

**Corporate Governance during Radical Change:
A Coordination Game Perspective**

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Abstract

Fundamental environmental change like the Asian crisis of 1997 may require enterprises to change their corporate strategy rapidly and radically. However, empirical evidence suggests that even when the need for change is widely recognized, firms are slow to implement new strategies.

One cause of such failure is the stakeholder conflicts arising during radical change. In most systems of corporate governance multiple groups of stakeholders have influence on key corporate strategies, and in consequence major change in organizational structure and strategy requires cooperation of a wide range of stakeholders. Hence, mechanisms of coordinating change have to be at the core of governance during radical environmental change.

The pertinent literature on governance emphasizes agency relationships, yet where they are not clearly defined the capabilities and leadership style of the top management are crucial to implement radical change. A leader has to coordinate large numbers of stakeholders. Based on the game-theoretic concept of a 'coordination game', we point to coordination costs that inhibit restructuring, and argue that crucial task of leaders are communication and creating common knowledge about the organizations future strategy.

Keywords

Coordination, corporate governance, radical change, game theory, leadership

1. Introduction

Fundamental environmental change such as the break down of the socialist economic systems, the Asian crises of 1997 or liberalization in the context of WTO membership may require enterprises change their corporate strategy rapidly and radically. However, empirical evidence suggests that change has mostly been gradual, if it happened at all. This has been demonstrated dramatically by the empirical evidence from firms in transition economies like the Czech Republic, Russia and Vietnam: Despite the obvious need for change, the actual change has been slow. Scholars have recently started to address this puzzle: Newman (2000) argues that cognitive and capability gaps inhibit change in case of radical environmental change. Uhlenbruck et al. (2003) argue that the reconfiguration of the resources is essential to achieve strategic flexibility and thus to improve performance. Yet this requires learning processes that are complex and slow.

We propose a complementary line of argument. The Anglo-American governance literature emphasizes that properly defined agency relationships, managers would implement a strategy that is in the best interest of shareholders as principal. Yet where these relations are not clearly defined, coordination of stakeholders can become a major obstacle. For instance, founding families pursue other objectives as owners than financial investors, or external stakeholders like labor unions or governmental authorities. Where stakeholders other than shareholders have an influence on corporate decision making like in transition economies and many Asian crisis countries, major change in organizational structure and strategy requires complex cooperation. Hence, mechanisms of coordination are essential to governance during radical environmental change, creating special leadership challenges.

I argue that the coordination aspect of leadership is core to understanding governance during radical organizational change. Organizations face a range of stakeholders who take an interest in the organization, especially if formal governance structures are poorly defined. A

leader has to coordinate these stakeholders, notably by means of communication and by creating common knowledge about the organizations future strategy.

Case studies show that exceptional managers distinguish the firms that best implement radical change. In Newman and Nollen's (1998) cases, strong leadership in terms of strategic thinking, decisiveness and initiative, and attention to operational efficiency distinguished the most successful Czech firms. Other case evidence points to the role and personality of the individual, or the management team, leading the enterprise (Johnson and Loveman 1995). Leadership research has shown that managers employing 'transformational' leadership style significantly improves organizational performance (Elenkov 2002). This is associated with characteristics of charisma, individualized consideration and intellectual stimulation, and appears necessary to overcome the organizational inertia and bridge the huge gap between past and future strategies in post-socialist organizations.

The theoretical arguments are developed in this paper on the basis of the game-theoretic concept of a 'coordination game'. Principal-agent models cannot be applied if the firm is subject to complex relationships with multiple, diverse agents, or if agency relationships are poorly defined, and include informal means of influence. Therefore, we use coordination games to analyze the challenge of coordinating a group of stakeholders to pursue a common strategy. Coordination games may appear simplistic relative to other games, yet they provide a powerful tool to analyze organizational realities, and the emergence or design of institutions in particular (Camerer and Knez 1994, Calvert 1995). Experimental economics research has shown that coordination games frequently fail, even in simple experimental settings (Ochs 1995). A mechanism is thus needed that induces agents to choose routines that provide the mutually best outcome. Leaders can resolve coordination games not only by creating incentives but by creating 'common knowledge' among agents on which routines shall be pursued in the future. They can therefore overcome the coordination challenges of

firms facing radical environmental change.

The paper is structured as follows: section 2 reviews theories of corporate governance, contrasting agency and stakeholder perspectives. Section 3 reviews outlines the coordination problems encountered under traditional governance systems and under the emerging governance systems observed in transition economies. Section 4 develops our new arguments on the basis of the game-theoretic construct of a coordination game. Section 5 concludes.

2. Theoretical perspectives on Corporate Governance

Corporate governance is “concerned with the means by which dominant decision makers (typically managers) are controlled by other interested parties” (Monks & Minow 1995, p.1). Effective corporate governance is particularly important during periods of radical environmental change. The way corporate restructuring is undertaken during periods of disruptive change has, due to path-dependency, long-term implications for the structure of the industry and its competitiveness.

In the Anglo-American literature, **principal agency theory** has become the dominant paradigm of corporate governance research. Managers are analyzed as the agents of the shareholders as principals (Jensen and Meckling 1976, Fama and Jensen 1983). Agency theorists consider a system of corporate governance as efficient if it ensures that suppliers of finance get an appropriate return on their investment (Shleifer and Vishny 1997). The interests of other stakeholders, such as employees, suppliers and customers, are mediated by labor and product markets. As agency theory models generally assume that these markets are functioning efficiently, this suffices to guarantee their interests (Buck et al. 1998, p. 83).

