

COMPLEMENTARITIES, COMMON CHANGE INITIATIVES, AND
THE TEAM-BASED ORGANIZATION*

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Abstract

Governance forms that effectively meld the virtues of both market control and traditional hierarchical control are alluring. While extensive research has examined such hybrids forms, the research has been restricted largely to market or contractual relations infused with elements of hierarchical control. Comparatively little research, outside of the M-form literature, has examined efforts to infuse hierarchical forms with elements of market control. This paper contends that common change initiatives, such as TQM, reengineering, autonomous work teams, and group-based rewards, are appropriately viewed as attempts to craft more market-like organizational forms by selectively infusing elements of market control within hierarchy. However, these common change initiatives are implemented commonly in isolation and, as a consequence, violate patterns of complementarity that both sustain traditional hierarchy or support the stable infusion of market control. Managers overlay new measures on existing, functionally-oriented structures; they implement new structures without new performance measures and without new pay systems; they implement new pay systems, but fail to restructure or develop new performance measures. The paper argues that these violations of complementarity often trigger the unraveling of the bundle of elements that support traditional hierarchy and spiral hierarchies toward fundamental transformation. The clear trajectory of these transformations is toward quite radically, disaggregated organizations structured around teams. The paper presents both logic and evidence supporting the existence of complementarities among these common change initiatives.

COMPLEMENTARITIES, COMMON CHANGE INITIATIVES, AND THE TEAM-BASED ORGANIZATION

Traditional, bureaucratic hierarchies, characterized by narrowly structured tasks and behavior-based control, have been widely critiqued in the popular literature as slow, plodding structures that excessively diffuse responsibility for outputs, undermine quality, and provide weak performance incentives (Hammer & Champy, 1993, Juran, 1992; Quinn, 1992; Lawler, 1989; Daft & Lewin, 1993; Peters, 1986; 1992). Trends in the 1980's and 1990's toward outsourcing and deconglomeration represented in part responses to the deficiencies of traditional hierarchy. Through boundary changes, managers substituted market control for hierarchical governance. In the process, managers transformed poorly evaluated and poorly motivated activities with widely scattered responsibility into more easily measured and highly motivated activities governed by markets.

The lure of market control, as an alternative to hierarchy, stems from its contrasting governance properties; markets spontaneously prompt the formation, expansion, and dissolution of activities to meet rapidly changing market demand. Markets provide high rates of flexibility and the capacity for autonomous adaptation (Williamson, 1991; Hayek, 1945). However, replacing hierarchy with market control carries clear hazards and potential deficiencies (Williamson, 1985; 1991; Demsetz, 1988). Unlike hierarchy, markets often provide inadequate safeguards to support cost-saving physical and human asset investments (Williamson, 1985; Klein, Crawford, & Alchian, 1978). They often fail to support the level of co-specialization needed to generate valuable new knowledge or the application of existing knowledge (Grant, 1996; Conner & Prahalad, 1996; Arrow, 1974; Demsetz, 1988). Unlike hierarchy, markets inadequately nurture the affiliative

bonds that support co-specialization and knowledge transfer (Szulanski, 1996; Kogut & Zander, 1996). Governance forms that optimally meld both market and hierarchical control are clearly quite alluring (Hennart, 1993; Zenger & Hesterly, 1997).

While empirical and theoretical studies of organizational forms that combine elements of markets and hierarchy have been extensive, research has almost exclusively focused on external hybrids — alliances, partnerships, and other forms of market contracting (Hennart, 1993; Powell, 1987; 1990; Shane, 1996). The study of organizations infused with elements of markets has been restricted largely to an examination of the multi-divisional structure (Williamson, 1975) and associated transfer pricing issues (Holmstrom & Tirole, 1991). While the multi-divisional structure is a significant organizational innovation, its influence on the work routines, performance evaluation, and rewards of most employees is limited. Rather, its effects are confined largely to senior management level within the hierarchy.

Attempts to infuse market-like elements within hierarchies may extend well beyond the multi-divisional structure. Many common organizational change initiatives are usefully viewed as focused attempts to infuse elements of market control within hierarchy. These change initiatives seek to infuse the measurement precision of market control, the structural autonomy of market control, or the incentive intensity of market control. I contend, however, that these isolated change initiatives violate patterns of complementarity that support traditional hierarchy as an organizational form. Managers overlay new measures on existing, functionally-oriented structures; they implement new structures without new performance measures and without new pay systems; they implement new pay systems, but fail to restructure or develop new performance measures. Such violations of complementarity encourage further change initiatives which unravel the bundle of elements that support traditional hierarchy and pushes the organization toward a fundamental transformation. The clear trajectory of this transformation is toward quite radically, disaggregated organizations structured around

teams. Complementary pressures, thus, push organizations toward either of two rather discrete and somewhat extreme organizational choices.

This paper examines complementarities among commonly-used change initiatives and the role of complementarities in producing market-like forms of internal governance — forms that infuse market control within hierarchy. The first section of this paper develops basic propositions about the influence of complementarities on the choice of organizational forms. A second section argues that traditional hierarchy and a newer, team-based organizational form are supported by discretely different bundles of complementary choices. Common change initiatives, taken individually, are presented as attempts to selectively infuse market elements into traditional hierarchy — attempts that violate the complementary properties that support traditional hierarchy and team-based organizational forms. A third section argues that the limited empirical evidence on change initiatives provides evidence consistent with the hypothesized complementary pressures. A final section discusses managerial implications.

COMPLEMENTARITIES IN ORGANIZATIONAL FORMS

A broad range of literature suggests that organizational forms, which survive due to their efficiency or survival properties, are supported by sets of complementary elements (see Tushman & Romanelli, 1985; Holmstrom & Milgrom, 1994; Williamson, 1991; Miller & Friesenk 1984; Milgrom & Robert, 1990; Lawrence & Lorsch, 1977). Implicit in much of this literature is an assumption that managers choose organizational forms, which offer improved efficiency and are therefore more likely to survive. Williamson (1991: 271) argues that viable organizational forms require “a syndrome of attributes that bear a supporting relation to one another” and contends that many forms of organization “never arise, or quickly die out, because they combine inconsistent features.” Williamson focuses on the differing set of instruments, administrative controls, incentives, and contracting regimes that accompany markets, hierarchy, and hybrid

structures. Using the modeling techniques of lattice theory, Milgrom and Roberts (1990) add precision to the study of organizational complementarities. They define complementarities to exist among the elements of an organizational form when increasing the level of one element increases the marginal return from increasing the level of all remaining elements. Consequently, within a complementary organizational system, elements or decision variables “move up and down *together* in a systematic, coherent fashion... (Milgrom & Roberts, 1990).” Managers, therefore, cannot identify a single element from an alternative cluster of complements, i.e. an alternative organization form, graft it into the existing organization and expect enhanced results. They further conclude that radical changes to an element of a stable system may set in motion a process of decomposition in which the entire system effectively “unwinds” due to complementary pressures. Once a system begins down a path of change that is supported by an underlying pattern of complementarity, this spiraling process of complementarity continues until environmental factors no longer support the pattern of complementarity (Milgrom, Qian, Roberts, 1991). Empirical work generally confirms the presence of complementarities in human resource practices (Ichniowski, Shaw, & Prensushi, 1997; MacDuffie, 1995; Wruck & Jensen, 1994; Black & Lynch, 2001; Wood, 1999).

