CAPABILITY-BASED PERSPECTIVE TO COMPETITIVE ADVANTAGES OF THE FIRM: THEORETICAL REVIEW AND EMPIRICAL EVIDENCES FROM US AND JAPANESE CORPORATE FIRMS

Dinh Thi Thanh Binh[1]

Abstract

This paper reviews the theory of competitive advantages of the firm from the capability-based perspective. This perspective is originated from the resource-based one. It inherits the resource-based perspective in the respect that it focuses on the exploitation of firm-specific assets (core competence) that are difficult if not impossible to imitate, but complements the explanation of how firms renew competences to response to shifts in business environment. Within the framework of capability-based perspective, the competitive advantages of the firm is firstly specified from its coordination mechanisms and incentive mechanisms, then moved to organizational learning processes, and then capabilities and competences. We have demonstrated this framework via the cases of the evolution of US corporations and Japanese corporations from various sources of empirical literatures.

Keywords: Capability-Based Perspectives, Competitive Advantages, Firm

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1. Introduction

Since 1960's, a single organizing framework (SWOT – strength, weakness, opportunities, threat) has been used to understand sources of sustained competitive advantage for firms. This framework suggests that firms obtain sustained competitive advantages by implementing strategies that exploit their internal strengths, through responding to environmental opportunities, while neutralizing external threats and avoiding internal weaknesses. Most research on sources of sustained competitive advantages has focused on isolating a firm's opportunities and threats (Porter, 1980, 1985), describing its strengths and weaknesses, or analyzing how these are matched to choose strategies.

Although both internal analyses of organizational strengths and weaknesses and external analyses of opportunities and threats have received some attention on the

[1] Ph.D, Foreign Trade University (Vietnam). Email: binhdtt@ftu.edu.vn

literature, during the last years of 1980's many researches tended to focus primarily on analyzing a firm's opportunities and threats in its competitive environment. Typically, is the work of Porter (1980) describing the environmental conditions that favor high level of firm performance. However, this approach has often been criticized as being inherently static and as making unrealistic claims as to the possibilities of identification of supposedly objective opportunities, strengths, weaknesses, and threats (see Spender, 1992, in Foss (1997)). Thus, instead of saying about firm's internal strengths and weaknesses, or the impact of idiosyncratic firm attributes on the firm's competitive position, this approach was wholly oriented outwards industry analysis with two implicitly simplifying assumptions. The first assumption is that firms within an industry are identical in terms of the strategically relevant resources they control and the strategies they pursue. The second assumption is that if resource heterogeneity is developed in an industry, this heterogeneity will exist in very short time because the resources that firms use to implement their strategies are highly mobile (i.e. they can be bought and sold in factor market) (Barney, 1986).

The weaknesses of the SWOT approach has urged scholars in the field of strategic management to look for another approach to strategy that can accommodate both internal and external aspects in a dynamic model. As a result, the resource-based perspective (RBP) was started on. In its modern manifestation, it may conveniently be dated to 1984 when two seminal papers were published. One of these is "A Resource-Based View of the Firm" by Birger Wernerfelt in the Strategic Management Journal, and the other is a paper by Richard P. Rumelt, 'Toward a Strategic Theory of the Firm' in a conference volume entitled Competitive Strategic Management. Since this landmark, the approach has been quickly developed by many important works such as Barney (1986), Montgomery and Wernerfelt (1988), Dierickx and Cool (1989), and Peteraf (1993). Since 1990, it is enriched towards a more dynamic direction, namely the dynamic capabilities/core competence approach, by combining with ideas in older, classical works on firms and firm strategies like Selznick (1957), Penrose (1959), Chandler (1962), Richardson (1972), and Nelson and Winter (1982), and ideas in the organizational learning literature like Senge (1990), Simon (1991), Marengo (1992), Von Hippel and Tyre (1995), and Argyris and Schön (1996). The contributions into the dynamic phase of the RBP are often credit to Prahalad and Hamel (1990), Langlois (1991), Nelson (1991), Kogut and Zander (1992, 1996), and Teece, Pisano and Shuen (1997).

The objective of this paper is to review the theoretical development and empirical researches of the (dynamic) capability-based perspective (CBP) to competitive advantage of the firm from its antecedent – the resource-based perspective. To meet our objective, we organize our paper into two sections. The first one focuses on the theoretical issues of the CBP to the competitive advantage of the firm. In this section, we take a quick review of the resource-based forerunners and put a deep analysis on the concept of capabilities, the mechanisms of coordination, of incentives, and of organizational learning, and their implications for the competitive advantage of the firm. In the second section, we search and compare empirical evidences conducted by various researches on firms located in the

US and Japan in order to highlight different mechanisms of building competitive advantages of firms.

2. Organizational Capabilities as Competitive Advantage of the Firm: A Theoretical Review

2.1. Resource - based Perspective to Competitive Advantage of the Firm

The RBP begins from two basic empirical generalizations: (i) there are systematic differences across firms in the extent to which they control resources that are necessary for implementing strategies, and (ii) these differences are relatively stable (Foss, 1997:4). These empirical generalizations raise the question that whether firms may secure a strong and stable performance by building or acquiring endowments of resources that are specific and different from others? The overall objective of the RB approach is to illuminate that the firm is capable of creating, maintaining, and renewing competitive advantage in terms of the resource side of the firms rather than gaining monopoly rents like competitive forces framework à la Michel Porter (1980) or gaining first-mover advantages from game theoretic models (see Teece et al., 1997). More specifically, it links the explanation of competitive advantage to the characteristics of internal resources, and how these characteristics change over time.

The RBP to competitive advantage that is originated from the work of Penrose (1959) and has been strongly developed since the paper of Wernerfelt (1984). It is built on the basis of two assumptions. The first one is that resources are heterogeneously distributed across firms and the second one is that that these resources may not be perfectly mobile across firms. According to Peteraf (1993) heterogeneity implies that firms of varying resources are able to compete in the market place and, at least, breakeven, firms with marginal resources can only expect to breakeven, and firms with superior resources will earn rents. Heterogeneity in an industry may reflect the presence of superior productive factors which are in limited supply (scarce). If a firm possesses a valuable and scarce resource, it will gain Ricardian rents. Resources yielding Ricardian rents include ownership of valuable land, location advantages, patents and copyrights (Mahoney and Pandian, 1992). In addition, heterogeneity may result from uniqueness and localized monopoly achieved by government protection leading firms protected gain monopoly rent. The second assumption implies that not all resources are actually bought and sold. Dierickx and Cool (1989) show some resources like trust and similar values such as loyalty or truth cannot be bought, instead dealer loyalty must be cultivated and customers' trust must be earned through history of honest dealings. And resources for which property right are not well defined or with "bookkeeping feasibility" problems fall in to this category. Being nontradable, the firm specific component is accumulated or built internally.