Principal agency theory has been employed to analyze different institutional and organizational arrangements to establish under which conditions shareholders can best ensure that managers pursue shareholders interests. Weak corporate governance can lead to

principal-agent conflicts between owners and management, and between different groups of owners. In the presence of incomplete contracts, managers retain discretionary control and possess inside information, such that owners incur considerable monitoring costs. These costs are particularly pertinent for dispersed outside owners, as each 'principal' would incur relatively high monitoring costs relative to her proportional share in increased profits.

Researchers taking a **stakeholder perspective** focus on the existence of multiple stakeholders other than owners of equity. This research tradition is sometimes called stakeholder theory, though it may not fulfill the requirements of a theory, but rather be an area of application of different organizational theories (e.g. Treviño and Weaver 1999). A stakeholder is "any group or individual who can affect or is affected by the achievement of the firm's objectives" (Freeman 1984). The stakeholder literature is "unique in its reluctance to assume the predominance of one stakeholder group - that is, shareholders - and its normative assumption that the interests of all stakeholder groups have intrinsic value" (Jones and Wicks 1999). Stakeholders can use both 'voice' and 'exit' strategies to influence the firm. The ability to exit strengthens effectiveness of the stakeholder's voice within the firm, as does a financial stake. Yet financial stakes are not the only determinant, especially under conditions of weak enforcement of property rights.

Three traditions of stakeholder research have evolved: instrumental, normative and descriptive approaches (Donaldson and Preston 1995). The *instrumental* view argues that if managers view the interest of stakeholders as having intrinsic value worth, and pursue the interests of multiple stakeholders, this would aid the performance of the firm as viewed from owners' perspective (e.g. Jones 1995). The *normative* stakeholder perspective intersects with business ethics literature. It starts from the presumption that managers have a moral duty to consider stakeholders other than shareholders (e.g. Freeman and Evan 1990, Donaldson and Preston 1995).

Descriptive stakeholder research starts out from the fact that stakeholders exist, and that they factually have influence on management. It thus analyses theoretically and/or empirically which stakeholders matter, and why (e.g. Brenner and Cochran 1991, Mitchell et al. 1997), or how these stakeholders influence managerial action (e.g. Frooman 1999). Scholars in this tradition “posit that the nature of an organization’s stakeholders, their values, their relative influence on decisions and the nature of the situation are all relevant information for predicting organizational behavior” (Brenner and Cochran 1991, p. 462).

Arguably, the stakeholder research has as yet little to say on how different stakeholders coordinate their activity in the absence of clear governance structures. However, where governance structures are ambiguous, stakeholder economics are a reality that cannot be defined away. Hence, advising managers to pursue profit maximization is insufficient when other stakeholders hold legitimate claims.

3. Governance under different forms of ownership

3.1. Traditional Models of Governance

The literature distinguishes broadly three models of governance that overcome the agency problem of dispersed ownership (Shleifer and Vishny 1997). In the **Anglo-American system** of governance, managers have to serve shareholders’ interests, who monitor them through the stock market. Other stakeholders normally have comparatively little influence. Shareholders’ lack of direct influence is compensated for by **efficient stock markets**. In particular, stock options provide powerful incentives for managers to act in shareholders interest and takeovers provide a mechanism by which widespread equity ownership may rapidly become concentrated (Shleifer and Vishny 1997). Managers act in anticipation of potential hostile takeover and thus aim at keeping the share price high, which is in the interest of shareholders.

Yet this mechanism requires credible threats of takeovers, and thus efficient and liquid markets for equity. Efficient markets in turn require readily available information about the firm's performance, e.g. in form of audited accounts, and market regulation that prevents for example insider trading. Agency theorists tend to prefer this model, because of its clear governance structure.

Criticism of the model comes from theoretical and empirical perspectives. The model assumes that all markets are efficient, and hence "principals and agents have freedom of *entry* into and *exit* from contractual relationships" (Hill and Jones 1992, p. 135, original italics). This assumption may to some extent hold in the very large economy of the USA, yet implies that the model is only to a limited extent transferable to other contexts. Empirical concerns arise from the high costs of hostile turnover battles, which have to be deducted when assessing the efficiency of the system. Moreover, the high salaries paid to top executives and the inefficiency of remuneration in form of stock options in practice (Murphy 1998, Economist 1999), and recent dramatic failures such as ENRON do not instill confidence that managers serve only shareholder interests.

In contrast to Anglo-American model, corporate governance systems in Japan and continental Europe assign stakeholders like banks and non-managerial employees a formal role in governance. In Germany, banks play an important role in the monitoring of firms, in two ways. Firstly, most individual shareholders delegate their voting rights to their bank, which then votes in shareholder meetings on behalf of their clients. Secondly, firms often entertain close relationships with their bank, the so-called *Hausbank*, which also may hold some equity. Thus banks have a central role in the monitoring process as they effectively control large shares of the votes at shareholder meetings. Japan has a similar **bank-based system of governance** such that this model is known as the **German-Japanese model** of governance. Agency theorists tend to be concerned that banks use their voting rights to

protect their interests as providers of loan capital, which may conflict with the interest of minority shareholders. Another feature of the German system is that firms have a two-tier board structure. The supervisory board (*Aufsichtsrat*) consists of up to 50% of members that are elected by employees, while the remainder represents shareholders. Hence the employees have a formal right to participate in setting the goals of the firm and in monitoring it. Yet the involvement of banks and employees in governance may create coordination problems, as agency relationships are less clearly defined.

