA: Harvard University Press.

Bain, J.S. *Industrial orgnization* (2nd ed.). New York: Wiley, 1968.

Barney, J. (1991). Firm Resources and Sustained Competitive Advantage. *Journal of Management*, *17*(1), 99–120.

Barney, J. B. (1986). Strategic Factor Markets: Expectations, Luck, and Business Strategy. *Management Science*, *32*(10), 1231–1241.

Batten, D. F. (2000). *Discovering artificial economics*. Boulder, CO: Westview Press.

Baum, J. A. C., & Korn, H. J. (1996). Competitive Dynamics Of Interfirm Rivalry. *Academy of Management Journal*, *39*(2), 255–291.

Beinhocker, E. D. (2006). *The origin of wealth: Evolution, complexity, and the radical remaking of economics*. Cambridge, MA: Harvard Business School Press.

Bettis, R. A., & Weeks, D. (1987). Financial returns and strategic interaction: The case of instant photography. *Strategic Management Journal*, *8*(6), 549–563.

Bourgeois, L. J., & Eisenhardt, K. M. (1998). Strategic Decision Processes in High Velocity Environments: Four Cases in the Microcomputer Industry. *Management Science*, *34*(7), 816–835.

Brandenburger, A. M., & Nalebuff, B. J. (1997). *Co-Opetition* (1 edition). New York: Currency Doubleday.

Brown, S. L., & Eisenhardt, K. M. (1998). *Competing on the Edge : Strategy as*

*Structured Chaos* (1St Edition edition). Boston, Mass: Harvard Business Review Press.

Caves, R. E. and M. Porter. (1977). 'From entry barriers to mobility barriers: Conjectural decisions and contrived deterrence to new competition', Quarterly Journal of Economics, 91, pp. 241-262.

Chen, M.-J. (2009). Competitive dynamics research: An insider's odyssey. *Asia Pacific Journal of Management*, *26*(1), 5–25.

Chen, M.-J., & Miller, D. (2012). Competitive Dynamics: Themes, Trends, and a Prospective Research Platform. *The Academy of Management Annals*, *6*(1), 135–210.

Coase, R. H. (1937). The Nature of the Firm. *Economica*, *4*(16), 386–405.

Conner, K. R. (1991). A Historical Comparison of Resource-Based Theory and Five Schools of Thought Within Industrial Organization Economics: Do We Have a New Theory of the Firm? *Journal of Management*, *17*(1), 121–154.

Crutchfield, J. (1994). Is anything ever new? Considering emergence. In G. Cowan, D. Pines, &.

D. Meltzer (Eds.), *Complexity: Metaphors, models, and reality* (pp. 515–537). Reading,

MA: Addison-Wesley.

Cyert, R. M., & March, J. G. (1992). *Behavioral Theory of the Firm* (2 edition). Cambridge, Mass., USA: Wiley-Blackwell.

D'aveni, R. A. (1994). *Hypercompetition* (1 edition). New York : Toronto : New York: Free Press.

D'Aveni, R. A. (1995). Coping with hypercompetition: Utilizing the new 7S's

framework. *The Academy of Management Executive*, *9*(3), 45–57.

D'Aveni, R. A., Dagnino, G. B., & Smith, K. G. (2010). The age of temporary advantage. *Strategic Management Journal*, *31*(13), 1371–1385.

Demsetz, H. (1973). Industry Structure, Market Rivalry, and Public Policy. *The Journal of Law & Economics*, *16*(1), 1–9.

Dierickx, I., & Cool, K. (1989). Asset Stock Accumulation and Sustainability of Competitive Advantage. *Management Science*, *35*(12), 1504–1511.

Dosi, G., Fagiolo, G., & Roventini, A. (2010). Schumpeter meeting Keynes: A policy-friendly model of endogenous growth and business cycles. *Journal of Economic Dynamics & Control*, *34*(9), 1748–1767.