But, what kinds of resources give a firm competitive advantage in comparison with other ones? 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 (Wernerfelt, 1984). They can be classified into three categories: physical capital resources (i.e. a firm's plant and equipment,

physical technology, geographic location), human capital resources (the training, experience, intelligence, relationships, and insight of individual managers and workers in a firms) and organizational capital resources (a firm's formal reporting structure, its formal and informal planning, controlling and coordinating systems, as well as informal relations among groups within a firm and between a firm and those in its environment). However, according to Barney (1991), a firm is considered to have a competitive advantage when it is implementing a value creating strategy not simultaneously being implemented by any current or potential competitors. A firm is said to have a sustained competitive advantage when it is implementing a value creating strategy not simultaneously being implemented by any current or potential competitors and when these other firms can not to duplicate the benefits of this strategy. A competitive advantage is sustained does not imply that it will last forever. It only suggests that it will not be competed away through the duplication efforts of other firms. Unanticipated changes in the economic structure of an industry can make what was, at one time, a source of sustained competitive advantage, no longer valuable for a firm, and thus not a source of competitive advantage.

Barney (1991) also discussed the impact of resource heterogeneity and immobility on sustained competitive advantage by examining possibility of discovering sources of sustained competitive advantage of a firm under the conditions of its homogenous and mobile resources. He showed that in an industry, firms possess exactly the same resources suggesting that all firms have the same amount and kinds of strategically relevant physical, human, and organizational capital, then if one of these firms has the resources to conceive of and implement a strategy means that these other firms can also conceive of and implement this strategy. Because these firms all implement the same strategies, they all will improve their efficiency and effectiveness in the same way, and to the same extend. Thus, in this kind of industry, firms are not possible to enjoy a sustained competitive advantage.

Based on the assumptions of resources' heterogeneity and immobility, researchers have theorized that when firms have resources with the valuable, rare, inimitable and non-substitutable attributes, they can achieve sustainable competitive advantage by implementing fresh value creating strategies that cannot be easily duplicated by other firms (Baney, 1991; Peteraf, 1993; Wenerfelt, 1984; Dierichx and Cool, 1989; Teece, Pisano and Shuen, 1997).

Valuable resources: a resource is valuable if it enable a firm to exploit opportunities and/or neutralizes threats in its environment. It implies that a valuable resource helps a firm to conceive of or implement strategies that improve its efficiency and effectiveness.

Rare resources: a valuable firm resource possessed by large numbers of competing or potentially competing firms cannot be sources of either a competitive advantage or a sustained competitive advantage. A firm enjoys a competitive advantage when it is implementing a value-creating strategy not simultaneously implemented by large numbers of other firms. If a valuable firm resource is possessed by large numbers of firms, then each of these firms has the capability of exploiting that resource in the

same way, thereby implementing a common strategy that gives no one firm a competitive advantage. However, it may be possible for a small number of firms in an industry to possess a particular valuable resource and still generate a competitive advantage. As long as the number of firms that possess a particular valuable resource or a bundle of valuable resources is less than the number of firms needed to generate perfect competition dynamics in an industry, that resource has the potential of generating a competitive advantage (Barney, 1991).

Imperfectly imitable resources: valuable and rare resources may be a source of competitive advantage. However, these resources can only be source of sustained competitive advantage if firms that do not possess these resources cannot obtain them. These firm resources are imperfectly imitable (Barney, 1986a). Firm resources can be imperfectly imitable for one or a combination of three reasons: (a) the ability of a form to obtain a resource is dependent upon unique historical conditions, (b) the advantage is causally ambiguous, or (c) the resource generating a firm's advantage is socially complex (Dierichx and Cool, 1989).

The first reason means that the performance of a firm does not depend simply on the industry structure within which a firm finds itself at a particular point of time, but also on the path a firm followed through history to arrive where it is. If a firm obtains valuable or rare resources because of its unique path through history, it will be able to exploit those resources in implementing value-creating strategies that cannot duplicated by other firms. Dierichx and Cool (1989) argue that whether imitation of a particular asset stock will be time consuming, costly, or both depends on the relative ease with which rival firms are able to accumulate a similar asset stock of their own. That is, imitability of an asset stock related to the characteristics of the process by which it may be accumulated. Dierichx and Cool suggest that firm-specific factors such as human capital, dealer loyalty, R&D capability etc. are the cumulative results of adhering to a set of consistent policies over a period of time. Put differently, strategic asset stocks are accumulated by choosing appropriate time paths of flows over a period. Such assets tend to defy imitation because they have a strong tacit dimension and are socially complex. They are born of organizational skill and corporate learning. Their development is "path dependent" in the sense that it is contingent upon preceding level of learning, investment, asset stocks, and development activity. For such assets, history matters.

The second reason means that causal ambiguity exists when the link between the resources controlled by a firm and a firm's sustained competitive advantage is not understood or understood only very imperfectly. In the face of causal ambiguity, imitating firms cannot know the actions they should take in order to duplicate the strategies of firms with a sustained competitive advantage. Indeed, for some asset stocks it maybe impossible to fully specify which factors play a role in their accumulation process, even for firms who already own those stocks (Dierichx and Cool, 1989; Nelson and Winter, 1982).

And, the third reason implies that a firm's resources maybe imperfectly imitable because they may be very complex social

phenomena, beyond the ability of firms to systematically manage and influence (i.e. interpersonal relations among managers in a firm, a firm's culture, a firm's reputation among suppliers and customers). When competitive advantages are based in such complex social phenomena, the ability of other firms to imitate these resources is significantly constrained.

Non-substitutable resources: the last requirement for a firm resource to be a source of sustained competitive advantage is that there must be no strategically equivalent valuable resources that are themselves either not rare or imitable. Dierichx and Cool (1989) argue that the fundamental danger lies in the fact that successful substitution threatens to render the original asset stocks obsolete, typically because they no longer create value to the buyer.

Although the RBP specifies characteristics to determine which resources generate Ricardian rent for firms, it cannot explain sustained competitive advantage in situations of rapid and unpredictable change due to its static or equilibrium framework (Teece et al., 1997). In the world of volatile environment, sustainable competitive advantage is achieved by continuously developing existing and creating new strategic resources in response to rapidly changing market conditions. The capacity to renew strategic resources so as to achieve congruence with changing environment is a specific one. This innovative capacity relates to skill and knowledge acquisition, learning processes, and accumulation of organizational and intangible assets that requires a dynamic or endogenous framework to analyze. In the next section we give a detailed account on this 'new' resource-based perspective, namely capability-based perspective (CBP).

2.2. Capability Based Perspective to Competitive Advantage of the Firm

As analyzed in the previous part, RBP focuses on the rents accruing to the owners of scare firm-specific resources rather than the economic profits from product market positioning. Competitive advantage lies 'up stream' of product markets and rests on the firm's idiosyncratic and difficult-to-imitate resources (Teece et al. 1997). However, in the markets where the competitive landscape is shifting, firms need a kind of capability to "integrate, build, and reconfigure internal and external competencies to address rapidly changing environments" (Teece et al., 1997: 516). For example, Teece et al. (1997) show that well-known companies like IBM, Phillips and others appear to have followed the 'resource-based strategies' of accumulating value technology assets, often protected by aggressive intellectual property stance. However, this strategy is not enough to support a significant competitive advantage. Winners in the global market place are firms that can demonstrate timely responsiveness and rapid and flexible product innovation, coupled with the management capability to effectively coordinate and redeploy internal and external competences. This fact requires a new strand of researches that focuses on the exposing of the nature an characteristics of this kind of capability as well as its relations to other strategic resources to sustain competitive advantage of the firm over time. It is called the Capability-Based Perspective (CBP), where the term 'capabilities' emphasizes the key role of strategic management in appropriately adapting, integrating, and reconfiguring

internal and external organizational skills, resources, and functional competences to match the requirements of a changing environment.