In many other countries the governance of firms relies to a large extent on **ownership concentration**. Especially in smaller and medium size firms, the founder's family or descendants, or a related firm, may hold a large bloc of shares, and thus have strong incentives to closely monitor the firm. Such ownership patterns are common across Asia, including for instance India and Thailand as well as overseas-Chinese businesses (Carney 1998, Young et al. 2002). Shleifer and Vishny (1997) describe such governance model as typical for Italy. Therefore, we call it here the **Asian-Italian model**. Yet also many medium-size firms in Scandinavia, Germany, and Japan have large bloc shareholders. Agency theory points out that conflicts of interest between the main shareholder and minority shareholders may be considerable. Hence, a system with extensive bloc ownership needs a strong legal framework that explicitly protects minority shareholders' rights. The lack of such protection has been noted as a major problem in major companies in Asian emerging economies (Economist 2000, 2001, Young et al. 2002). Managers have to coordinate the interests of bloc shareholders and financial investors.

3.2. Governance in Transition Economies

The problems of governance vary according to the ownership pattern of the firm. In most transition economies, privatization led to a variety of new owners including investment funds,

management and employee owned firms, the state, dispersed private shareholders, as well as firms with partial or full foreign ownership (e.g. Estrin 2002). These alternative forms of private ownership create very different relationships between managers and stakeholders. In the following, we review different types of ownership in transition economies to identify the implications for corporate governance.

As a consequence of diverse forms of ownership, and diffuse control structures, theories considering stakeholders received considerable interest by analysts of corporate governance in transition economies (Buck *et al.* 1998, Mygind 2001). In transition economies, owners are often comparatively weak relative to other stakeholders, and some of these stakeholders may have ownership rights too. Stakeholder theorists have described managers as the center of a ‘hub and spoke’ stakeholder system (Jones 1995), which is a particular appropriate description of societies that rely to a high degree on relationship-based coordination of economic activity, such as China and overseas Chinese businesses.

Buck *et al.* (1998, p. 100) hypothesize that in the long run, dysfunctional managerial behavior will lead to failure of firms, and ownership patterns will move towards outside shareholders with ‘core shareholdings’. However enterprises have to face current challenges, and take strategic decisions, without the luxury of time to wait for governance structures to evolve. Firms in transition economies act by relying to a large extent on network relationships (Stark 1996, Peng and Heath 1996). We interpret this as a symptom of ambiguous governance structures and weakly developed market-supporting institutions.

a) Dispersed ownership, with weak capital market institutions

Across transition economies, mass privatization on the basis of vouchers has been used to create widespread popular ownership of industrial equity and to redistribute wealth to citizens in a ‘fair’ way, thus generating popular support for reform. Policy makers and their advisors

who designed these schemes generally intended to create Anglo-American type governance systems. However, experience has shown that this model depends on sophisticated institutions that were not in place, and moreover are difficult to create under the conditions of unclear legal frameworks and weak law enforcement (e.g. Estrin 2002, Buck et al. 1998).

Dispersed ownership and indirect control structures may provide many shareholders with formal rights to monitor firms, yet few if any may have the necessary power, incentives and capabilities. Individual small shareholders have little leverage to influence management, as they would only get a small return on their monitoring efforts; and many may lack the basic expertise to understand corporate accounts and corporate strategy.

Governance via stock markets requires credible threats of takeovers, and thus efficient and liquid markets for equity. Yet the nascent stock markets in emerging markets lack efficiency and transparency and thus are not able to serve this function. Moreover, the legal requirements to involve outside shareholders and to publish relevant information are only gradually being established, and even slower implemented. Even basic accounting and auditing practices have not been implemented everywhere. Hence outside shareholders may face considerable information gaps.

In many transition economies, **investment funds** have sprung up, like in the Czech Republic, or been created by the privatization authorities, like in Poland. They control considerable stakes in many voucher-privatized firms. Yet this construction raises the issue of who monitors the monitor? In other words, do the managers of these funds have appropriate incentives to act in the interest of the shareowner whose shares they administer? In the **Czech** scheme - the first and most publicized - investment funds attained considerable power through the accumulation of vouchers and bidding on behalf of individuals. They now control major Czech businesses, but themselves are often owned by (largely state owned) banks. This creates interdependent institutions without clear monitoring and control structures, but with

multiple agents that have hold-up power (Hayri and McDermott 1998).

Overall, voucher privatization has not fulfilled the expectations that its political proponents initially pursued (Estrin 2002). Dispersed ownership and weakly defined roles of other stakeholders, such as state-owned banks and investment funds, have created diffuse governance structures that at the same time involve many stakeholders, yet allow managers in many firms to pursue their own objectives in the absence of effective owner control.

b) Managerial ownership

If managers own a firm, the principal-agent conflicts between manager and owners are eliminated. Partial managerial ownership may help to align the interests of managers and owners, but under some constellations may raise concern over the protection of minority stakeholders. Moreover, theoretical arguments suggest that also managerial ownership can inhibit effective governance. This concerns firstly the entrenchment of incumbent managers resisting change, and the selection mechanisms of recruiting the best-qualified individuals into leadership positions.

