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Accelerated Learning During Organizational Transition

In this world of constant change, the only sustainable competitive advantage is an organization's capacity to learn (Senge, 1990). Organizations are changing to become dramatically more responsive to customers, efficient, fast, and flexible. Critical core competencies such as lean manufacturing, process improvement; customer focus, concurrent engineering and integrated process management underpin the ability of the organization to deliver products and services quickly, efficiently and responsively. Competencies such as networking, partnering, lateral management, and organizational self-design underpin the flexibility required in the dynamic environment. In order to grow in increasingly competitive markets, organizations must generate and respond to unanticipated competitive directions. To do this, they must be able to reconfigure themselves as needed: to apply resources where needed, to shift their array of projects and activities, to establish temporary and lasting partnerships, and to relate with a variety of customers who prefer to do business in different ways.

All this requires new organizational architectures: "Those companies that are creative in designing new organizational architectures will be those that gain significant competitive advantage in this new era of change (Nadler, 1992, p. 8)." Transformation has become a major organization activity as organizations try to adapt to their new environmental realities. A major leadership challenge has been to guide organizations through the transition process (Bennis and Nanus, 1985 ; Tichy and Devanna, 1986).

In transforming themselves, organizations are faced with two dilemmas. First, we know that organizational transformation is a long, involved process, and yet the environment is demanding flexibility and speed. Second, organizational learning is often an accumulation of many small, incremental changes that spring up as units design and redesign themselves (Weick and Westley, 1996; Levitt and March, 1988); yet, dramatically impacting the overall capability of the organization depends on the simultaneous accomplishment of change in many of the aspects of the way the organization functions (Ledford et al, 1989). For example, the establishment of a team-based organization requires far more than the creation of teams; it also calls for changes in the information systems, rewards, management positions and roles, and

other aspects of the organizational context within which teams are performing units (Mohrman, Cohen and Mohrman, 1995). As organizations embark on the transition to becoming a team-based organization, they go through a gradual and profound learning process about how to bring the many aspects of the organizational architecture into alignment with this new way of doing work. Even when these changes are initiated, teams learn to become effective at varying rates.

The challenge facing organizations is to put in place core architectures that are themselves flexible and that promote the continual and intense learning that will be required for an organization to succeed in today's environment, and to develop the internal capability for ongoing self-design and accelerated learning. This chapter is based on close study of many organizations as they have gone through a fundamental transformation in their organizational model, and of the factors that contribute to accelerated learning during such transitions. A fruitful way to understand the learning challenges inherent in these transitions is to conceptualize them as changes in three related areas of organizational architecture: the market, social and technical architectures; and to focus on the cognitive, behavioral and structural changes that are required. We then describe the dynamics that characterize organizational learning as organizations change their underlying architectures.

Architectural Change and Organizational Learning

Many organizations today are undergoing large scale transitions in which they are purposefully introducing fundamental change to the way they are organized and do business, change that entails the establishment of new organizational architectures that shape and enable new ways of performing. Crafting and successfully implementing such change involves considerable organizational learning. In our experience studying organizational change, a recurring phenomenon is organizations that say "we changed the organization but behavior didn't change"; or "we restructured the organization but performance didn't change". Thus, the organization changed some formal attributes of the organization but did not succeed in changing the underlying patterns of behavior. Another recurring phenomenon is that within organizations

undergoing large-scale change, some units seem better able than others to learn how to operate effectively within the new directions. This causes us to be very interested in how organizations learn to operate differently. It also leads us to believe that the phenomenon of organizational learning is at least in part a phenomenon that occurs within individual operating units, even when the stimulus for learning is a company-initiated change process.