2.2.1. The General Framework of the Perspective

Although the concept of (dynamic) capability is formalized by Teece et al. (1997), it is actually discussed more or less by Prahalad and Hamel (1990) in the term of 'core competences' and Kogut and Zander (1992) in the term of 'combinative capabilities'. Prahalad and Hamel define core competences as the collective learning in the organization, especially how to coordinate diverse production skills and integrate multiple streams of technologies. Consider Sony's capacity to miniaturize. The theoretical knowledge to put a radio on a chip does not in itself assure a company the skill to produce a miniature radio no bigger than a business card. To bring off this feat, Sony must harmonize know-how in miniaturization, microprocessor design, material science, and ultrathin precision casing- the same skills it applies in its miniature card calculators, pocket TVs, and digital watches. If core competence is about harmonizing stream of technology, it is also about the organization of work and the delivery of value. For example, to bring miniaturization to its products, Sony must ensure that technologists, engineers, and marketers have a shared understanding of customer needs and of technological possibilities. Core competence is communication, involvement, and a deep commitment to working across organizational boundaries. It involves many levels of people and functions. The skills that together constitute core competence must coalesce around individuals whose efforts are no so narrowly focused that they cannot recognize the opportunities for blending their functional expertise with those of others in new and interesting ways. Core competence does not diminish with use. Unlike physical assets which deteriorate overtime, competencies are enhanced as they are applied and shared. But competencies still need to be natured and protected. Competencies are the glue that binds existing businesses. They are also the engine for new business development. Patterns of diversification and market entry may be guided by them, not just by the attractiveness of markets.

In the same line, Kogut and Zander (1992) defines combinative capabilities as those to create new applications from existing internal and external knowledge. However, not like Prahalad and Hamel, who shape the concept of core competence from the empirical ground, Kogut and Zander do it from the abstract one. They begin by analyzing the nature of organizational knowledge of the firm by distinguishing between information and know-how. Information, such as prices, can be transmitted without loss of integrity. Know-how on the other hand cannot be transmitted without loss. To be accumulated, it must be learned and acquired. However, both information and know-how within the firm are characterized by the degree of condifiability and the degree of complexity, which cause to the inertness of organizational knowledge, i.e. the difficulty and time-taking for knowledge to transfer and imitate. To make them more useful for many people, they need to be facilitated by organizing principles. This higher-order set of principles play the role as a common language to communicate and combine varieties of functional expertise into

technological capabilities that allow firm to replicate and exploit above-normal rents from them. The paradox here however is that, the more replicable the technological capabilities are the easier for other firms to imitate them. To solve this paradox, the firm needs to have what they call combinative capabilities to 'generate new applications from existing knowledge.' It is the intersection of the capabilities of the firm to exploit its existing knowledge and the unexplored potential of the technology. Since combinative capabilities depend on current state-of-art of internal technologies accumulated by the firm they are not only characterized by organizing principles but also characterized by path dependence.

Surely, Prahalad and Hamel(1990) and Kogut and Zander (1992) provide the crucial elements, such as knowledge, learning, organizational structure and social relations, and path dependence, for a formal capability-based framework to competitive advantage. What they lack however is to put them in a consistent way. And this work is done by Teece et al. (1997). First of all, they give clear definitions to distinguish various concepts which are somehow ambiguous like factors of production, resources, organizational routines/competences, core competences, and dynamic capabilities. According to them, factors of production like land, unskilled labor, capital, and public knowledge are 'undifferentiated' inputs available in disaggregate forms in factor markets; resources like trade secret, specialized production facilities, and engineering experience are firm-specific assets that are difficult to imitate; organizational routines/competences such as quality, miniaturization, and systems integration are integrated clusters of firm-specific assets that enable the firm to perform distinctive activities; core competences are those competences that define a firm's fundamental business as core, i.e. very distinctive and difficult to imitate from competitors; dynamic capabilities are the firm's ability to integrate, build, and reconfigure internal and external competences to address rapidly changing environments. Then, they move to specify that the ways of organizing and getting things done, which are the essence of competences and capabilities, are what is distinctive about firms and may be considered as strategic elements of firms. After that, the authors explore the determinants of these strategic elements. They argue that the strategic dimensions of the firm are its managerial processes, its present position, and the paths available to it. By managerial and organizational processes the authors means the way things are done in the firms, which include its current pattern of practices inside the firm, its learning processes to improve the quality of the current pattern, and its environment-searching processes to accomplish reconfiguration and transformation of the current pattern ahead of competition. By position, the authors refer to its current specific endowments of technology, intellectual property, complementary assets, customer base, and its external relations with suppliers and complementors. And by paths, the authors refer to the strategic alternatives available to the firm, and the presence or absence of increasing returns and attendant path dependencies. Thus, according to the authors, by considering these strategic dimensions, the firm can determine what it can do and where it can go.

2.2.2. The Unit of Analysis

So far, we have understood factors determining distinctive competences and dynamic capabilities of a firm. However, this model is still missing an essential element: a unit of analysis. In Teece et al. (1997), the authors specify that the fundamental unit of analysis of the CB approach is 'processes, positions, paths'. Indeed, this is exactly three dimensions of what Nelson and Winter (1982) call organizational routine. According to Nelson and Winter (1982), routines are constituted from activities that are exercised by individual members and machines within the firm; they are a persistent feature of the firm and determine its possible behavior; and they are heritable in the sense that tomorrow's its performance have many of the same characteristics of its today's.

Nelson and Winter (1982) construct the concept of organizational routine from the concept of individual skill. Following the argument of Michael Polanyi, a scientist-philosopher, the authors show that individual skill is a kind of tacit knowledge which is difficult to communicate and imitate. A person who wants to have it must dwell it by himself through regular and intensive practices. They then argue that organizational routines are not only ultimately constituted from individual skills or but somehow similar to them. On one side, we may think individual skills are quasi-modular components of organizational routines; their names are useful in expressing, for example, the idea that the role played by one skilled machine operator might well be played by another. 'Knowing the job', however, involves knowing things that are relational – involving other participants – and organization-specific (Nelson and Winter, 1982). That is why the skilled operator still needs to learn the job of operating a familiar machine when joining an unfamiliar organization, and why someone who is a perfectly adequate machine operator might nevertheless fail to learn the job. Some of the non-modular knowledge required is skill-like, regardless of what it is called, but these are skills that can be learned only through experience in the specific organization. And on the other side, we may think organizational routines as the skills of a firm. Nelson and Winter describe this metaphor remarkably. "The performance of an organizational routine involves the effective integration of a number of component subroutines (themselves further reducible), and is ordinarily accomplished without 'conscious awareness' – that is, without requiring the attention of top management. This sort of decentralization in organizational functioning parallels the skilled individual's ability to perform without attending to the details" (ibid., p.124-125). Thus although individual skills and organizational routines are similar, the term 'skills' are reserved for the individual level and the term 'routines' for the organizational level (Nelson and Winter, 1982; Dosi, Nelson and Winter, 2000).