The *entrenchment* of incumbent managers may result from privatization schemes with preferential access to insiders, e.g. as part a voucher scheme. These schemes do not have a build-in mechanism to replace managers that may hold their position due to political rather than managerial qualifications. If the owner-managers control a large share of equity, and their outside career opportunities are lower than their current income, then they have strong incentives to retain their share, which serves to increase their job security. Hence they inhibit sale of shares to outside investors, who eventually may replace management with better-qualified individuals and downsize employment (Filatochev, Wright and Bleaney 1999). Moreover, insiders gaining ownership through voucher privatization may perceive it as *windfall gain*, which, according to studies on windfall gains in the US, is consumed faster

than earned income (Djankov 1999).

A different line of theoretical work attributes superior performance of private firms not only to incentives for agents but the ability of private firms to attract and select more qualified managers (Rosen 1992, Barberis et al. 1996). The efficiency of mechanisms of replacing managers may be crucial for restructuring because lack of managerial qualifications for the market economy inhibits performance. MBOs, and even more Management Buy-Ins, contain a competitive element to select better-qualified manager-owners. If managers acquired the firm through a MBO, this process is likely to act as a selection mechanism that brings only the most qualified individuals into the top management positions (Carlin and Landesmann 1997). Only managers believing in their ability to improve enterprise performance would be willing to invest their own capital, and only well qualified managers would be able to raise capital externally to finance the MBO.

These arguments suggest that the individual personality of the manager, in particular the qualification and the entrepreneurial talent, are crucial for performance of manager-owned firms. Empirical evidence supports the importance of bringing in new managers, rather than creating stronger incentives for incumbents. Barberis et al. (1996) analyze 452 shops in Russia and find that human capital *change* stimulates restructuring. Hence, they argue that “restructuring requires new people, who have new skills more suitable to a market economy”, and that “equity incentives for old people might not be particularly effective in bringing about significant change” (1996:488). Similarly, Claessens and Djankov (1998) find that performance in the Czech Republic is improved by *changing* managers, but *not* by providing managers with *incentives* in form of equity stakes.

c) Employee ownership

Employee-ownership is widespread across Eastern Europe as the privatization procedures

often gave insiders preferential access to ownership (Earle and Estrin 1997, Buck et al. 1998).¹ Insiders often received preferential access to ownership to ensure their cooperation in the privatization process. However, many commentators see it as an obstacle to enterprise transformation because workers pursue motives other than profit maximization, and because insider-owners complicate internal decision processes, inhibiting radical change (e.g. Boyko et al. 1996). On the other hand, employee-ownership can have positive effects on productivity through motivation and a cooperative atmosphere that increase trust and information sharing (e.g. Ben-Ner and Jones 1995).

The results of empirical studies on the effects of employee-ownership on firm performance are highly sensitive to the selected proxy of performance. Most studies find beneficial effects of employee-ownership compared to the *status quo ante* of state-ownership. However, foreign- and managerially-owned firms generally outperform employee-owned firms (Djankov and Murrell 2002). Yet some studies also find positive effects of employee ownership compared to dispersed shareholding on production efficiency (Earle and Estrin 1997), on labor productivity (Djankov 1999), or on product, input and asset restructuring (Estrin and Rosevear 1999).

However, the influence of employees is not limited to their ownership shares. One unpredicted consequence of east European privatization is the influence that managers and/or worker councils attained, *de facto* or *de jure*, notably in Poland and many CIS countries. Many cases have been reported, where work councils have blocked restructuring proposal (Carlin et al. 1995) or a take-over by a foreign investor (Bak and Kulawzuk 1997).

In consequence, managers wishing to implement radical change have to co-opt employees, and cannot rely solely on their legal authority or the threat of dismissal of non co-

¹ Contrary to widely held perceptions, partial employee-ownership is also a common phenomenon in Western countries, including the USA as reported by for instance Demsetz (1983) and Blasi and Kruse (1991).

operative employees. Formal rights held by employee-owners or statutory work councils may reinforce this need for cooperation.

d) State ownership

In China and Vietnam public ownership still dominates many sectors of industry. As units of the state, such as central ministries and local authorities, hold equity in firms. The vast majority of Chinese firms traded on the stock exchange still has the state as a dominant owner, or even as majority shareholder, which creates potential conflicts of interest between minority shareholders and the state as owner (e.g. Tian 2002). Also in Eastern Europe, the government still holds directly or indirectly partial ownership in about 20% of privatized firms (Maw 2002).

Across transition economies, firms in state ownership generally under-perform privately owned firms in terms of profitability and growth, but partially state-owned firms may perform well if the state takes a passive role (Djankov and Murrell 2002). Theoretically, it should be feasible to create effective control and monitoring mechanisms, and clearly defined objectives. There is some evidence that providing autonomy and profit incentive would increase performance of Chinese state-owned enterprises (Groves et al. 1994, Li 1995), though Li and Wu (2002) argue that the effect of such incentives is less than that created by ownership changes.

The underperformance, in financial terms, of state-owned firm may in part be due to them pursuing additional social rather than economic objectives. But there is also evidence suggesting that state-owned firms are particularly resistant to change, which undermines their ability to react to a volatile environmental.

This resistance to change may arise from the large number of inside and outside stakeholders taking an active interest in state-owned firms, including politicians, bureaucrats,

the media and various interest groups. Managers are subjected to these pressures, while at the same time being able to play off different stakeholders against each other. Major change in state-owned firms may be subject to approval by political institutions. These in turn may only approve a given new strategy if none of the key stakeholders in the political process objects. Hence, several stakeholders may be in a position to bloc change, while not being able (led alone being forced) to present alternative suggestions.