Much of the organizational theory literature similarly contends that organizational forms are discretely arrayed. The organizational configuration literature, for instance, argues that all combinations of structures, strategies, and cultures are not observed with equal frequency in organizational populations (Meyer, Tsui, and Hinings, 1993). Instead, a few specific configurations or clusters of traits define a large portion of these populations (Miller & Friesen, 1984). Organizations, which closely resemble these commonly found configurations of traits, are more effective or higher performing (Doty, Glick, and Huber, 1993). This literature also acknowledges fundamental non-linearities in the performance relationships among traits that comprise configurations.

Consequently, organizations alternate between disequilibrium and equilibrium with these

radical shifts occurring only occasionally. Organizational forms are viewed as “pliable up to a point, but if stretched beyond that point, they actively resist change” (Meyer, Tsui, and Hinings, 1993). The general focus of this approach is thus not on understanding the relationship among individual variables, but rather on understanding the patterns of organizational elements that exist within populations of organizational forms

Several basic predictions emerge from this literature on complementarities. First, significant change initiatives unleash complementary pressures to alter other organizational elements (or to retract an initial change initiative). These complementary pressures reflect the possibility of performance gains from choosing complementary sets of change initiatives (or retracting non-complementary ones). Second, succumbing to such complementary pressures unwinds existing organizational forms, initiating a process of change that ceases only when an alternative bundle of complementarities is discovered that pushes an organization toward a new form.

COMPLEMENTARITIES IN TRADITIONAL AND MARKET-INFUSED HIERARCHIES

Traditional Hierarchy

As Weber first discussed, traditional hierarchy represents a stable governance form, an “ideal type,” supported by a bundle of complementary attributes (Weber, 1946 tr.). Scott’s (1981: 69) interpretation of Weber is that each element of bureaucracy “operates not in isolation, but as part of a system of elements that, in combination, ... provide more effective and efficient administration.” Scholars have described the underlying complementarity that supports traditional hierarchy in a variety of different ways. These descriptions focus on bundles of elements including the structure, the promotion system, the assignment of responsibilities, the incentive system, and the system of evaluation and

measurement (Brickley, Smith, & Zimmerman, 1997; Williamson, 1985 Weber, 1946 tr.; Milgrom & Roberts, 1995).

I argue in this paper that the key complementary elements supporting hierarchy involve choices around performance measurement, the structure of tasks, and the form of incentives. Traditional hierarchy structures work into narrow functions that minimize employees' interdependence and maximize the repetition of tasks. This functional division of labor enables the development of expertise in performing tasks and permits the development of explicit rules and procedures to guide behavior (Scott, 1981). Measurement systems then complement this structure by monitoring employees' adherence to rules, guidelines, and proscribed behaviors. Incentives also complement this structure and measurement approach by being very low-powered; rewards are typically only weakly linked to functional task performance (Baker, Jensen, & Murphy, 1988; Medoff & Abraham, 1980). High-powered incentives that aggressively attach pay to functional task performance encourage an excessive functional focus and distract employees from attending to overall outputs of the firm. Thus, the reward system reinforces the structure and the structure demands a particular measurement and incentive approach.

Team-based Hierarchies

The distinctive bundle of complementary attributes termed hierarchy is ideally configured to govern the mass production of a stable set of goods or services. Stability enables the formation of focused skill sets that benefit from a narrow division of labor and consequent specialization. However, the deficiencies of traditional hierarchy emerge in environments demanding innovation and change. The low powered incentives that accompany traditional hierarchy discourage the innovation and initiative necessary in these environments. Narrowly defined tasks and measurement systems focused on rules, guidelines, and proscribed behaviors also discourage the needed innovation and flexible

response. A vast popular literature has discussed the emergence of team-based organizational forms (e.g. Peters, 1986; 1992; Mohrman, Cohen, & Mohrman, 1995), involving extreme disaggregation and aggressive infusion of market control. These team-based organizational forms are arguably better suited to environments demanding more rapid change and are supported by a fundamentally different set of choices along the dimensions of structure, measurement, and incentives. These forms structure work cross-functionally into work teams, rather than functionally by task. Each team is responsible for a complete output, process, or activity (Peters, 1992; Hammer & Champy, 1993; Mohrman, Cohen, & Mohrman, 1995). Rather than measuring the inputs of individuals, these forms measure the output of teams. Finally, rather than rewarding inputs quite weakly, these forms reward team outputs aggressively (Zenger & Marshall, 2000; Hamilton, Nickerson, & Owan 2001).

Configured, measured, and rewarded in this manner, teams function under market-like control, much like an external subcontractor. Similar to an external contractor, the autonomous work teams possess the capacity to deliver complete outputs (often complete intermediate outputs) and are measured and rewarded based on delivery of these outputs. Again, there is a clear pattern of complementarity among the choices supporting team-based organization. Because teams are structured around the production of observable outputs, performance measurement is focused on team outputs. Such clear output measures attached to teams also enable high-powered incentives. High-powered incentives linked to team outputs in turn reinforce the team-based structure.

Change Initiatives and Complementarities

While the team-based organization represents a stable internal governance form, few managers set out to implement the comprehensive bundle of changes that transforms an organization from traditional hierarchy to team-based structures (see Figure 1). Instead, managers seek more modest infusions of market control. They seek to remedy the

deficiencies of hierarchy through common change initiatives that shift singular elements of traditional hierarchy toward the greater market control characteristic of team-based forms. Thus, many quality initiatives have sought to infuse market-like control through the infusion of output measurement. A broad set of structural initiatives, led most recently by the reengineering movement, sought to infuse market control by restructuring around autonomous, cross-functional teams and subunits responsible for complete outputs. A final set of change initiatives sought to infuse market control by creating high-powered incentives attached to output measures.

I contend that such limited changes violate the patterns of complementarity that support either traditional hierarchy or team-based organizations. Such limited change initiatives, because they violate the complex pattern of complementarity among structure, measurement, and incentives, trigger complementary pressures to adjust other elements or cause a reversion to traditional hierarchy. These complementary pressures are reflected in opportunities for performance gains from choosing complementary bundles. Those organizations that “succumb” to complementary pressures and implement a bundle of complementary changes will evolve into radically disaggregated team-based organizational forms.