There are many competing frameworks for understanding organizational learning, including those that reduce it to the learning of individuals within the organization (e.g., Argyris and Schon, 1978; Kolb, 1983; McGill, Slocum, and Lei, 1993), those that focus on particular activities such as TQM and training (Ulrich, Glinow and Jick, 1994), and those that look at generic competencies such as shared vision, team learning and mental models (Senge, 1990). In trying to understand the learning that occurs during organizational transition, we choose to think of organizational learning as a collective phenomenon—one in which organizations put in place new approaches that enable them to perform more effectively and to improve performance through time. This broad definition allows us to reconceive the process of organizational transformation as a learning process, and to search for the processes that allow the organization to establish new ways of functioning to better achieve its objectives in a dynamic, complex environment.

Substantively, organizational transformations frequently aim at putting in place new organizational architectures. Organizational architecture as a metaphor and concept has been gaining increasing prominence in the organizational design literature (Keidel, 1995; Nadler, Gerstein and Shaw, 1992). The term architecture as originated by the Greeks referred to something higher than mere structure—it was intended to denote a superstructure (Keidel, 1995). Architecture can be thought of as creating a framework around our life through the shaping of space so it creates opportunities for certain kinds of views, movements, and actions while constraining others (Rasmussen, 1991, p.10). In the organizational literature, it has been used to refer to a framework for the conduct of organizational life. Gerstein (1992) suggests that organizational architecture is the shaping of organizational space to meeting human needs and aspirations. Nadler (1992) has presented a systemic view of organizational architecture as

consisting of the various systems, structures, management processes, technologies, and strategies that make up the 'modus operandi' of the firm.

The concept of organizational architecture is connected to the concept of organizational design, which is the process of "bringing about a coherence between the goals or purposes for which the organization exists, the patterns of division of labor and interunit coordination and the people who will do the work" (Galbraith, 1977, p. 5). Consistent with Galbraith's use of the term, we use design to refer to the process of determining how the organization will be configured. The word "architecture" we use to refer to the configurations and processes that result.

Applying the notion of design to organizations raises to consciousness the fact that organizational architectures are purposeful artifacts that "…embody goal-oriented operational principles specified for them by the person or persons who contrived them. The specification of the purposes and operational principles of artifacts is essentially a human activity, and it is this activity that sets out the criteria for success or failure of that artifact" (Turner, 1992; p. 369). Galbraith (1977) argues that designed organizations that explicitly relate strategy and purpose to decisions about the architecture of the organizations outperform organizations where patterns of activity simply emerge as a result of interaction between people. Designers have certain intents that relate to the strategy of the organization and the kinds of performances that need to be delivered, and they generate architectures that embody a logic, or chain of reasoning, about how particular architectures will yield intended patterns of behavior.

Today's organizational transformations are simultaneously impacting almost all aspects of the organization's architecture. To understand the richness of the changes that are going on, we identify three simultaneous and intersecting "architectures":

Strategic/market architecture refers to the organization's patterns and practices for relating to its business and market environment. It includes the elements of its market strategy, customer and supplier relationships, and the financial model of the organization. Commonly used elements of emerging strategic/market architectures are customer and supplier partnerships, outsourcing of non-strategic functions, product strategies that rely on rapid generation of new products that in essence cannibalize old offerings, offering families of related

products and services rather than stand-alone products, and taking work to the customer's location. An example of an underlying logic in the case of partnering with customers might be that the growth in the business depends on the growth of the customer's business, which can be made more likely if it partners with its customers to deliver greater overall value to the end customer.

Technical architecture encompasses the choices the organization makes with respect to accomplishing the technical transformation processes of the organization that deliver value to the customer. It includes the technical know-how, tools, methods, processes, routines, problem-solving strategies and steps, and the related technical artifacts that underlie the core transformation process. Various computer based systems such as application software, groupware, networks, and shared data bases are often components of technical architecture. Advanced manufacturing technologies such as computer-aided design, manufacturing and engineering, concurrent design, and flexible manufacturing systems all represent emerging directions of technical architecture. An underlying logic of concurrent engineering is that if work that used to be done sequentially (e.g., product marketing followed by the design and development of the product followed by development of a manufacturing process) can be done concurrently, the activities can inform one another in a real time manner, which will prevent rework and enable much faster cycle time.