In consequence, managers' ability to win broad support among stakeholders for their strategic change proposal may often be precondition for implementing change in state-owned firms. A symptom of this aspiration for broad support is that state-owned firms use to a high extent network-based strategies to pursue growth, or at least survival (Peng and Heath 1996).

3.3. Governance Challenges

The review of ownership and governance structures in emerging markets shows that clear governance structures are more an exception than the rule. A convergence towards the Anglo-American model is, if at all, happening slowly due to the diverse legal, political and institutional contexts of firms and markets in emerging markets (Guillén 2000).

The advice to create clearer governance structures and an institutional framework to support them is likely to benefit in the long term, but it does not help addressing problems facing businesses in the short run. Managers in many firms have to deal with the fact that they have many stakeholders that take an active interest, and many of them have possibilities of blocking restructuring decisions (Hayri and McDermott 1998).

Hence, coordination of multiple agents in a context of ambiguous control structures is a key task for managers in many countries, especially in transition economies. Empirical research suggests that leadership qualities (Elenkov 2002) and networks (Peng and Heath 2002) are important in these contexts. But how do they help overcoming the coordination

problem? In the next section, I develop a theoretical analysis of governance as coordination game, which illustrates the managerial challenges of radical change, and hence the type of skills required of managers.

4. Governance as a Coordination Game

How do managers lead strategic change when faced with radical environmental change? First, they have to develop strategies, which involves analysis of the business environment and of the position of the firm and its resources, identification of business opportunities, and then formulation, assessment and continuous adjustment of possible plan of action. The strategy has to establish how **stakeholders providing resources to the firm** should together develop and exploit these resources to create competitive advantage for the organization.

Secondly, the strategy has to be implemented. This requires motivating stakeholders to follow the prescribed path of action. **They, or at least a critical mass of them, have to be convinced of the path to pursue.** A precondition is that incentives for the individual agents are consistent, which may include side payments for those who would not benefit from change. Else, incompatible incentives for individual agents may create to prisoners' dilemma type situations and lead to non-cooperative games that undermine cooperation.

However, even if all stakeholders would become better off with the new *strategy*, they may fail to coordinate their individual *routines* accordingly.² Cognitive barriers may inhibit the **understanding the structure of the game and other players' likely actions.** A leader³ can **overcome the coordination failure and bring all members of an organization on a common path** by creating common knowledge a about the aspired new strategy and thus creating **the**

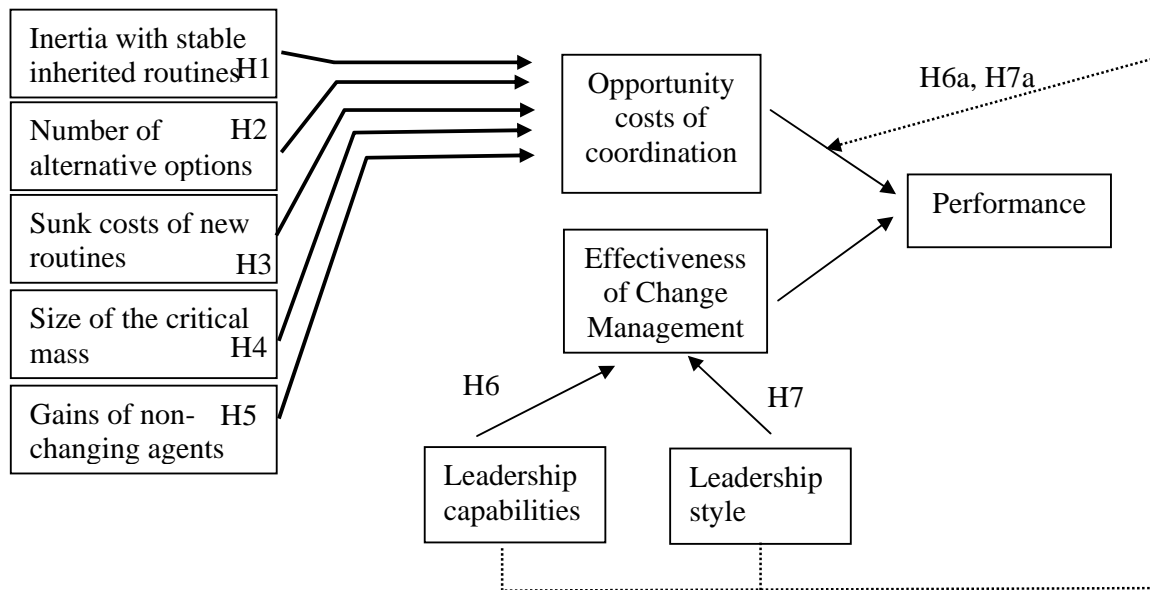
² We adapt the following terminology: *strategy* refers to the action of the firm, and *routine* to the actions by individuals within the firm.

³Analogous to the convention in the principal agent literature, we refer to the leader as *she*, and to the players

expectation that everyone else is pursuing the same path (Foss 2001).

The challenge of changing corporate strategies can be depicted as a coordination game in which many independent agents simultaneously have to change their modes of behavior. In this theoretical discussion, we first explore that sources of coordination problems, and the proceed to analyze how leaders overcome these obstacles. Firms ability to implement radical change and their corporate performance then is a function of coordination costs and managers ability to deal with them (Figure 1).