Figure 1 displays the relationships introduced in this section and discussed through the remainder of the paper. The drawing depicts traditional hierarchy and team-based forms as clusters of mutually complementary and unique choices around measurement, structure, and incentives. Traditional hierarchy is characterized by a functional structure that supports measures of individual inputs and necessitates low-powered incentives. By contrast, team-based hierarchy is characterized by cross-functional team structures that support team output measures and facilitate higher-powered team rewards. Common change initiatives target shifting singular design choices from those that support traditional hierarchy to those that support the team-based form. For example, as discussed below, quality initiatives have sought to shift the focus on measurement from

individual to team outputs. Analogous change initiatives have targeted shifts from functional structures to cross-functional teams and from low-powered to high-powered incentives. These shifts trigger complementary pressures to alter other design choices or to reverse the initial change. Of course, many change initiatives are more broadly focused than the caricatures presented below. In part, greater breadth in these initiatives merely confirms the primary contention of complementarities presented in this paper. For purposes of illustration, the discussion highlights only the primary focus of these change initiatives.

CHANGE INITIATIVES AS MARKET INFUSION: EVIDENCE OF COMPLEMENTARITIES

Measurement Initiatives as Market Infusion

The Total Quality Movement. In traditional bureaucratic organizations, the division of tasks into narrow functions ensures that outputs are observable only for very large aggregations of individuals. Entire divisions are responsible for outputs and are measured through financial reporting. Relevant measurement systems for employees are therefore focused on assessing employee behaviors in performing narrow tasks. This structure and measurement system, however “[insulates employees] from intimate knowledge of customer needs” (Juran, 1992: 388). Instead, employees’ efforts are guided through “specifications, standards, and procedures” (Juran, 1992: 388). The primary contention of the quality movement has been that traditional hierarchy encouraged a disregard for the ultimate customer, including a neglect of behaviors that would enhance quality (Wruck & Jensen, 1994).

It is this disregard for the quality of outputs that the quality movement seeks to remedy. This remedy arrives primarily through a set of measures to meter and motivate attention to these neglected performance outcomes (Hackman & Wageman, 1995;

Sashkin & Kiser, 1993). These measures seek to shift employee attention away from satisfying managers and toward satisfying customers, whether internal or external to the firm (Dean & Bowen, 1994). Thus, total quality programs (TQM) identify customers (either internal or external), identify their performance requirements, and define metrics, which assess performance in satisfying their requirements (Ishikawa, 1985: 43; Deming, 1986: 177-182; Sitkin, Sutcliffe, Schroeder, 1994). New measures encourage employees to focus on more precise indications of organizational output — the quantity, quality, timeliness, and accompanying service associated with the goods and services they produce and sell. Such output-focused measurement is, of course, a characteristic feature of market control. Markets encourage employees to focus on outputs, because outputs are rewarded through the payment of prices.

The benchmarking movement and Baldrige Award Program accelerated the infusion of this element of market control during the early 1990's. For many firms, the Baldrige Award criteria functioned as a blueprint for modifying measurement systems (Garvin, 1991; Baldrige Award Criteria, 1994). These criteria demanded that firms benchmark their performance and processes and create metrics that permitted performance comparison across firms, like international standards such as ISO (Eccles, 1991; Maskell, 1991; Garvin, 1991). Furthermore, these guidelines demanded active measurement of customer satisfaction with outputs. The net effect of these efforts to improve measurement was that firms developed an expanded internal capacity, similar to that accessed through market control, to focus employee attention on key measures that drive customers' satisfaction. Osterman (2000) estimates that by 1997 57% of establishments had implemented TQM with at least 50% of their employees.

Complementarities and Quality Initiatives. According to the complementarity logic, this fundamental shift from individual input to group output measurements should provoke complementary pressures for further change (see Figure 1). Oddly enough, leaders of the

quality movement rather clearly denounced any such complementary changes (Deming, 1993; Juran, 1974; Ishikawa, 1985). Initially, quality initiatives typically sought to work within the existing hierarchical structure (Lawler, 1994:70; Hackman & Wageman, 1995). To redesign or restructure work cross-functionally around outputs was viewed as an activity beyond the bounds of TQM (Graham, 1993; Hackman & Wageman, 1995). Similarly, TQM philosophy generally regarded incentive pay, based on either individual or team performance, as destructive to the objectives of the quality movement (Deming, 1993; Juran, 1974; Ishikawa, 1985; Hackman & Wageman, 1995: 336). Pay for performance was viewed as undermining intrinsic motivation, encouraging employees to focus only on those few elements of performance that are measured (Ishikawa, 1985; Deming, 1986). Thus, total quality initiatives are change initiatives that in many circumstances set out to explicitly avoid altering two of the three elements that support functionally structured hierarchy.

Consistent with the core proposition that complementarities govern the effectiveness or stability of change initiatives, pressures to make complementary adjustments should be considerable despite this limited focus of quality initiatives. The significant changes in measurement associated with TQM should undermine both the existing structure and the existing incentive scheme and pressure complementary changes. Measuring cross-functional outputs heightens interest in cross-functional coordination, thereby undermining the existing functional structure. Similarly, these new output measures lessen the risk imposed on employees by higher-powered incentives (Milgrom & Roberts, 1992; Lal & Srinivasan, 1993).

Recent reviews of the quality movement provide evidence that managers feel these complementary pressures quite acutely. Many studies suggest that performance gains for many firms were modest (Fuchsberg, 1992; Rheger, et al., 1994). For instance, surveys by A.T. Kearney and Arthur D. Little both suggest that as few as one third of the companies with total quality programs perceived significant performance results

(Schaffer, 1992; Kendrick, 1992). Black and Lynch (2001) conclude that TQM implemented in isolation has no positive effect on performance and that positive effects from TQM require the implementation of practices that give employees greater voice. Certainly, team-based structures which grant employees control over outputs would qualify for such a practice. Consistent with the complementarities logic, Hackman and Wageman (1995) credit the common failure of TQM to attempts at “fundamental change without changing the fundamentals (p. 336).”

Surveys of corporate quality initiatives suggest that TQM’s scope broadened significantly with time. In particular, TQM initiatives embraced changes in reward structures. A 1991 Conference Board study suggested that 85% of organizations with TQM programs supplemented these with new incentive initiatives (Conference Board, 1991). Further, the tendency to modify incentives appears to have escalated with time (KPMG Peat Marwick, 1991). Hackman and Wageman (1995) conclude that, while only a small percentage of firms initially implement incentives in conjunction with a quality program, the majority of firms with five or more years of TQM experience explicitly rewarded the achievement of quality goals. They concluded that the absence of incentives in TQM was simply “unstable over the longer term” (Hackman & Wageman, 1995: 336). As firms modify pay systems to complement TQM, they typically attach pay to teams, groups, or the organization, rather than individual performance (KPMG Peat Marwick, 1991).