Nelson and Winter argued that both individual skills and organizational routines are different kinds of tacit knowledge. Unlike machines and blueprints, they cannot be easily transferred to others firms; indeed, they can exist and create value only in the firms in which they are evolved. As competences and capabilities are constituted from organizational routines and individual skills, they are also tacit in nature and therefore a prime determinant of firm's competitive advantage.

Before ending this sub-section, it is better to make a clear distinction between two notions, competence and capability, which are both constituted from organizational routines, even Teece et al. (1997) have already mentioned on that. After reviewing a large number of theoretical papers, Dosi, Nelson and Winter (2000) suppose that the notion of 'capability' should be used as a fairly large-scale unit of analysis, one that has a recognizable purpose expressed in terms of the significant outcomes it is supposed to enable, and that is shaped significantly by conscious decision both in its development and deployment. While the notion of 'competencies' should be seen as something intermediate between single routines and overall firm-wide capabilities, capturing 'chunks' of organizational abilities identified in terms of performed tasks and knowledge bases upon which they draw. Thus, one might talk like Richardson (1972) that firms do tend to specialize in activities for which their capabilities offer some comparative advantage, and that the pursuit of activities that are similar in the sense of drawing upon the same capabilities may lead a firm into a (coherent) variety of markets and a (coherent) variety of product lines. And one might talk of mechanical competencies to capture, together, ensembles of skills of individual members of the organization and, at the same time, to capture directly organization-embodied elements of knowledge, routines, and so on, all aimed at the design production improvement of, say, machine tools. Note that, in this example, mechanical competencies are not likely to fulfill the overall organizational capability of producing and effectively selling the machine tools themselves. Other complementary competencies will be required to that effect, concerning, for example, electronic technologies, marketing activities, and so on.

2.2.3. Organizational Learning and Learning Organization

If the essence of competitive advantage from the CBP is distinctive knowledge, then the mechanism by which knowledge is acquired, accumulated and adapted in the firm over time is the main determinant. In this sub-section we review literature in the field of organizational learning (Argyris and Schon, 1978; Levitt and March, 1988; Senge, 1990; Simon, 1991; Marengo, 1992; Nonaka and Takeuchi, 1995; Kogut and Zander, 1996; and Marengo et al., 2000) to see how firms can exploit organizational-learning mechanisms as a weapon to maintain and renew its competitive advantage.

In a strict sense, knowledge is created only by individuals (Simon, 1991). An organization cannot create knowledge without individuals. In general, individuals may acquire knowledge via three learning modes: non-cognitive learning, routine-based learning, and associated learning. The first one refers to an automatic process in which individuals are not aware of a learning process in progress and thus are not able to direct it. They are short-sighted and independent of consequences appearing later on. The second one, routine-based learning, is a cognitive way of learning requiring that individuals are aware of the situation, of possible alternative behaviors, and of the freedom to choose between two or more of these behaviors. In other words, routine-based learning has to be motivated. The process to acquire knowledge is followed a set of fixed learning rules and that when the behavior of individuals follows learning rules mechanically, its

outcomes may predict. It changes behavior itself according to experience, knowledge of events. Since it consumes time and cognitive capacity, routine-based learning implies only improvement of individual behaviors rather than leading to optimal behaviors. And the last one, associative learning is the learning process that enables individuals to build or change cognitive models of the worlds, i.e. casual effects and inter-temporal and spatial relations of components of the world.

The firm supports personal learning mechanisms. It provides organizational settings as cognitive frameworks to conduct the two first learning mechanisms. It may provide them new challenges such as new tasks, new means such as new machines, and new social interactions such as new colleagues to overcome problems facing by the firm and by that individuals may generate new knowledge. According to Levinthal (2000) and Marengo et al. (2000), organizations foster learning by its individual members in certain directions and hinder it in others, affect the rates at which individuals learn, shape the efficacy by which individual skills are exploited and contribute to the overall performance of the organization, and affect the rates at which individual skills and broader competencies are diffused throughout the organization.

Since organizational learning is obviously linked to the change of individual skills, it is also linked to the change of organizational routines, competences and capabilities, and organizational structures of the firm (Marengo et al., 2000). In this sense, the firm may control mechanisms of organizational learning to maintain and renew its competences as well as capabilities for competitive advantage. According to Senge (1990), firms who know how to do it is called as "learning organizations." He argued that the learning organization has the capacity for both generative learning (i.e., active) and adaptive learning (i.e., passive) as the sustainable sources of competitive advantage. According to Senge, managers must do the following in order to build a learning organization: (i) adopt "systems thinking"; (ii) encourage "personal mastery" of their lives; (iii) bring prevailing "mental models" to the surface and challenge them; (iv) build "a shared vision"; and (5) facilitate "team learning." Among these five "disciplines", Senge emphasized the importance of "system thinking" as "the discipline that integrates the disciplines, fusing them into a coherent body of theory and practice" (p.12).

Following Senge (1990), there is a large body of literature on the topics of learning organization (or the firm as a processor of knowledge) like Nonaka and Takeuchi (1995), Kogut and Zander (1996), Grant (1996), and Fransman (1999). Although there is a variety among them, there are two sorts of controllable mechanisms which play as determinants for the firm to become a learning organization: coordination mechanisms and incentive mechanisms (Cohendet, Llerena, and Marengo, 2000). Coordination mechanisms are those that 'make the firm possible to bring together both individual actions to meet a defined set of objectives, and local and decentralized learning processes to drive organizational change in a given direction' (ibid., p. 99). When the firm designs coordination mechanisms it should consider the tension between centralization and decentralization to operate successfully in a changing environment. Decentralization

in the acquisition of knowledge is a source of diversity, of experimentation, and ultimately of learning. However, centralization provide a body of common knowledge that guarantees the coherence of the various learning processes. To balance the tension, the firm should consider the characteristics of the learning processes and those of the environment in which the firm operates.

Incentive mechanisms on the other hand are those mechanisms which 'provide a 'pay-off structure' in order to guide actions in a certain direction. They include control/monitoring mechanisms, which instead exert a direct check on actions and their results' (ibid., p. 101). According to Cohendet, Llerena, and Marengo (2000), when organizational learning is considered as the locus to maintain and renew competitive advantage, "incentive schemes should allow the organization to respond, continuously and in a satisfactory and coordinated way, to a turbulent environment This necessity means that there must be in-depth reconsideration of the setting-up of incentive schemes, asking, for example, how to stimulate local learning and diversity while maintaining co-ordination inside the firms; how to allow trials and errors without diminishing the accountability of the final result; and how to ensure that the incentive scheme fosters co-ordination among actions and processes" (p. 102).

2.2.4. Summary

We are coming up to the following logical arguments of the capability-based approach to competitive advantage of the firm:

(i) Coordination mechanisms and incentive mechanisms are the determinants of organizational learning processes of the firm;

(ii) Organizational learning processes determines the pattern, the growth rate, and the path of knowledge accumulation of the firm;

(iii) Within the firm, knowledge is accumulated in organizational routines, competences, and capabilities; and

(iv) Organizational routines, competences, and capabilities are all characterized by the tacit character, and hence they are difficult to be imitated and substituted. They are the source of competitive advantage of the firm over time.