Figure 1: Coordination Costs and Leadership



(agents, employees, stakeholders) as *he*.

Figure 2: A coordination game

		Player 2	
		A	B
Player 1	A	(2,2)	(0,0)
	B	(0,0)	(3,3)

Note: in the initial situation, all agents play routine A (shaded area).

4.1. A Coordination Game Analysis

Figure 2 illustrates a basic ‘coordination game’. Two players, 1 and 2, both face a choice between two routines A and B. If both pursue routine A, they will collect a return of 2, and if both routine B, they may collect a higher return of 3. Yet if they fail to coordinate, both will get a zero return. Under these conditions, and under conventional assumptions, agents should be able to achieve higher returns by changing their individual routines to play B. But is this sufficient to trigger change?

Suppose the two players have played routine A over many rounds of the game. Changes in the environment make routine B feasible (or more profitable), but information concerning routine B is not widely shared. Thus players’ individual incentives suggest staying with routine A, if expectations over other player’s strategy are formed based on past behavior. No one would divert from (A,A), which is a Nash-equilibrium. Such a backward formation of expectations is commonly assumed in adaptive learning and evolutionary models of game theory (e.g. Fudenberg and Kreps 1993), and fairly realistic unless potential losses are small. The assumption is supported by experiments of repeated games that have shown strong path dependency: “learning commonly yields convergence to an equilibrium in the stage game, but the outcome is frequently history-dependent, and the effects of strategic uncertainty may

persist long after it has been eliminated by learning” (Crawford 1997: 235, emphasis added).⁴

Coordination games emerge in many economic contexts both within and between organizations. They are a particular appropriate depiction of radical organizational change, where many stakeholders, including employees of the firm, have to be coordinated on a coherent set of routines. However coordination is often more complex, for instance because stakeholders could choose among several alternative strategies. With several new strategies that each yield higher returns if and only if *all* pursue the *same* routine, but lower returns otherwise, the coordination requires inducing everyone to pursue the same strategy. Such a game has multiple Pareto-ranked equilibriums, but not necessarily a selection mechanism to choose among them.

Moreover, we have so far assumed implicitly that change is costless. However, agents may have to invest in new skills to be able to shift their routines. This investment may be at least in part sunk costs specific to the strategy. The sunk costs may moreover be higher the earlier a player changes his routine.

Hence the need for coordination creates opportunity costs in that the actual strategy of the firm may be implemented slow or imperfectly. We refer to these opportunity costs as coordination costs. The higher these coordination costs, the less efficient forms are in implementing strategic changes with negative implications for corporate performance. Hence, the complexity of the coordination task impacts on performance. As argued above, the complexity depends on inertia to change and the range of possible actions. These arguments are summarized in the following propositions:

⁴ This game is similar to ‘stag hunt games’. In such a game, players using routine A would earn a return of 1 independent of how the other player behaves. Yet the higher return of 2 can only be earned if both players use routine B (see Bergstrom (2002) for a review of recent conceptual work on the evolutionary dynamics of stag-hunt games). This makes coordination slightly more complex as routine A is always a low risk alternative if confidence in the other player is low. Experiments using stag-hunt games have shown that, although groups often reach an equilibrium, failure to coordinate on the Pareto-optimal equilibrium was observed in several of the experiments reviewed by Crawford (1997) and Ochs (1995).

Proposition 1: *The more an organization has inertia created by the stability of inherited routines, the higher are coordination costs, and in consequence the weaker is post-restructuring performance.*

Proposition 2: *The wider the range of alternative options available the higher are coordination costs, and in consequence the weaker is post-restructuring performance.*

Proposition 3: *The higher the individual sunk costs of adopting new routines the higher are coordination costs, and in consequence the weaker is post-restructuring performance.*

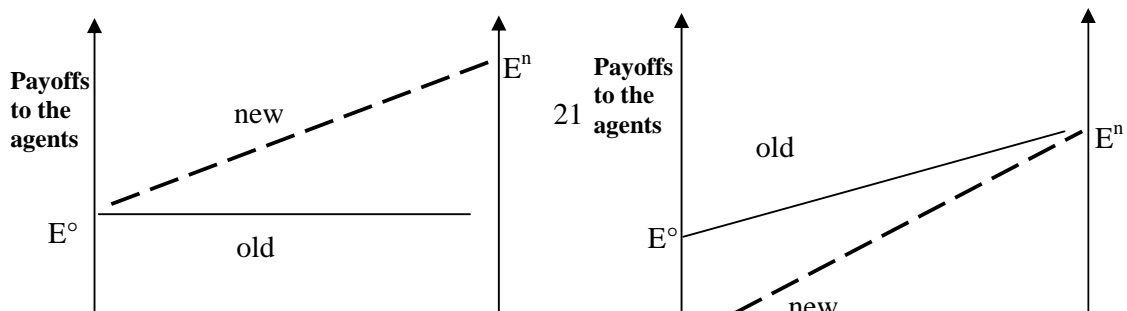
4.2. Multiple Agents, and Critical Mass

The model of Figure 1 considers only two agents, yet most corporate change requires the coordination of many stakeholders. The outcome of a multiple agent coordination game depends on the returns that agents receive whether or not they cooperate. However, theoretical and empirical research suggests that the probability of coordination failure increases with the number of players. Figure 3 illustrates two benchmark cases of coordination games with many agents. The pay-off that each agent collects depends not only his own chosen routine, but also on that of others. In Figure 3a, agents switching to the new routine collect an increased pay-off even if there is only a single agent switching, while those who stay with the old routine do not. Hence, the initial equilibrium at E^o is unstable, and the agents will naturally progress to the new equilibrium E^n .