Quality initiatives also increasingly adopted complementary structural changes — changes in the design of work and autonomy of groups. The 1991 KPMG Peat Marwick survey found that while only 15% of all organizations with TQM initiatives had restructured work around self-directed work teams, 60% of those with more than five years of experience had restructured around self-directed work teams. Such teams

typically include all functionality required to deliver an observable and easily measured output and thereby complement efforts to enhance measurement accuracy. Osterman (2000) similarly reports that the simultaneous implementation of TQM, self-managed teams, and job rotation (a device likely to be found in cross-functional teams) increased substantially from 1992 to 1997.

In summary, consistent with the hypothesized effects, complementary pressures appear pervasive in implementing TQM initiatives. Despite formal rhetoric that discourages structural changes and strongly opposes incentives, the majority of firms appear to eventually make complementary changes in structure and incentives. Further, the probability of such complementary changes escalates with time.

Structural Initiatives as Market Infusion

Cross-functional Teams. The functional configuration of traditional hierarchy typically leaves employees rather weakly empowered to influence outputs sold to the market, even if outputs are measured. Responsibility for key performance attributes, such as product or service quality, speed of delivery, or speed of order processing, are widely diffused. This diffusion of responsibility ensures that employee attention to customer concerns and outputs is generally quite weak. Markets can influence employee behaviors only when employees can influence products sold to the market. Hence, a second set of common change initiatives seeks to restructure work by combining within small teams the critical functions necessary to generate complete outputs (see Figure 1).

Surveys of human resource practices in the late 1980's estimated that perhaps as many one fourth of large US corporations had experimented with restructuring work into such cross-functional or self-directed teams (Verespej, 1990; O'Dell & McAdams, 1987; Lawler, 1986). These cross-functional teams receive extensive latitude in choosing the means whereby outputs are achieved. Teams assign tasks, manage quality control, perform discipline, evaluate and select team members, and manage production schedules.

With such clear responsibility for outputs, internal teams function with a degree of autonomy characteristic of market control.

By the early 1990's, the use of self-directed teams had become considerably more widespread, encompassing a large portion of the workforce (Gordon, 1992; Mehta, 1994; Verespej, 1990). Osterman's study (1994) of large firms reported that the majority of employees were assigned to self-directed work teams in 40% of the business units examined. The reengineering wave of the 1990's fueled the diffusion of cross-functional teams with its mandate to configure work around "groups of tasks that together create a result of value to customers" (Hammer, 1996:11; see also, Hammer & Champy, 1993; Hammer, 1996).

Complementarities and Cross-functional teams. In the same way that measurement initiatives in the quality movement ignored structure and incentives, structural initiatives around teams have typically neglected complementary measurement and incentive changes. Reengineering's original proponents subsequently criticized reengineering initiatives for their narrow focus on the configuration or structure of work (White, 1996; Hammer, 1996; Champy 1995). Meyer (1994) also argues that organizations often retain traditional, functionally-oriented performance measures in implementing cross-functional teams. Such functionally-oriented measurement works in opposition to cross-functional structure by encouraging team participants to pursue functional interests. Incentive changes have also typically been outside the domain of structural initiatives around teams. Mohrman, Cohen and Mohrman's study (1995) of firms structured around teams found that most still used merit pay as the primary mechanism for rewarding employees. Such pay systems rather weakly reward individual performance and individual behavior. Similarly, a 1994 Hay/Conference Board survey (Gross, 1995:15) found that among those corporations, which had undertaken reengineering, only 25% revised pay systems.

Thus, the majority of firms implement team structure with pay systems in place that undermine cross-functional teams.

The prediction is that over time firms adopt changes in measurement and incentives that complement these new structures. Gross (1995:15) reports that while only 25% of firms in a Hay/Conference Board study revised their pay system in conjunction with an initial reengineering initiative, the vast majority of firms indicated strong pressures to subsequently revamp their pay systems. Gross comments that eventually the new work culture, now structured around group outputs, and the old reward system, which rewards individual inputs, “makes for an unstable situation” (Gross, 1995: 15). Similar complementary pressures encourage firms to adopt group-based performance measures to support new group-based structures. Indeed, reengineering initiatives often measured team outputs (Champy, 1995). Further, the trajectory of measurement and benchmarking initiatives has been clearly toward measuring the performance of teams (Meyer, 1994; Eccles, 1991; Maskell, 1991), which in turn has been enabled by the cross-functional clustering of tasks. Thus, much like measurement initiatives, structural initiatives appear to confront strong pressures to adopt complementary pay and measurements schemes.

Incentive Initiatives as Market Infusion

Group-based Rewards. Traditional, functionally-structured hierarchies offer rather low-powered incentives. Pay levels within traditional hierarchies are largely based on seniority; changes in individual contributions yield rather insignificant gains in individual pay (Medoff & Abraham, 1980; Baker, Jensen, and Murphy, 1988). A final set of change initiatives focuses on replacing the traditional, low-powered pay systems of hierarchy with higher-powered incentives, typically group-based rewards (see Figure 1). Much like market control, such reward systems compensate group members for delivering measurable outputs. These outputs may either be final outputs to be marketed and sold or intermediate outputs transferred to internal customers.

Like cross-functional teams and TQM, group-based pay plans have become widespread in the 1990's (Hewitt Associates, 1994; O'Dell & McAdams, 1987; Schuster & Zingheim, 1992; McAdams & Hawk, 1992; Mitchell, Lewin & Lawler, 1990). Studies of prevalence suggest that by the early 1990's as many as 25% of private sector firms had experimented with such reward plans (Hewitt Associates, 1993; O'Dell & McAdams, 1987). The vast majority of these incentive schemes were, however, profit sharing or gainsharing pay plans that measured and rewarded the performance of very large groups within the firm (McAdams & Hawk, 1992).² For all but the most senior managers, attaching pay to such aggregated measures of performance is of little incentive value. To place large portions of individual pay contingent on the performance of large groups simply imposes large amounts of uncertainty on individual employees, while providing little motivation.

Complementarities and Group-based Rewards. Theoretical literature in agency theory suggests that the capacity to implement high-powered incentives is determined by the accuracy of performance measures and employees' capacity to control them (Basu, et. al, 1985; Milgrom & Roberts, 1992). Uncertainty is reduced as the link between pay and measured performance increases. Similarly, attaching pay to measures that employees can easily control reduces further the level of uncertainty. This reduced uncertainty escalates the intensity with which pay can be effectively linked to performance.