3. Empirical Evidences of the Capability-based Approach to Competitive Advantage: The Case of US and Japanese Corporate Firms

Empirical evidences to support the CBP to competitive advantages of the firm are explored by many economists during the recent decades. Among them, we may list some typical works, which are conducted deeply, widely, and scrutinizing, such as Chandler (1961, 1977, 1992) on US corporations, Lazonick (1990) on British, US and Japanese corporations, Best (1990) on Japanese corporations, Nonaka and Takeuchi (1995) on Japanese corporations, Fransman (1999) on Japanese corporations, and O'Sullivan (2000) on US and German corporations. For the purpose and scope of our paper, we restrict our review on four works written by Best (1990) and Fransman (1999) on Japanese corporations, and by Lazonick (1990) and O'Sullivan (2000) on US corporations. We also restrict the historical period of examination as the post-World War II.

3.1. The Competitive Advantage of US Corporations

The US economy after WWII was indisputably the world's most productive and strongest one. The US not only held dominant positions in capital goods industries such as steel, machine tools, and chemicals but also the leader in consumer goods industries such as automobiles, consumer electronics, and pharmaceuticals. Moreover the leadership of the US industry was not confined to mass-production industries, but also dominant in high technology industries like aircraft, aerospace, professional and scientific instruments, engine turbines, and office, computering, and accounting machinery (O'Sullivan, 2000:105).

The dominance of US corporations after WWII was maintained by the continuity of their successful governance structure established during the New-Deal period. The development of mass-production methods during the late 19th century and the early 20th century broke craft control over work organization on the shop floor. It dispensed the need for shop-floor skills in the development and utilization of technology and allowed the application of Frederick Winslow Taylor's principles of scientific management to the organization of production. As a result, an extreme hierarchical and functional division of labor for shop-floor workers in a wide range of industries. Corporate control was vested in the hands of corporate managers in the interests of shareholder. The separation of ownership and control in many leading corporations made it increasingly apparent that managers characterize of themselves as shareholder-designates. In his 1962 seminal book Strategy and Structure, Alfred D. Chandler documented that the emergence and diffusion of the multidivisional structure within the American corporation from 1920s to 1950s permitted the enterprise to diversify into many new businesses without succumbing to strategic segmentation.

In mass-production corporation, managerial employees share some of the corporate surplus with their shop-floor operatives in the forms of more stable employment and greater wages and benefits. Indeed, the rights of workers in mass-production corporations were protected by powerful worker unions[2] after many wildcat strikes. For example, in General Motor, collective bargaining agreements were reached with a 'right-to manage' clause in 1945. According to the clause, industrial unions did not, in general, challenge the principle of management's right to control the development and utilization of the enterprise's production capabilities. But managers had to ensure that industrial corporation had to share the financial gains with their shop-floor workers. The combination of a growing economy and union movement in the post-war decades meant that blue-collar workers with the major corporations could realistically expect the corporation to provide them with long-term employment. Yet the corporate ideology persisted that shop-floor workers were merely 'hourly' employees, and hence easily interchangeable units of labor, whereas, as 'salaried' personnel, managerial employees were deemed to be members of the enterprise whose skills that corporation

[2] By 1955 the unionization rate has risen dramatically to 33.2% in compared to just 11.3% in 1933 (US Bureau of the Census, 1976:178; in O'Sullivan, 2000:97).

had invested and in the retention of whose capabilities the corporation had an interest.

The consequence of this kind of coordination and incentive mechanisms is enterprises concentrated organizational learning among technical, administrative, and professional personnel within the managerial structure (Lazonick, 1990: ch. 7). The hierarchical segmentation of managerial employees from blue-collar workers and the development of skill-displacing technologies meant that the structures of organizational learning evolved in ways that systematically excluded shop-floor operatives. In other words, there was a division between insiders and outsiders to the corporation's learning process. Nevertheless, the corporations still relied on their steady work - high effort, low absenteeism - to obtain high levels of utilization of the installed mass-production technologies (Lazonick,1990; O'Sullivan, 2000:107).

Core competences of US corporations therefore relied on a set of professional management principles that managers applied to handle their departments and divisions for the profit performance. According to these principles, the organization was broken down into operations that had full responsibility for 'the design, production, and sale of its product, having all the aspects of a separate business'. Such decentralization allowed top managers to specialize into general management skills such as planning, policy-making, and controlling, while let production divisions operate in a routine way to reduce production time and control the quality of mass products. US Corporations developed their organizational competence in a systematic and academic way. For example, General Electric (GE) set up its own business school in New York in 1956 to indoctrinate existing managers and new recruits in the management principles contained in the 'blue books' entitled Professional Management in General Electric. All GE's aspiring managers had to attend the training program in this business school. Once they finished they had secured a position in the managerial organization of GE and were paid a relatively high salary (see O'Sullivan, 2000:116-22).

US corporation then exploited their competitive advantages from these core managerial competences (built mainly from Taylorlist management skills) by extending their product lines into related and even unrelated lines of business activities, not only from internal development but also from external acquisition. Using the Federal Trade Commission data, Ravenscraft and Scherer (1987:32, in O'Sullivan, 2000:110) shown that for the top 200 US manufacturing companies ranked by sales, the means number of lines business rose from 4.76 in 1950 to 10.89 in 1975. And the entry by these corporations into new lines of business was predominantly accomplished through acquisition; only 14 percent of these enterprise's new lines of business were entered through internal development. For example, the Radio Corporation of America (RCA) had grown into one of the leading electronics companies in the US from its origins as a vehicle for the control of the radio-related patents. From the second half of 1960s it committed enormous financial and organizational resources to the computer business and other businesses entirely unrelated to its electronics capabilities such as records, books, carpets, car rental, and frozen food. By 1975, only one-quarter of the company's revenue were

earned in electronics (Chandler, 1997:90, in O'Sullivan, 2000:111).

However, US corporations could not enjoyed their managerial core competences for long. Due to the segmentation between managers and workers, it is difficult for the US companies to respond effectively when from the 1960s they confronted international competitors who were generating higher quality, lower cost products through the integration of both managerial and shop floor employees into processes of organizational learning. Organizational learning within the managerial structures of many US enterprises were limited by the functional segmentation of different groups of technical specialists from one another. Specialists in marketing, development, production, and purchasing may have been highly skilled in their particular functions, but relative to their Japanese counterparts in particular (see the next sub-section), they tended to respond to incentives that led them to learn in isolation from one another. Functional segmentation made it difficult for such specialists to solve complex problems that required collective learning (O' Sullivan, 2000:152). As a consequence, they could not maintain the profit performance of many acquired business lines. The Ravenscraft and Scherer study shows that roughly one-third of all acquisitions (related and unrelated) made in the 1960s and 1970s were sold off (Ravenscraft and Scherer, 1987:190, in O'Sullivan, 2000:115). Similarly, using data on 33 major US corporate enterprises from 1950 to 1986, Porter found that more than half of the acquisition made by these companies until 1980 had been divested by 1986; for unrelated acquisitions, the rate of divestment was even higher at 74 per cent (Porter, 1987:48, 51, in O'Sullivan, 2000:115). The Radio Corporation of America as we illustrate above as a typical case of the expansion wave of US corporation during 1960s had also failed not only to compete with IBM in the computer industry but also in its traditional consumer electronics businesses. And in 1987, RCA had to be controlled by General Electric and was subsequently dismantled (see O'Sullivan, 2000:112).