Figure 3: Payoff function for agents following the old/new routine: Polar cases

Figure 3a: Self-solving coordination game

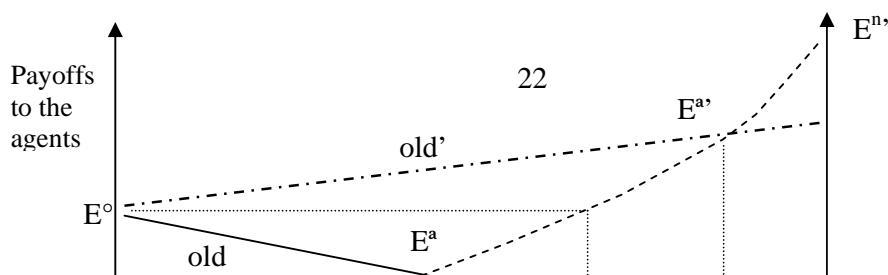
Figure 3b: Weakest link game



The opposite polar case would be a game where a superior outcome is only reached if all agents cooperate. Theoretical models show such failure for instance if mutations or inertia influence the selection of routines (Cooper 1999:14). Experimental research of such 'weakest-link games' finds that groups of 10 persons or more mostly fail to coordinate on the optimal equilibrium (e.g. Camerer and Knez 1994).

However, such strict necessity of all agents co-operating is not an appropriate reflection of business realities. Rather, superior outcomes may depend on cooperation of many but not all agents. Consider a game where players need to coordinate their shift from an established but inferior routine 'old' to a superior one called 'new'. The new routine yields a higher pay-off if, and only if, a substantial share of agents shifts to the new routine. If however too few agents change, then everyone may be worse off. This leads to a *critical mass problem*. Since expected returns depend on the expected behavior of other agents, it is necessary that a sufficiently large number of agents believe that a critical number of others will shift to the new routine.

Figure 4: Payoff functions for coordination game with critical mass



Notes: a = critical mass, b = critical mass avoiding the transitional crisis.

Figure 4 shows a general case of this multi-person coordination game. The payoff for each agent depends not only on their own actions, but on the routines chosen by all other players. Agents choose between their old routine and switching to the new one based on the expected returns that in turn depend on their *beliefs* concerning other player's behavior. If an agent believes that at least a agents will switch, he will do likewise - even if the new return is below the pay-off in the previous period. Thus, a is the critical mass.

Considering the evolutionary dynamics of the game, it has three equilibriums, of which two are stable. The initial position is a stable Nash-equilibrium: with adaptive expectations (based on other agents' past behavior), no agent has an incentive to change. It requires a coordination of at least a agents to choose 'new' to create a situation where playing 'new' yields at least as much as staying with the old routine.

In repeated rounds of this game, and adaptive expectations, the dynamics of the game will lead to a convergence to an equilibrium where all agents play the same strategy, E^o or E^n , though it may temporarily rest at the inferior unstable equilibrium E^a . If at least $a+1$ shift to 'new', the game converges to the new equilibrium E^n . If less than a agents shift to the new regime, the dynamics of a repeated game will lead to a return to the original, low-level equilibrium E^o .

In general, *if returns from pursuing a new strategy are positively related to the number of agents pursuing the same strategy, and if a small number of switching agents would be worse off than with the old routine, then coordination of a critical mass of agents is necessary to reach the Pareto-superior equilibrium.* In applying this model to business, this critical mass may be anywhere between 0% and 100%, and some stakeholders *may carry more weight than others.*

During the adjustment process, the returns may fall before they increase. This provides an explanation of the transition crisis experienced by *many firms during radical change. Such a transition crises may undermine the credibility of the announced strategy, and can thus lead to a resistance to change.* The transition crisis can be avoided if a larger critical mass ***b*** switches to the new routine from the outset.

In a variation, the payoff function *old'* for those staying with the old routine is assumed to benefit from the increased productivity of those switching early. While this scenario avoids the transitional crises, paradoxically, it requires a larger critical mass (***a'**=**b'***) to reach the new equilibrium. Considering the critical mass effects, we can state two more hypotheses that arise from the analysis in figure 4:

Proposition 4: The more agents are required to achieve the critical mass the higher are coordination costs, and in consequence the weaker is post-restructuring performance.

Proposition 5: The more agents staying with their old routine partake in increasing revenues the higher are coordination costs, and in consequence the weaker is post-restructuring performance.

4.3. Creation of Common Knowledge to resolve Coordination Games

The theoretical discussion suggests that *a move to the higher-level equilibrium occurs if*

agents believe that the *other* agent(s) will play the new routines. Hence, a switch to the higher level-equilibrium requires them to change their *beliefs* about the other agent(s). When they recognize the new strategic option, they do not know if the others have the same information. Neither do they know *when* the others will move to the new routine. They will only act if they share ‘common knowledge’ (Lewis 1969, Geanakoplos 1992) on the structure of the new game, and when the switch to the new routines is to occur. Common knowledge refers to a situation where A knows that B knows that A knows that B knows, and so on, i.e. *all agents know that others also share the knowledge*, inclusive the fact that everyone else knows it too. Without common knowledge, on both the new pay-off structure and the timing of the switch, the higher-level Nash-equilibrium may never be reached.