Group size is clearly a primary determinant of individuals' control over group performance. Firms are more willing to attach a large portion of pay to group performance when groups are 10 individuals than when groups are composed of 10,000 individuals. When groups are large, the free-riding problem is substantial and the incentive value of high-powered group-based rewards is modest. Therefore, structural

² In 1992, McAdams & Hawk estimated that only 5-7% of group incentive plans were linked to performance measures at the team level.

initiatives that craft small teams responsible for clear outputs enable high-powered incentives. Consistent with this prediction, Zenger & Marshall (2000) find that incentive intensity in group rewards indeed rises with diminishing group size and enhanced measurement accuracy. Hence, efforts to create small groups with easily measured outputs enhances the capacity of the firm to infuse high-powered group incentives.

Measurement initiatives of TQM may also enable the infusion of high-powered group incentives. Measurement initiatives enhance the accuracy of performance measures to which pay is attached. To aggressively reward traditional indicators of functional inputs rather than cross-functional outputs is likely to trigger inattention to key drivers of output performance. High-powered incentives require output measures controllable by small groups of employees. Thus, consistent with the complementarities logic, crafting new, high-powered group incentives appears increasingly linked to structural initiatives around teams and measurement initiatives.

There has been little systematic study of the recent evolution of group incentive plans. Nonetheless, few would dispute that the trajectory in group rewards has been toward rewards attached to smaller groups. During the past decade group incentive plans have migrated from profit sharing plans toward gainsharing plans and from gainsharing plans toward team-based pay plans. Complementary initiatives that structurally create and measure small, autonomous groups clearly enable this infusion of team-based rewards.

SPIRALING TOWARD A MODULAR, TEAM-BASED ORGANIZATION?

The preceding discussion suggests that complementary pressures render problematic the attempt of common change initiatives to selectively infuse elements of market control. The source of these complementary pressures is both structural and behavior-based. Thus, structurally, those implementing measurement initiatives such as TQM soon discover that attention to new measures benefits from complementary incentives

and that the capacity to find accurate new measures is increased by restructuring work. Similarly, those implementing reengineering programs around teams soon discover that newly structured teams deliver a host of new performance measures, which in turn facilitate higher-powered group incentives. Finally, managers who lead with high-powered incentives quickly discover that infusing high-powered incentives requires new performance measures; new performance measures are in turn enabled by new team-based structures. These structural pressures to adopt complementary change initiatives are also reinforced by employee behaviors and incentives. For instance, employees assigned to highly autonomous, cross-functional teams will desire to have their incentives attached to the outputs of this team. Thus, consistent with the complementarities literature, significant changes to a core element of hierarchy unleash complementary pressures to either alter other elements or to abandon the original change. Isolated change initiatives often reach trigger points that prompt further complementary changes — changes that may, as in the case of TQM, even violate the fundamental philosophy of the proponents of the change.

In the wake of common change initiatives, therefore, complementarities pressure the organization toward broader change which both unravels hierarchy and spirals the organization toward an alternative, team-based configuration with its own pattern of complementarity. Indeed, such new forms are the logical extension of a complementary bundle of common change initiatives around structure, measurement, and rewards (see Figure 1). In this configuration, structure, incentives, and measurement are all focused around small, autonomous modules within the hierarchy that are responsible for clear outputs. Such configurations are analogous to the multi-divisional (M-form) structure, but implemented at a much lower organizational level. Rather than the functional task structure of traditional hierarchy, team-based organizations cross-functionally cluster tasks around small, autonomous teams responsible for definable outputs. Rather than the weak individual incentives of traditional hierarchy, team-based organizations adopt

higher-powered group incentives. Rather than measurement focused on behaviors, this configuration focuses on group output measurement. Configured as such, individual units within the firm closely resemble small, autonomous firms. Consequently, organizations composed of configurations of these teams closely resemble an internal market in which semi-autonomous teams are operated, evaluated, and rewarded in a manner similar to external subcontractors. Thus, as complementary change initiatives in measurement, structure, and rewards unravel hierarchies, market control emerges.

Discrete Choices and Pressures to Resist Complementarities

One of the implications of the complementarity logic is that these internal hybrid governance forms, much like markets and hierarchies, are discrete governance choices. Team-based organizations, like traditional markets and hierarchies, are supported by a unique bundle of complementary features. Managers are constrained in their capacity to craft forms that violate these complementary bundles. Nonetheless, managers have clear incentives to attempt violations of complementarities. The motivation stems from a simple desire to craft forms with governance attributes that lie intermediate to the market control of team-based structures and the hierarchical control of traditional hierarchy.

The discreteness of governance forms described in this paper is thus a likely source of managerial frustration. For instance, suppose task conditions demand an organizational form with attributes positioned somewhere between a functionally-structured hierarchy and a radically disaggregated team-based structure. A firm that begins with a functionally-structured hierarchy may implement a change program such as TQM, reengineering, or group incentives, in search of an organizational form positioned between these discrete choices. Complementary pressures may render any such intermediate configuration quite unstable and perhaps low performing. If the firm adopts complementary changes, this may infuse a level of market control that is excessive for the task conditions and environmental demands. Thus, upon achieving this state, the

deficiencies of market governance become evident. Consequently, the firm may choose to recentralize the structure, weaken incentives, and alter measurement away from teams. However, doing so places the organization on a pathway of complementarities back toward functionally-structured hierarchy. Assuming governance properties follow organizational choices with some lag, the rational solution may be for an organization to vacillate between these discrete governance choices, i.e. internal market-based structure and functional structure. Such vacillation avoids violating complementarities and maximizes the time during which the organization is in an optimal intermediate state (Nickerson & Zenger, 2001).

It is the above logic that rescues the arguments of this paper from the seeming empirical inconsistency that we observe rather few radically disaggregated, team-based organizational forms. In part this is because firms may spend some considerable period of time transitioning toward or away from team-based structures. Furthermore, as indicated previously, managers may choose to actively resist the pattern of complementarities that govern traditional hierarchy and team-based structures. The critical point is that, while complementary pressures push organizations toward stable endpoints, managerial intervention is required to maintain more intermediate, though less stable, configurations.