The insurgence of Japanese corporations and the disadvantage of core competences based mainly on managerial skills forced US corporations to restructure their governance structures to response to new challenges. In respect to coordination mechanisms, US corporations followed two approaches, namely, the leveraged buyout (LBO) and the downsizing. The first approach means that a small group of investors purchases all of the stock or assets of a company with finance raised largely by borrowing. Some of the incumbent manager of the target company is usually included in the buying group The buying group may be also associated with buyout specialists or with investment bankers or commercial bankers. The buying target sometimes is an entire company, but sometimes only a segment, a division, or a subsidiary of a corporation. The purpose of LBO is to reduce the number of stockholders into a smaller group who are able to manage corporate resources better than other groups. Michael Jensen and Richard Ruback state that "competition among managerial teams for the rights to manage resources limits divergence from shareholder wealth maximisation by managers and provides the mechanism through which economies of scale or other synergies available from combining or reorganizing control and management of

corporate resources are realized" (Jensen and Ruback, 1983:6, in O'Sullivan, 2000:167). The LBO approach was started in the US in 1970s and rapidly followed up at the peak in the second half of 1980s.

Besides concerns about the restructuring of corporate control, US corporation also engaged in a process of restructuring their labor forces via the downzing strategy during the 1980s and 1990s. Statistical figures show that between 1983 and 1987, 4.6 million workers lost their jobs, of which 40 per cent were from the manufacturing sector. The elimination of these well paid and stable blue-collar jobs is reflected in the decline of the proportion of the manufacturing labor forces that is unionized from 47.4 per cent in 1970 to 27.8 per cent in 1983 to 18.2 per cent in 1994 (O'Sullivan, 2000:188). The propensity towards downsizing in US corporation affected not only blue-collar workers but also professional, administrative, and technical personnel – so-called 'white-collar' employees. Around tens of thousands of managerial positions were eliminated in the early 1990s (ibid., p. 189). Job elimination has continued to be pervasive among US corporate enterprises during 1990s. A survey from the American Management Association demonstrates that almost 60 per cent of companies employing more than 10,000 people laid off some of their workforce in 1996-97 (ibid., 1990).

In respect to incentive mechanisms, US corporations during the 1980s and the 1990s distributed a large part of their revenue to their shareholders. This behavior was the result of a new slogan 'create value for shareholders' during this period. Annual payout ratios– the ratio of dividends to after tax adjusted corporate profits – in average increased up to 51.6 percent during the 1980s and 58.5 per cent during the 1990s from just 40.5 per cent during the 1960s (ibid., p. 192). The next large portion of the increasing corporate revenue was the direct compensation (salary, bonus, and stock option grants) for CEO, which was increased substantially in real terms by a 209 per cent from 1980 to 1994 (ibid., p. 196). And only a small portion of the increasing corporate revenue have been passed on to the large majority of the US labor force. Productivity grew by 9 per cent from 1989 to 1997 but compensation fell, in real terms, by 4.2 percent for all workers and by 7.8 per cent for male workers (Mishel, Bernstein, and Schmitt, 1999:18, in O'Sullivan, 2000:198). Further, workers were no longer compensated on an 'hourly' basis. Rather, they were put on salaries at a fixed portion (around 90 percent) and a 'reward' portion depending on certain performance criteria (such as productivity and quality) (ibid., p. 214).

The restructuring of coordination mechanisms and incentive mechanisms in US corporations then affected their organizational learning processes. The LBO approach, at least in the early years of the movement, helped the corporation to remedy the problems of strategic segmentation by undoing the mistakes of the conglomerate era. By placing in positions of strategic control 'middle managers' who understood their lines of business far better than senior conglomerate executives, these divisional buyouts created the possibility for the reintegration of strategy and learning - a type of organizational integration that conglomeration had typically destroyed (O'Sullivan, 2000:172). The 'downsizing and distributing' strategy also allowed US

corporation to rebuild innovative organization by investing in the capabilities of narrower and more concentrated skill bases. Such skill bases integrate the productive activities of a relatively small number of highly educated personnel focused on a narrow range of highly specialized activities, e.g. design-intensive activities. By this way, US corporation was possible to outsource assembling activities to other foreign companies. This trend was demonstrated quite clearly in the automobile industry (typically, General Motor), the semiconductor industry (typically IBM and Hewlett-Packard), and the aircraft engine industry (typically General Electric, Pratt and Whitney, and Rolls-Royce) (see O'Sullivan, 2000:211- 221). This trend was also demonstrated in dynamic new venture companies which were settled in networks as Silicon Valley – the phenomenon is precisely what is missing in Japan and many of the advanced economies of Europe. These networks attracted highly educated people around the world, who also grouped into relatively narrow and concentrated skill bases to boost high-tech industries in the US.

By relying on more concentrated skill bases, US corporations developed their core competences as the intellectual property and know-how associated with setting, maintaining, integrating and continuously re-shaping standards for new industries. As Borrus observed: "[US firms] reasserted control over new product development by de-coupling the key technical standards that defined new products from commodity technology inputs, and then aggressively protecting those standards through strengthened intellectual property protection" (Borrus, 1998:2, in O' Sullivan, 2000:222). For examples, IBM built the standards for the personal computer industry, Intel shaped standards for the microprocessor industry, Microsoft shaped the standards for the software industry, General Electric, Pratt and Whitney, and Rolls-Royce set up the standards for aero-engine components, and venture companies in Silicon Valley shaped standards for the information technology industry (ibid., p. 222-3).

With these new core competence, US companies exploited their competitive advantage in design-intensive activities and therefore still control over the value chain of most high-tech industries. The following description written by Brusoni and Prencipe on the basis of detailed empirical research on the aero-engine industry may be the best illustration for the exploitation of the competitive advantages of US corporations in design-intensive activities:

Thanks to accumulated knowledge of components' behaviour as well as of the entire system behaviour, systems integrators can decompose the engine system more effectively and focus more on a few 'soft' capabilities, such as software codes, rather than 'hard' ones, such as manufacturing. Our interviewees have, in fact, confirmed that manufacturing is no longer deemed critical for the integration of the engine system, whereas design and development play a much more prominent role. Within the design activities, however, engine manufacturers focus more on 'concept design', leaving 'detailed design' to suppliers or better RRSPs [risk-and-revenue-sharing partnerships]. (Brusoni and Prencipe, 1999:14, in O' Sullivan, 2000:224)

To some extent, the triumph of US companies over the world during the recent decades is no doubt. However, some scholars

are skeptic on the long-run sustainability of US corporations' competitive advantage in high-tech industries. According to O'Sullivan, the main problem of the US economy nowadays is that US corporations and venture companies have a little interest in investing in workforces, and the government also pays too little attention on upgrading the nation's education, training, and research capabilities (O'Sullivan, 2000:226-30). Without the strong foundations for the increase in productivity, the persistence of the current momentum of the US triumph in future is open to question.

3.2. The Competitive Advantage of Japanese Corporations

The emergence of Japanese enterprises in the global market after the WWII was often viewed as a miracle. Before the war, Japanese products were at the bottom of the quality spectrum in comparison with German and American ones. But, just after three decades, the Japanese successfully challenged the Americans in the mass production of durable goods such as passenger cars, televisions, audio equipment, video equipment, photocopiers, and computers. For examples, by 1976, Japan enjoyed the following share of OECD exports: motorcycles, 90%; televisions and radios, 70%; ships, 43%; watches, 23%; cars, 20% (Best, 1990:141). So, what made the Japanese such successful performance?