This common knowledge can be created by a leader (Foss 2001). In the case of Figure 2, the coordination can be achieved through modifications in the assumptions, e.g. by allowing pre-play communication (Myerson 1989, Kim and Sobel 1995). If one player is appointed leader and can make (non-committing) announcements about the strategy, she can lead the game to a Pareto-optimal Nash-equilibrium by announcing a strategy from which she has no incentives to divert. The communication creates a *focal point* that becomes common knowledge, and thus triggers coordination on the efficient outcome substantially.⁵

In more complex situations the creation of common knowledge also extends to the nature of the game and the selection among several choices. The leader takes the necessary decisions on corporate strategy and the future role of the agents. We cannot assume, as game-theoretic analysis often does, that the structure of the new game is common knowledge, because radical change of the environment or the corporate strategies implies major changes in individual costs and benefits of alternative actions. Agents are likely to have incomplete

⁵ The situation is more complex if both players are permitted to send messages to each other before the game. If played infinitely, they too reach the superior Nash equilibrium eventually (Kim and Sobel 1995). Yet, as shown

information about other players and available strategies (Calvert 1995, Foss 2001). Therefore, *common knowledge about the game has to be created*. Strategic decisions have to be communicated to all stakeholders such that everyone knows that this knowledge is shared with all other relevant parties.

Thus the leader can facilitate a shift to a higher-level equilibrium by coordinating the complementary actions of agents through designing incentive compatible routines and by creating common knowledge concerning their implementation. The techniques employed by business leaders to create common knowledge vary. Some may publish and promote a “*vision*” to focus the organization’s activities and learning (e.g. Ireland and Hitt 1999, Finkelstein and Hambrick 1996). A shared vision implies common knowledge on the organization’s objectives, and how they are supposed to be reached. It may be created through, for example, public speeches to communicate simultaneously to many stakeholders, who thus know that they share this knowledge with everyone else who also attended the event. Common knowledge can also be created through participatory decision processes that involve public debate among stakeholders. Such a process, even if ritualized and with limited impact on the actual decision, provides an important means to share knowledge. Moreover, it informs the leader of gaps of the common knowledge in the organization.

In the critical mass game, less strict assumptions are required about agents sharing common knowledge on the structure of the game. It suffices that a critical mass of agents believes that a critical mass understands the game, and will thus switch. The leader thus does not need to convince all stakeholders to adopt the new routine, but only a critical mass of agents. A leader creating the common belief among a critical mass of agents can achieve this coordination, and induce the critical mass will switch.

The leader thus has to create *common beliefs* among a large number of her employees,

in the experiments by Cooper et al. (1994), coordination failure in the initial stages of the game is likely.

but does not need to fulfill the strict assumptions associated with the theoretical concept of *common knowledge*. These arguments imply that managers' ability to coordinate stakeholders is crucial for implementing corporate change, and that such abilities are more important where coordination costs are high. Hence we propose.

Hypothesis 6: Post-restructuring performance will be higher the better comprehensive strategic changes are announced and communicated such as to create common knowledge among stakeholders of the firm.

Hypothesis 7: Post-restructuring performance will be higher the more change is led by managers with charismatic characteristics and social capital.

Hypothesis 6a: The higher the coordination costs, the larger the effect of announcing and communicating strategic change.

Hypothesis 7a: The higher the coordination costs, the larger the effect of charisma and social capital of the manager.

5. Conclusions

Radical changes of corporate strategies require adjustments **not only at the organizational level, but also for each stakeholder** related to it. The adjustment will occur if agents *not only learn their own new routines, but form the belief that other agents will also change their routines in such way that his own new routine will make him better off*. Leaders have an important role in solving such coordination problems. Firstly, they have to **define the strategy of the firm**, and to **create incentives that minimize conflicts of interest among the**

stakeholders.⁶ Moreover, the leader has to create *common beliefs* about the new strategy among a *critical mass* of stakeholders who will thus switch and trigger evolutionary dynamics that will lead to a superior Nash-equilibrium.

This game-theoretic discussion leads to practical implications for managers. When aiming to implement radical change they should ensure that they not only create appropriate individual incentives, but common knowledge on all relevant aspects of the new strategies, including all agents' individual benefits from changing to new routines.

Further research should incorporate the pivotal role of leaders. Elenkov (2002) points out that transformational leadership and group cohesiveness improve organizational performance. *Theoretical research should deepen the analysis of coordination problems in radical change processes, analyzing for instance under which circumstances stakeholders cooperate and/or follow the direction proposed by a leader.*

The hypotheses suggested in this theoretical paper ought to be tested in empirical research of firms undergoing radical change. Moreover, *empirical studies on radical change in enterprises should include vectors of personal characteristics of leadership, such as the prior experience and reputation of both the CEO and the top management team*, as well as their leadership style. Empirical research should compare corporate change in different contexts and radical environmental change. An interesting extension would be to compare the pattern of strategic change, governance structures and leadership styles in transition economies like China and Vietnam with those affected by the 1997 Asian crisis. To what extent can the factors hypothesized to be relevant explain the speed of corporate adjustment in the Asian crisis countries?

⁶ To focus the analysis on the coordination task, I assumed that there are no incentive conflicts in the foregoing theoretical discussion.

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