Leadership and Complementarities

An image of managers pressured by complementarities to adopt specific organizational changes is seemingly incongruous with the image of managers as architects of organizational form. This paper suggests that managers, indeed, have somewhat constrained flexibility in crafting internal governance forms that infuse elements of markets. However, discussions of complementarities in both economics and organization theory focus on the significance of leadership in crafting stable

organizational forms (Tushman & Romanelli, 1985; Milgrom & Roberts, 1995). Such leadership requires at a minimum cognizance of the patterns of complementarity that support organizational forms and influence common change initiatives. Further, change initiatives that coordinate adjustments in measurement, structure, and reward system may outperform change initiatives that lack coordination. The absence of coordination among change initiatives may well lead to results in which limited change initiatives rationally taken to incrementally respond to environmental changes may actually damage performance (Milgrom & Roberts, 1995). New compensation plans that fail to develop complementary measurement systems may escalate turnover and trigger low performance. Similarly, structural initiatives that maintain existing compensation and measurement systems may find that these new structures also undermine performance.

One of the difficulties in attending to complementarities is that different change initiatives are often crafted by different groups of employees and managers. Compensation initiatives may stem from human resource departments, reengineering from line management, and quality initiatives from a separate quality function. The separation of these decisions increases the probability that non-complementary design choices will be selected. However, as Milgrom and Roberts (1995) have noted, the role of the leader need not be to define the outcome, i.e. define the new organizational form, but rather to effectively convey the pattern of complementarity that governs organizational forms. Managers need not mandate a comprehensive shift from traditional bureaucratic organizations to team-based structures. Rather, leaders must convey the logic of complementarity that exists within an organizational form and among common change initiatives. Complementary pressures will themselves reveal desired refinements.

Group rewards are improved through improved output measurement and improved output measurement results from the formation of small, cross-functional groups. New cross-functional groups are aided by supportive group rewards and measures. Managers must generate the surrounding intuition that triggers optimal choices. Such information provides a “direction for coordinated search” (Milgrom and Roberts, 1995: 190).

Leadership or central coordination may therefore dramatically quicken and enhance the probability of transforming traditional hierarchies into team-based organizations infused with significant market control.

References

- Arrow, Kenneth. 1974. *The Limits of Organization*. New York: W. W. Norton & Company.
- Baker, George P., Jensen, Michael C., and Murphy, Kevin J. 1988. Compensation and Incentives. *Journal of Finance*, 43: 593-616.
- Baldrige Award Criteria*. 1994. U.S. Department of Commerce, National Institute of Standards and Technology.
- Basu, A. K., R. Lal, V. Srinivasan, and R. Staelin. 1985. "Salesforce Compensation Plans: An Agency Theory Perspective." *Marketing Science*. 4 (4):267-291.
- Black, Sandra E. and Lisa M. Lynch. 2001. "How to Compete: The Impact of Workplace Practices and Information Technology on Productivity." *Review of Economics and Statistics*, 83(3): 434-445.
- Brickley, James A., Clifford W. Smith, Jr., Jerold L. Zimmerman. 1997. *Managerial Economics and Organizational Architecture*. Chicago: Irwin.
- Champy, J. 1995. *Reengineering management: The mandate for new leadership*. New York: HarperBusiness.
- Conference Board, 1991. *Employee Buy-in to Total Quality*. New York: Conference Board.
- Conner, Kathleen and C.K. Prahalad. 1996. "A Resource-based Theory of the Firm: Knowledge versus Opportunism." *Organization Science* 7(5): 477-501.
- Daft, R.L. and Lewin, A.Y., "Where Are the Theories for the 'New' Organizational Forms? An Editorial Essay." *Organization Science*, 4, (1993), pp. i-vi.
- Dean, James W. and David E. Bowen. 1994. "Management Theory and Total Quality: Improving Research and Practice Through Theory Development." *Academy of Management Review*, 19(3): 381-624.
- Deming, W. Edwards. 1986. *Out of the Crisis*. Cambridge, MA: MIT Center for Advanced Engineering Study.
- Deming, W. Edwards. 1993. *The New Economics for Industry, Government, and Education*. Cambridge, MA: MIT Center for Advanced Engineering Study.
- Demsetz, Harold. 1988. The theory of the firm revisited. *Journal of Law, Economics, and Organization*, 4(1):141-162.

- Doty, D. Harold, William H. Glick, and George P. Huber, 1993. "Fit, Equifinality, and Organizational Effectiveness: A Test of Two Configurational Theories." *Academy of Management Journal*, 36(6): 1196-1250.
- Eccles, Robert G., "The performance management manifesto, *Harvard Business Review*, 69, January-February 1991, pp. 131-137.
- Fuchsberg, Gilbert, "Management: 'Total Quality' is termed only a partial success." *Wall Street Journal*, October 1, 1992, p. B1.
- Garvin, David A., "How the Baldrige Award really works." *Harvard Business Review*, 69, November-December 1991, pp. 80-92.
- Gersick, Connie, J.G. 1991., Revolutionary Change Theories: A multi-level explanation of the punctuated equilibrium paradigm, *Academy of Management Review*, 16:30-36.
- Gordon, Jack. 1992. "Work Teams: How Far Have They Come? *Training*, October, 59-65.
- Graham, Laurie. 1993. "Inside a Japanese trasplant: A critical perspective." *Work and Occupations*, 20: 147-193.
- Grant, Robert M. 1996. "Toward a Knowledge-based Theory of the Firm." *Strategic Management Journal*, 17 (S2): 109-122.
- Gross, Steven E. 1995. *Compensation for Teams*. New York: Amacom.
- Hackman, J. Richard, and Ruth Wageman. 1995. "Total Quality Management." *Administrative Science Quarterly*, 40: 309-342.
- Hamilton, B.H. Nickerson, J.A. & Owan, H. 2001. "Team Incentives and Worker Heterogeneity: An Empirical Analysis of the Impact of Teams on Productivity and Participation," Olin School Working Paper.
- Hammer, Michael, and James Champy, *Reengineering the Corporation*, HarperCollins Publishers, New York, 1993.
- Hammer, Michael. 1996. *Beyond Reengineering*. New York: Harper-Collins.
- Hayek, Friedrich. 1945. "The use of knowledge in society." *American Economic Review*, 35: 519-530.
- Hewitt Associates. 1993 and 1994 Salary Increase Survey Reports. Linconshire, IL: Hewitt Associates. 1994.