After the war, Japan had nearly no resources except labor. To generate the foreign exchange required to finance food and raw material imports, Japanese firms channeled financial and material resources to labor-intensive industries such as textiles, toys, and footwear. Exports were made by low-paid workers and labor-intensive processes. However, they were aware that labor-intensive industries and processes were not the basis for building a high growth economy and therefore sought to redirect resources toward high volume capital-intensive processes.

To achieve this target, Japanese firms applied an appropriate organizational structure that allowed them to decentralize activities but also integrate into a single system. Normally, in Japanese corporations, project teams are assigned by top management to pursue a broad strategic product development goal. The groups have autonomy to decide their own activities. The groups are composed of members with diverse functional backgrounds who work together. Product designers, process engineers, manufacturing personnel, and marketers, for example, work together from the birth of a new idea to its maturity in the new product. In addition, the phases of product design, development, and commercialization are overlapped so that problems are being tackled simultaneously. The product development group faces challenges collectively rather than in the isolation of distinctive specialist departments; information is shared across functional boundaries as common languages are developed and responsibility is shared. In the process, a segmented division of labor is replaced by a shared division of labor. Mr. Watanabe of Honda, who contrasts team members in a relay where each member says: "my job is done, now you take it from here", with rugby, where "every member of the teams runs together, tosses the ball left and right, and dashes toward the goal". The rugby approach allows the cross penetration of ideas from each functional specialty in the design phase; thus knowledge that will

affect the ultimate success of the product is brought to bear on product design at any early stage from each of the departments (see Best, 1990:155).

Japanese enterprises also established special relations between producing units. The automobile industry is a typical example. In Japan, automakers' engineers do not prepare detailed blueprint specifications for each components and send them to subcontractors. Instead, they describe the function and the performance standards and ask a limited number of familiar suppliers to design the component. The supplier offers design ideas that are examined by the automakers' engineers and changes are suggested. A process of dialogue on the performance, quality, production characteristics and costs ensues until a prototype and, eventually, product specifications are agreed. Instead of writing a price and quality standard into a contract in advance of its development, the automakers and parts makers agree a "target cost performance" and a "target quality performance" (ibid., p. 165).

Regarding to incentive mechanisms, Japanese corporations pursued a strategy that kept worker's wages increased continuously in parallel with the increase in their profit performance. At the beginning of the 1970s Japanese wages per hour for production workers in manufacturing were only about one-sixth of US hourly wages. By the end of the decade, however, Japanese wages were about five-sixths of the US level, and during the 1980s the differential vanished (O'Sullivan, 2000:151). They also pursued a strategy that ensured 'permanent employee' status for their workers. According to Lazonick, although only 30 per cent of the Japanese labor forces were regular workers, virtually all the male employees of the dominant mass producers had this status Lazonick (1990:297). This strategy also allowed them to apply the pay increase based on seniority, that made incentives for workers to improve their skills (ibid.).

With the integrated organizational structure and the shop-floor incentive mechanisms, Japanese corporations could conduct organizational learning processes that integrate an ever-increasing array of specific productive capabilities. Learning thus could extend down the organizational hierarchy and involve more functional specialties. One important factor that enabled Japanese corporations to integrate all their members, including top managers, middle managers, and shop-floor workers, into organizational learning processes is the Japanese culture. Culture implies the existence of mutual understandings that allow individuals to transcend the individualism of economic man. Culture is the wellspring of teamwork. Teamwork comes, in part, from a shared commitment to the beliefs that are reinforced by actions on a day-to-day basis, not beliefs embodied in company slogans. Such relations of trust exist between managers and permanent workers in Japanese corporations. Japanese shop-floor workers have responsibility not only to improve their skills but also have degrees of authority and responsibility to plan and coordinate the flow of work for ensuring the quality as well as the quantity of the manufactured goods they produce. And Japanese managers have responsibility to put skills on the shop floor and to elicit high levels of effort from the workers possessing these skills.

The study of Ramchandram Jaikumar (1986, in Best, 1990) is the best illustration of organizational learning processes in Japanese corporations in which social factors and technology are twined together. Jaikumar compared the application of flexible manufacturing systems[3] (FMS) by American and Japanese machine tool companies and concluded that the FMS in USA show an astonishing lack of flexibility. The average number of parts made by an FMS in USA was 10, in Japan the average was 93. The USA companies used the FMSs the wrong way- for high-volume production of a few parts rather than for high- variety production of many parts at low cost per unit. Jaikumar added that the problem facing the USA cannot be solved only by investing in more equipment. Indeed, the way the equipment is used is more important. In Japan, operators on the shop floor make continual programming changes and are responsible for writing new programs for both parts and the system as a whole. In the words of Jaikumar: "the new role of management in manufacturing is to create and nurture the project teams whose intellectual capabilities produce competitive advantage. What gets managed is intellectual capital, not equipment" (Jaikumar, 1986:75, in Best, 1990:158).

The distinct organizational learning processes in Japanese corporations enabled them to develop core competences in time management (Lazonick, 1990:285-8). First, the successful application of FMS gave Japanese corporations to achieve rapid setup times in changing equipment from one relatively short production run to the next. In Japan, the term single setups mean making the necessary change in under ten minutes compared with several hours in other countries. The success of FMS requires that workers possess the skills necessary to coordinate the changes and that they supply their effort to set up a new run as quickly as possible. The more skills workers possess and the more effort they supply, the greater the reduction in unit costs as the fixed costs of plant and equipment are spread over the output produced for a variety of market segments.

Second, the use of the just-in-time (JIT) inventory system is particularly cost effective in flexible mass production.[4] With input requirements changing from one product run to the next, long runs of product-specific intermediate inputs cannot be transformed into final output as quickly, and hence JIT avoids the stockpiling of many different types of supplies. JIT requires workers to coordinate the flow of work across vertically related activities. The involvement of shop-floor workers in coordinating JIT gives them significant power to control the pace of work. The failure to order and deliver inventories "just in time" can bring the whole set of downstream activities to a halt. The success of JIT assumes that management can rely on

[3] In principle, a FMS is an integrated group of computer-numerically controlled and robotized workstations linked by automated material-handling systems. It combines the specialist advantages of a job shop for small-batch production with the scale advantages of a flow line for high volume production. An FMS is flexible in that it functions as a general tool capable of producing a range of specialized products by simply changing the instructions

[4] The inspiration behind JIT, the idea that inventories can be virtually eradicated in the production process, came from Kiichrio Toyoda, the foundation of Toyota Motor Works.

workers to cooperate in supplying their effort to facilitate the smooth and speedy flow of work. In addition, the success of JIT requires that Japanese shop-floor workers possess broad-based skills, developed through systematic job rotation that enable them to participate in the prevention of machine breakdowns, the minimization of downtime, and the repaired of defective work-in-progress whenever and wherever they are needed. As a result, the very involvement of shop-floor workers in the coordination of JIT puts them in the position to engage in quality control.