Dosi, G., Nelson, R. R., and Winter, S. G. (eds.) (2000). The Nature and Dynamics of Organizational Capabilities, Oxford: Oxford University Press.

Eisenhardt, K. M., & Martin, J. A. (2000). Dynamic Capabilities: What Are They? *Strategic Management Journal*, *21*(10/11), 1105–1121.

Epstein, J. M. (2006). *Generative social science: Studies in agent-based computational modeling*. New York: Princeton University Press.

Gallegati, M., Delli Gatti, D., Gaffeo, E., Cirillo, P., & Desiderio, S. (2010). *Macroeconomics from the bottom-up*. Berlin: Springer.

Galunic, D. C., & Eisenhardt, K. M. (2001). Architectural Innovation and Modular Corporate Forms. *Academy of Management Journal*, *44*(6), 1229–1249.

Ghemawat, P. (Sept-Oct 1986). 'Sustainable advantage', Harvard Business Review, pp. 53-58.

Ghemawat, P. (1995). Games Businesses Play: Cases and Models, New York NY: Wiley.

Ghemawat, P., & Cassiman, B. (2007). Introduction to the Special Issue on Strategic Dynamics. *Management Science*, *53*(4), 529–536.

Gilbert, N., & Terna, P. (2000). How to build and use agent-based models in social science. *Mind & Society*, *1*(1), 57–72.

Gilbert, N., & Troitzsch, K. (2005). *Simulation for the social scientist*. Buckingham: Open University Press.

Gluck, F. W., Kaufman, S. P., & Walleck, A. S. 1980. Strategic management for competitive advantage. *Harvard Business Review.* 58(4): 154-161.

Hamel, G. and C. K. Prahalad (1989). To Revitalize Corporate Performance, We Need a Whole New Model of Strategy. Strategic intent, Harvard Business Review, 67 (3), pp. 63–76.

Hannan, M. T., & Freeman, J. (1977). The Population Ecology of Organizations. *American Journal of Sociology*, *82*(5), 929–964.

Hax, A. C., & Wilde, D. L. (2002). *The Delta Model -- Toward a Unified Framework of Strategy* (SSRN Scholarly Paper No. ID 344580). Rochester, NY: Social Science Research Network.

Henderson, R., & Cockburn, I. (1994). Measuring Competence? Exploring Firm Effects in Pharmaceutical Research. *Strategic Management Journal*, *15*(S1), 63–84.

Iansiti, M., & Levien, R. (2004, March 1). Strategy as Ecology. Retrieved May 30, 2017, from https://hbr.org/2004/03/strategy-as-ecology

Jacobson, R. (1992). The "Austrian" School of Strategy. *Academy of Management*

*Review*, *17*(4), 782–807.

Ketchen, D. J., Snow, C. C., & Hoover, V. L. (2004). Research on Competitive Dynamics: Recent Accomplishments and Future Challenges. *Journal of Management*, *30*(6), 779–804.

Kirman, A. P. (2011). *Complex economics: Individual and collective rationality*. The Graz Schumpeter Lectures, Routledge.

Knott, A. M. (2003). Persistent Heterogeneity and Sustainable Innovation, Strategic Management Journal, 24, 687–705.

Kogut, B., & Zander, U. (1992). Knowledge of the Firm, Combinative Capabilities, and the Replication of Technology. *Organization Science*, *3*(3), 383–397.

Lippman, S. A., & Rumelt, R. P. (1982). Uncertain Imitability: An Analysis of Interfirm Differences in Efficiency under Competition. *The Bell Journal of Economics*, *13*(2), 418–438.

MacMillan, I., McCaffery, M. L., & Van Wijk, G. (1985). Competitors' responses to easily imitated new products—exploring commercial banking product introductions. *Strategic Management Journal*, *6*(1), 75–86.

Mailath, G. J. and Samuelson, L. (2006). Repeated Games and Reputations: Long-Run Relationships, Oxford: Oxford University Press.