- Hennart, Jean-François "Explaining the swollen middle: Why most transactions are a mix of 'market' and 'hierarchy'." *Organization Science*, **4**, 1993, pp. 529-547.
- Holmstrom, B.R., and P.R. Milgrom. 1994. "The Firm as an Incentive System." *American Economic Review* **84**: 972-91.
- Holmstrom, Bengt and J. Tirole, 1991. "Transfer Pricing and Organizational Form," *Journal of Law, Economics, and Organization*, **7**(2): 201-228.
- Illinitch, Anne Y., Richard A. D'Aveni, & Arie Y. Lewin. 1996. "New Organizational Forms and Strategies for Managing in Hypercompetitive Environments," *Organization Science* **7**(3): 211-220.
- Ichniowski, C., K. Shaw, and G. Prennushi. 1997. "The Effects of Human Resource Management Practices on Productivity." *American Economic Review*, **87**(3): 291-313.
- Ishikawa, Kaoru. 1985. *What is Total Quality Control? The Japanese Way*. Englewood Cliffs, N.J.: Prentice-Hall.
- Juran, J.M. 1992. *Juran on Quality by Design*. New York: The Free Press.
- Juran, J.M. 1974. *The Quality Control Handbook*. 3rd ed. New York: McGraw-Hill.
- Kendrick, John J. "Companies continue to embrace quality programs -- but has TQ generated more enthusiasm than results?" *Quality*, **31**(May 1992), p. 13.
- Klein, Benjamin, Crawford, Robert, and Alchian, Armen. "Vertical integration, appropriable rents, and the competitive contracting process." *Journal of Law and Economics*, **21** (October 1978), pp. 297-326.
- Kogut, Bruce and Udo Zander. 1996. "What Firms Do? Coordination, Identity, and Learning." *Organization Science*, **7**(5): 502-518.
- KPMG Peat Marwick. 1991. *Quality Improvement Initiatives through the Management of Human Resources*. Short Hills, NJ: KPMG Peat Marwick.
- Lal, Rajiv, and V. Srinivasan. 1993. Compensation Plans for Single- and Multi-product Salesforces: An Application of the Holmstrom-Milgrom Model. *Management Science*, **39**(7): 777-793.
- Lawler, Edward E. III. *High Involvement Management*, San Francisco: Jossey-Bass, 1986.
- Lawler, Edward E. III. 1989. "Substitutes for hierarchy." *Incentives*, **163**(3): 39-45.

- Lawler, Edward E., III. 1994. "Total Quality Management and employee involvement: Are they compatible?" *Academy of Management Executive*, 8(1): 68-76.
- Maskell, Brian H., *Performance Measurement for World Class Manufacturing*. Cambridge, Mass.: Productivity Press, Inc., 1991.
- MacDuffie, J. (1995), "Human Resource Bundles and Manufacturing Performance: Organizational Logic and Flexible Production Systems in the World Auto Industry," *Industrial and Labor Relations Review*, 48(2).
- McAdams, Jerry L., and Elizabeth J. Hawk. Capitalizing on Human Assets: The Benchmark Study. American Compensation Association and Maritz, Inc. 1992.
- McKinsey and Company, Inc. *The 1992 Report on the Computer Industry*, McKinsey and Company, 1992.
- Medoff, James., and Abraham, Katherine. 1980. Experience, Performance, and Earnings. *Quarterly Journal of Economics*, 95:703-736.
- Mehta, Stephanie. 1994. "Enterprise: Cell Manufacturing Gains Acceptance of Smaller Plants," *Wall Street Journal*, September 15, B2.
- Meyer, Alan D., Anne S. Tsui, and C.R. Hinings. 1993. "Configurational Approaches to Organizational Analysis." *Academy of Management Journal*. 36(6): 1175-1195.
- Meyer, Christopher, "How the right measures help teams excel," *Harvard Business Review*, 1994 (May-June), pp. 95-103.
- Miles, R.E. and C.C. Snow. "Causes of failure in network organizations", *California Management Review*, 34, 1992, pp. 53-72.
- Milgrom, Paul R., and John Roberts. 1992. *Economics, Organization & Management*. Engelwood Cliffs, NJ: Prentice-Hall, Inc.
- Milgrom, Paul, Yingyi Qian, and John Roberts. 1991, "Complementarities, Momentum, and the Evolution of Modern Manufacturing." *American Economics Association Papers and Proceedings*. 81(2): 84-88.
- Milgrom, Paul and John Roberts. "The economics of modern manufacturing: Technology, strategy, and organization." *American Economic Review*, 80, 1990, pp. 511-528.
- Milgrom, Paul and John Roberts. Complementarities and fit: Strategy, structure, and organizational change in manufacturing." *Journal of Accounting and Economics* 19(1995): 179-208.

- Miller, D., and P. H. Friesen. 1984. *Organizations: A Quantum View*. Englewood Cliffs, N.J.: Prentice-Hall.
- Mitchell, Daniel J.B., David Lewin, and Edward E. Lawler III, "Alternative Pay Systems, Firm Performance, and Productivity," in Alan Blinder (ed.), *Paying for Productivity*, Washington D.C.: The Brookings Institution, 1990.
- Mohrman, Susan Albers, Susan G. Cohen, and Allan M. Mohrman, Jr. 1995. *Designing Team-based Organizations*. San Francisco: Jossey-Bass.
- Nickerson, Jack A. & Todd Zenger, 2001. "Being Efficiently Fickle: A Dynamic Theory of Organizational Choice." Olin School Working Paper.
- O'Dell, C. and J. McAdams. *People, Performance, and Pay*. Houston, TX: American Productivity Center, 1987.
- Osterman, Paul. 1994. "How Common Is Workplace Transformation and Who Adopts It?" *Industrial and Labor Relations Review*, 47(2): 175-188.
- Osterman, Paul. 2000. "Work Reorganization in an Era of Restructuring: Trends in Diffusion and Effects on Employee Welfare." *Industrial and Labor Relations Review*, 53(2): 179-196.
- Peters, T. *Thriving on Chaos*, Knopf, New York, 1986.
- Peters, T. *Liberation Management*, Knopf, New York, 1992.
- Powell, Walter W. "Hybrid organizational arrangements", *California Management Review*, 30, 1987, (Fall), pp. 67-87.
- Powell, Walter W., "Neither Market nor Hierarchy: Network Forms of Organization." *Research in Organizational Behavior*, 12, 1990, pp. 295-336, JAI Press.
- Quinn, James Brian. *Intelligent Enterprise*, The Free Press, New York, 1992.
- Rheger, Rhonda K., Loren T. Gustafson, Samuel M. DeMarie, and John V. Mullane. 1994. "Reframing the Organization: Why Implementing Total Quality is Easier Said Than Done." *Academy of Management Review*. 19(3): 537-564.
- Sashkin, Marshall, and Kenneth J. Kiser. 1993. *Putting Total Quality Management to Work*. San Francisco: Berrett-Kohler.
- Schaffer, Robert H., "The Quality Quagmire." *CIO*, 6(3): 28-31, 1992.
- Schlotes, Peter R., "An Elaboration of Deming's Teachings on Performance Appraisal," in Gary N. McLean (ed.) *Performance Appraisal: Perspectives on a Quality*