Time management and the creation of value on the shop floor are no doubt the key competences of Japanese corporations to reduce costs and improve quality of mass products. It becomes the most important weapon for them to contest with US corporations in various industries in the global arena. All of the management practices – 'JIT manufacturing, total quality control, focused factories, concurrent engineering, short product development cycles, and close relationships with suppliers, customers, and laboratories' – that, by the 1980s, were being exported from Japan to the rest of the world entailed broader and deeper organizational integration (Lazonick, 1998, in O'Sullivan, 2000:151-2). Americans began to recognize Japanese manufacturing superiority, not only in automobiles, but also in consumer electronics, electrical machinery, semiconductors, and steel. In 1990 Andrew Grove, the chairman of Intel Corporation, pronounced that 'computers are just like cars, or machine tools, or consumer electronics. American market share is trending down and Japan's is going up. I call it the X-curve. It would depress a cow' (Ferguson and Morris, 1994:109-10, in O'Sullivan, 2000:150).

For illustration, we pick up the case of the consumer electrics industry which was studied scrutinizingly by Fransman (1999) in his book Vision and Innovation: The Firm and Japan. In 1950s, Japanese companies like Matsushita, Sony, Hitachi, Toshiba, Sharp, and Sanyo started moving into transistors and transistor-based products with the aids from their joint ventures or licenses with Western companies (e.g., Matsushita had a joint venture with Phillips in 1952 where it owned 70%) (ibid., p. 96). They then quickly gained and mastered the technical competences necessary to produce their own products such as radios, tape recorders, TVs, video recorders and audio products for the Japanese markets. During 1960s, they were able to develop the competence to innovate. For example, apart from its transistorized radio, Sony produced the world's first fully transistorized television set in 1960. other product-related competences that were have important competitive consequences were miniaturization and design capabilities that facilitated the use of fewer components and more efficient manufacturing methods. In addition, process-related competences were developed which allowed costs to be reduced while quality was improved (ibid., p. 96). With this innovative competence, Japanese corporations now were able to move to international markets. For example, in 1951 Konosuke Matsushita, the founder of Matsushita, make his first trip to the USA. In 1960, 12% of Matsushita's output was exported. This momentum had continued for later decades. By the mid-1970s Japan accounted for over half of world production of color TVs and three quarters of world exports. The outstanding success of the Japanese consumer electronics companies is

also evident from two inter-firm comparisons. In 1982 Matsushita had sales of about $14 billion compare with $16 billion for Phillips, the largest Western consumer electronics company. By 1992 Matsushita had sales at $61 billion against Phillips's $32 billion (ibid., p. 93).

Although Japanese companies achieved high ranks in many industries they still had not held dominant or even very strong competitive positions in many of the major subsegments of these international markets (ibid., p. 97). For example, Japanese information and communication (IC) companies lack dominant or very strong market share outside Japan in subsegments such as: mainframes, minicomputers, workstations, personal computers, software, complex telecommunications equipment, optical fiber, and microprocessors. According to Fransman, this paradox lies on the vision of the Japanese IC companies in international markets. They are still dependent too much on the Japanese economy. Whether they can integrate themselves more closely into the international business and economic structure and can enforce new standards like US counterparts upon these markets is still an open question. "Time will tell how successful they will be" (ibid., p. 99).

3.3. Discussions

Two cases of the evolution of US corporations and Japanese corporations illustrate our argument that firm's coordination mechanisms and incentive mechanisms shape organizational learning processes, which then constitute firm's distinct capabilities and competences that the firm can exploit for its competitive advantage. However, which coordination mechanisms and incentive mechanisms the firm choose and how organizational learning processes are shaped within the boundary of the firm are indeed influenced by the economic environment and somehow by the social and cultural environment of the country where the firm locates.

Lazonick shows that the origins of the differences corporate control between US corporations and Japanese Corporation is a matter of the institutional histories. Since the late nineteenth century, management in US mass-production firms has been concerned with taking skills and authority off the shop floor to deprive workers if the power to control the pace of work. US firms that invest in FMS do not take advantage of the potential complementarities between programmable technology and shop-floor skills. On the contrary, management tries to use technology to increase its control over the flow of work. The story of the relationship between workers and managers in Japan is different. The history of manufacturing at Toyota, for example, indicates that in Japan flexible mass production originated before the advent of numerically controlled machine tools, computers, and other high technology components of modern FMS. The prior development of shop-floor skills and the delegation of authority to workers created the human-resources base for the introduction of flexible technologies, which in turn have enabled Japanese manufacturing firms to transform the high fixed costs of these investments in flexible mass production into low unit costs. Given this institutional legacy, it is not surprising that, from the perspective of American management, the skilled shop-floor worker has represented a threat to the managerial surplus rather than a source of

enhanced value creation. This is the reason explaining why US mass producers have pursued a strategy of segmenting shop-floor workers from participation in the planning and coordination that forms the essence of firm-specific organizational capability and why the dominant Japanese mass producers have integrated a portion of their blue-collar work force into the organizational structures of their firms; And why firms in Japan are successful in introducing quality control on shop-floor whereas US firms have made quality control a managerial function (Lazonick, 1990:289-91).

Our demonstrating cases also show that the competitive advantage that the firm gain is a dynamic one. We may see US corporations after WWII tried to build the competitive advantage solely on the ground of 'scientific' managerial skills. This belief was intensified by the success of General Motor during the New Deal period and inspired to every US managers during the post war period. Only when they had to challenge with the competition from Japan, they were aware that mere managerial skills were not enough to make their competitive advantage concrete. They have then changed and adjusted coordination and incentive mechanisms towards the incorporation of technical specialists into the building of their organizational competences. At some certain extent they succeed, indeed.

After WWII Japanese corporations on the other hand started building their competences from labor-intensive industries. Labor management therefore became their main weapon to compete with US counterparts. This competitive advantage helped Japanese companies quickly get high ranks in global markets. However, only when Japanese firms integrated deeply into international arenas they had been aware of that their existing competences could not ensure them to hold dominant or very strong competitive positions outside Japan. In order to achieve this difficult goal, Japanese companies have no way but adjust their coordination and incentive mechanisms. This process has been proceeded for the last decades and we are now waiting for the result. Will their efforts succeed?

4. Concluding Remarks

In this paper we have reviewed the theory of completive advantages of the firm from the capability-based perspective. This perspective is originated from the resource-based one. It inherits the resource-based perspective in the respect that it focuses on the exploitation of firm- specific assets (core competence) that are difficult if not impossible to imitate, but complements the explanation of how firms renew competences to response to shifts in business environment. Within the framework of capability-based perspective, the competitive advantages of the firm is firstly specified from its coordination mechanisms and incentive mechanisms, then moved to organizational learning processes, and then capabilities and competences. We have demonstrated this framework via the cases of the evolution of US corporations and Japanese corporations from various sources of empirical literatures.

This paper certainly provides only a general picture of how the competitive advantage of the firm is analyzed from the capability-based perspective. To make our logical argument more convinced it is necessary to elaborate particular blocks of the argument such as

specifying typical or hypothetical forms of coordination mechanisms, of incentive mechanisms, and of organizational learning processes, specifying their relationships, specifying lists of possible competences and capabilities, and specifying particular ways the firm exploit them. They should be then used for empirical researches undertaking upon particular corporations in particular industries. This task is open to my future research.

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