Makadok, R. (2001). Toward a Synthesis of the Resource-Based and Dynamic-Capability Views of Rent Creation, Strategic Management Journal, 22, 387–401.

MacMillan, I. C., McCaffery, M. L., & Van Wijk, G. 1985. Competitor's responses to easily imitated new products: Exploring commercial banking product introductions. *Strategic Management Journal*, 6: 75-86.

McGahan, A. M. (1999). The Performance of US Corporations: 1981–1994. *The Journal of Industrial Economics*, *47*(4), 373–398.

McGAHAN, A. M., & Porter, M. E. (1997). How Much Does Industry Matter, Really? *Strategic Management Journal*, *18*(S1), 15–30.

McGee, J., & Thomas, H. (1986). Strategic groups: Theory, research and taxonomy. *Strategic Management Journal*, *7*(2), 141–160

McKelvey, B. (1997). Perspective—Quasi-Natural Organization Science. *Organization Science*, *8*(4), 351–380.

McKelvey, B. (1999). Complexity Theory in Organization Science: Seizing the Promise or Becoming a Fad? *Emergence*, *1*(1), 5–32.

Miller, D., & Droge, C. 1986. Psychological and traditional predictors of organization structure. *Administrative Science Quarterly*, 31: 539-560.

Miller, J. H., & Page, S.E. (2006). *Complex adaptive systems: An introduction to computational models of social life*. New York: Princeton University Press.

Mises, L. 1949. *Human action: A treatise on economics.* New Haven, CT: Yale University Press.

Ndofor, H. A., Sirmon, D. G., & He., X. 2011. Firm resources, competitive actions and performance: Investigating a mediated model with evidence from the in-vitro diagnostics industry. *Strategic Management Journal*, 32: 640-657.

Nelson, R. 1976. Goldschimd, Mann, and Weston's industrial concentration: The new learning. *Bell Journal of Economics.* 7: 729-732.

Nelson, R. R. (1991). Why do firms differ, and how does it matter? *Strategic Management Journal*, *12*(S2), 61–74.

Nelson, R. and Winter, S. (1982). *An Evolutionary Theory of Economic Change*, Cambridge
MA: Belknap Harvard

Nicolis, G., & Nicolis, C. (2007). *Foundations of complex systems nonlinear dynamics, statistical physics,and prediction*. World Scientific Publishing.

Penrose, E., & Pitelis, C. (2009). *The Theory of the Growth of the Firm* (4 edition). Oxford ; New York: Oxford University Press.

Peteraf, M. A. (1993). The cornerstones of competitive advantage: A resource-based view. *Strategic Management Journal*, *14*(3), 179–191.

Porter, M. (1979). How Competitive Forces Shape Strategy, Harvard Business Review, 57(2),
137–45.

Porter, M. E. (1980). Competitive Strategy: Techniques for Analyzing Industries and Competitors.

Porter, Michael E. (1991). Towards a dynamic theory of strategy. *Strategic Management Journal*, *12*(S2), 95–117.

Rivkin, J. W. (2000). Imitation of Complex Strategies, Management Science, 46(6), 824–44.

Rosser, J. B. (1999). On the complexities of complex economic dynamics. *The Journal of Economic Perspectives*, *13*, 169–192.

Rumelt, R. P. (1984). *Towards a strategic theory of the firm*. In Lamb, R.B. (Ed.), *Competitive Strategic Management.* Englewood Cliffs, N.J.: Prentice-Hall.

Rumelt, R.P. 1987. Theory, strategy and entrepreneurship. In D. Teece (ed.), *The competitive challenge* (pp. 137-58). Cambridge: Ballinger.

Rumelt, R. P. (1991). How much does industry matter? *Strategic Management Journal*, *12*(3), 167–185.