- Management Approach, Alexandria, VA: University of Minnesota Training and Development Research Center and American Society for Training and Development, 1990.
- Schuster, Jay R. and Zingheim, Patricia K., *The New Pay: Linking Employee and Organizational Performance*, New York: Lexington Books, 1992.
- Scott, W. Richard. 1981. *Organizations: Rational, Natural, and Open Systems*. Englewood Cliffs, N.J.: Prentice-Hall Inc.
- Shane, Scott. 1996. "Hybrid Organizational Arrangements and Their Implications for Firm Growth and Survival: A Study of New Franchisors." *Academy of Management Journal*, 39(1): 216-234.
- Sitkin, Sim B., Kathleen M. Sutcliffe, & Roger G. Schroeder, "Distinguishing Control from Learning in Total Quality." *Academy of Management Review*, 19(3): 537-564, 1994..
- Szulanski, G. 1996. "Exploring Internal Stickiness: Impediments to the Transfer of Best Practice Within the Firm." *Strategic Management Journal* 17(S2): 27-44.
- Thorelli, H. "Networks: Between markets and hierarchies", *Strategic Management Journal*, 7, 1986, pp. 37-51.
- Tushman, Michael L., and Elaine Romanelli, "Organizational Evolution: A Metamorphosis Model of Convergence and Reorientation." In L.L. Cummings and Barry Staw (eds.) *Research in Organizational Behavior*, 7:171-222, 1985.
- Verespej, Michael A. "When you put the team in charge," *Industry Week*, December 3, 1990, pp. 30-31.
- Weber, Max. 1946 tr. *From Max Weber: Essays in Sociology*, eds. Hans H. Gerth and C. Wright Mills. New York: Oxford University Press.
- White, Joseph B. "'Next Big Thing': Reengineering Gurus Take Sps to Remodel Their Stalling Vehicles." *The Wall Street Journal*, November 26, 1996, A1.
- Williamson, Oliver E. *Markets and Hierarchies: Analysis and Antitrust Implications*. New York: The Free Press, 1975.
- Williamson, Oliver E. *The Economic Institutions of Capitalism*. New York: Free Press, 1985.
- Williamson, Oliver E. "Comparative economic organization: The analysis of discrete structural alternatives," *Administrative Science Quarterly*, 1991, 36,, pp. 269-296.

- Wood, Stephen. "Getting the Measure of the Transformed High-Performance Organization." *British Journal of Industrial Relations*, 1999, 37(3): 391-417.
- Wruck, Karen H. and Michael C. Jensen. 1994. "Science, specific knowledge, and Total Quality Management." *Journal of Accounting and Economics*, 18: 247-287.
- Wyatt Co. *Restructuring -- Cure or Cosmetic Surgery: Results of Corporate Change in the 80's with Prescriptions for the 90's*. Wyatt Co. 1991.
- Zenger, Todd R., and C.R. Marshall (2000) "The Determinants of Incentive Intensity in Group-Based Rewards," *Academy of Management Journal*, 2000, 43(2): 149-163.
- Zenger, Todd R., and William S. Hesterly (1997), "The Disaggregation of U.S. Corporations: Selective Intervention, High-Powered Incentives, and Molecular Units," *Organization Science*, 8 (3): 209-222.

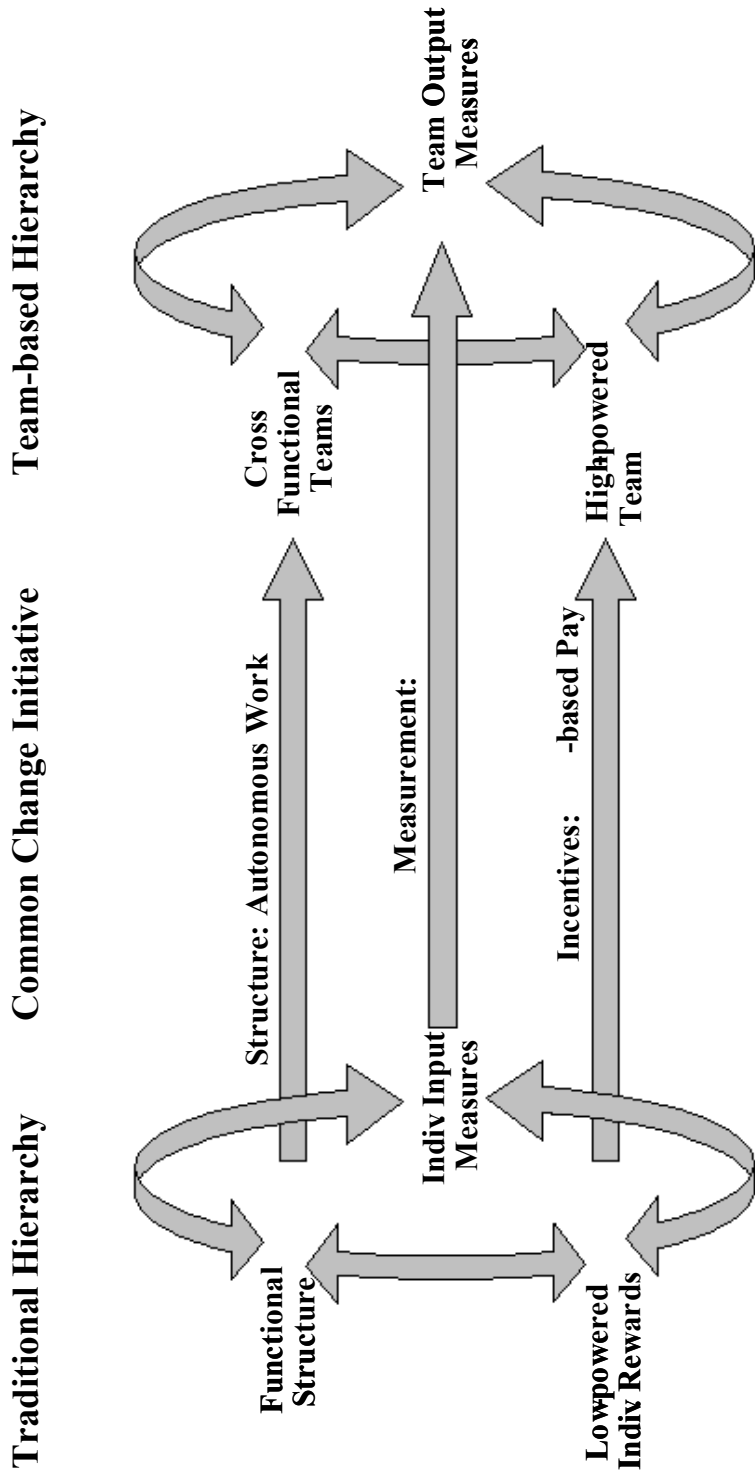


Figure 1