Social architecture embodies the organization's design choices that structure and provide the context for the interactions and behavior in the organization. It includes the designation of such organizing features as units, levels, coordinating mechanisms, authority structures, and performance management practices, including reward systems. Flat organizations, multi-functional units, team accountability, business-performance based rewards, distributed information and authority, and lateral coordinating mechanisms represent emerging directions of social architecture. An underlying logic of the flat, cross functional business unit structure is that by creating business units with all the skills required to carry out a piece of the business, that unit can be given authority, can act quickly in meeting the needs at hand, and can be held accountable for its performance.

An important component of all three facets of organizational architecture are the norms and values that underpin them. For example, a strong value and behavioral norm of collaboration and cooperation must underpin a market architecture that emphasizes partnerships with customers. A value of market success for the product and norms of cross functional collaboration must underpin concurrent engineering. The value of employee involvement and development and norms of power sharing must underlie a social architecture that creates flat, empowered business units. Herein lies part of the reason why the learning that accompanies transformation is so difficult. The organization is not simply learning to put a new architecture in place, it is learning to make it work effectively. To do this, it is not simply the design artifacts that are important, although they do in fact set a context that makes certain kinds of behavior more likely and enable new norms to develop. In addition, organizational learning occurs when elements of deep culture (language, behavioral routines, and values) change; these aspects have often become embedded and automatic, and have come to possess an aura of naturalness and to be taken for granted despite the fact that they constitute the background condition for organizational interpretation, action, and behavior. They are therefore less susceptible to direct intervention and alteration (Ciborra and Schneider, 1992; Sandelands and Stablein, 1987; Drazin and Sandelands, 1992).

Successfully implementing new organizational architectures requires the establishment of new 'webs of shared meaning' (our phrase) that shape the interpretation of organizational situations, inform action and behavior, and underpin ongoing design decisions. The logics underpinning the choice of architectural features are not always immediately self-evident to the people in the organization; and this failure to understand or accept the meanings embedded in the organizational changes often correlates with faulty implementation.

Insert Figure 1 about here.

As is depicted in Figure 1, particular architectures are enacted through changes in the cognitions, behaviors, and local structuring that occur throughout the organization (Drazin and

Sandelands, 1992). Cognitions refer to the mental models that consist of concepts and beliefs about action-outcome relationships that actors use to identify relevant issues, frame problems, and understand situations, each other and the environment. Behaviors refer to the way actors actually behave on their own and with one another to get the work done. Local structuring refers to the actual structures and patterns of practice that a unit establishes to do its work, which may or may not conform to a formal, prescribed structure; and may include local adaptations and extensions of such prescribed structure. Thus, for example, an architecture that calls for partnering with customers requires that members of local partnering units develop a cognitive understanding of the ways in which partnering can lead to benefits for both organizations; it requires a set of collaborative behaviors such as information sharing and mutual problem-solving, and it requires that at the local level social structures (such as teams, information connections, and/or linking roles) be established and active.

There are both prescribed and emergent aspects of organizational architectures. Both are critical to the success of large-scale change, and both are integral to organizational learning. During times of turbulence demanding fundamental organizational change, large organizational units such as corporations or businesses within them are having to radically change the way they function as a macro-structure. Ironically, this may include the creation of a corporate architecture that permits great amounts of local autonomy and variation of the architectures of the different business units of the corporation. However, for an organization transitioning away from a centralized, uniform architecture, even the architecture to permit diversity needs to be designed. Furthermore, even network organizations manage some key strategic assets centrally (knowledge, management skills, financial systems, etc.). Thus, the relation of the whole to the parts calls for the crafting of some organization-wide architectural features.