Saari, D. G. (1995). Mathematical complexity of simple economics. *Notices of the American*

*Mathematical Society*, *42*, 222–230

Schelling, T. C. (1978). *Micromotives and macrobehaviour*. New York: W. W. Norton.

Scherer, F.M. *industrial market structure and economic performance.* Chicago: Rand McNally, 1970.

Schmalensee, R. (1985). Do Markets Differ Much? *American Economic Review*, *75*(3), 341–51.

Schumpeter. J. A. 1934. *The theory oí economic development.* Cambridge, MA: Harvard University Press.

Schumpeter, J. A. 1942. *Capitalism, socialism and democracy.* New York: Harpers.

Simon, H. A. (1957). *Administrative Behavior.* New York: Macmillan.

Simon, H. A. (1969). *The sciences of the artificial*. Cambridge, MA: MIT Press.

Sirmon, D., Gove, S., & Hitt. M. 2008. Resource management in dyadic competitive rivalry: The effects of resource bundling and deployment. *Academy of Management Journal*, 51: 919-935.

Smith, K. G., Grimm, C. M., & Gannon, M. J. 1992. *Dynamics of competitive strategy.* Newbury Park, CA: Sage Publications.

Smith, K. G., Ferrier, W. J., & Ndofor, H. (2001). Competitive dynamics research: Critique and future directions. In *The Blackwell Handbook of Strategic Management, Blackwell Publishers Ltd* (pp. 314–361).

Stigler, G. J. (1964). A Theory of Oligopoly. *Journal of Political Economy*, *72*(1), 44–61.

Szulanski, G. (1996). Exploring internal stickiness: Impediments to the transfer of best practice within the firm. *Strategic Management Journal*, *17*(S2), 27–43.

Teece, D. J. (1980). Economies of scope and the scope of the enterprise. *Journal of Economic Behavior & Organization*, *1*(3), 223–247.

Teece, D. J. (1986). Profiting from technological innovation: Implications for integration, collaboration, licensing and public policy. *Research Policy*, *15*(6), 285–305.

Teece, D. J., Pisano, G., & Shuen, A. (1997). Dynamic capabilities and strategic management. *Strategic Management Journal*, *18*(7), 509–533.

Tsai, W., Su, K. H., & Chen, M. J. 2011. Seeing through the eyes of a rival: Competitor acumen based on rival-centric perceptions. *Academy of Management Journal*, forthcoming.

Wernerfelt, B. (1984). A resource-based view of the firm. *Strategic Management Journal*, *5*(2), 171–180.

Wernerfelt, B. and C. A. Montgomery. (1988). 'Tobin's q and the importance of focus in firm performance', American Economic Review, 78, pp. 246-250.

Wernerfelt, B. (1989). 'From critical resources to corporate strategy', Journal of General Management, 14, pp. 4-12.

Williamson, O. E. (1981). The Modern Corporation: Origins, Evolution, Attributes. *Journal of Economic Literature*, *19*(4), 1537–1568.

Williamson, O. E. (1985). *The Economic Institutions of Capitalism: Firms, Markets, Relational Contracting* (SSRN Scholarly Paper No. ID 1496720). Rochester, NY: Social Science Research Network.

Williamson, O. E. (1989). Chapter 3 Transaction cost economics. *Handbook of Industrial Organization*, *1*, 135–182.

Winter, S. G. (2003). Understanding dynamic capabilities. *Strategic Management*

*Journal*, *24*(10), 991–995.

Wooldridge, M. (2001). *An introduction to multiagent systems*. New York: Wiley.

Young, G., Smith, K. G., & Grimm, C. M. (1996). "Austrian" and Industrial Organization Perspectives on Firm-level Competitive Activity and Performance. *Organization Science*, *7*(3), 243–254.

Zander, U., & Kogut, B. (1995). Knowledge and the Speed of the Transfer and Imitation of Organizational Capabilities: An Empirical Test. *Organization Science*, *6*(1), 76–92.