On the other hand, successful transition depends on the ability of many units of the organization to take up the new directions and put in place local practices to make them a reality and to continue to improve and achieve performance outcomes through time. For example, Brown and Duguid (1991) in their study of Xerox repair technicians found that based on 'learning by doing' (or what they term as 'situated invention and innovation') these technicians developed new understandings of repair procedures that were different from those prescribed in

repair manuals, invented new ways of working jointly with each other and customers, and found unique modes of sharing knowledge with one another. Indeed, the purpose embedded in many organizational changes is to create architectures that make it more likely that this kind of local learning will occur.

Weick (1993) has criticized the use of an architectural metaphor because he felt it leads to the rather limiting conceptualization of a design process that is a bounded activity that occurs at one point in time and focuses primarily on structure. This critique evidently stems from the vernacular use of "architecture" to refer to buildings (literally set in concrete and stone). On the other hand, Weick also argues for creating organizational designs that make it more likely that local learning will occur. It is our experience that although many organizations going through fundamental transitions do go through a major redesign effort that includes structural reconfiguration, architectures continuously undergo minor shifts as local units learn and self-design. In addition, local units operating within a broad rubric of a large-scale transformation frequently generate novel approaches which ultimately may become disseminated throughout the organization. Thus we find the architectural image to be useful in enabling a simultaneous focus on the overall configuration of the organization and the forms that emerge in different units. This view even has currency with regard to the architectures of buildings which have been observed to "learn" in much the same way we have observed that organizations learn (Brand, 1994).

A Generic Case Illustration

Currently a large number of companies are transforming themselves from an integrated functionally organized architecture to one that consists of multiple cross-functional business units each of which has responsibility for delivering products or services to customers. In order to illustrate the nature of the organizational learning challenge inherent in large-scale transformations involving the establishment of fundamentally different architectures, we will use this transition as

a point of discussion. There are of course a number of different kinds of architectural changes going on today (see chapters 3, 4 and 5 of Tomorrow's Organization: Creating Winning Competencies for more discussion of several of them). The choice of the transition to a business unit structure case for our discussion does not in any way suggest that this is the architecture of choice for any particular organization. But because the establishment of agile, flat, self-contained business units is occurring as part of many transitions today, it seems an appropriate focus for this illustration.

The nature of the transition to a business unit organization is depicted in Figure 2. The business unit organization might be a program in the case of an aerospace or defense firm, a product unit in a consumer electronics firm, or a customer service team in the case of a financial services firm. Such a social architecture might be put in place along with the introduction of an integrated technical architecture that links together the work of the various disciplines through common data bases and applications and makes possible concurrent technical work. Simultaneously a new market architecture might be designed that aims at achieving a new level of customer focus or even partnership with the customer. It might be characterized by including customers on program teams or new product development teams, or by establishing key account links or customer advisory boards in order to create a more responsive linkage to the customer.

Insert Figure 2 about here.

This set of changes might be crafted by an organizational design team charged with generating a design for achieving a changing business strategy that relies on superior customer service and local flexibility to meet the needs of the customer. This design team may go through a learning process that entails exposure to what other companies are doing, internal diagnostic and input-generating activities, and exposure to organizational design or process reengineering frameworks (Mohrman and Cummings, 1989). The organizational "blueprint" that they generate

might be a product of learning processes that enable this team to generate a discontinuous change that truly embodies a new logic.

The logic underpinning the functional organization is a bureaucratic one: its form is justified by the need to maintain discipline expertise, to have people supervised by individuals with the same expertise, to create standard processes that enable efficiency and the orderly introduction of process improvements, and to have integration occur at higher levels in the organization where people have visibility to the larger picture. The argument is that if these conditions are maintained, the organization will get maximum efficiency and control over work processes, which will lead to predictable organizational performance.

The business unit organization embodies a different logic. The logic is that by placing together in a single unit the requisite variety of skills and knowledge to perform a whole piece of the work of the organization that delivers value to the customer, that unit will be able to carry out all the operations and make the necessary adjustments internally and externally to deliver timely value to the customer. By moving control into the performing unit rather than into management and staff control units, the organization can avoid costly delays and non-responsive decisions. By holding the unit accountable for business performance (not simply technical accomplishment of task) work decisions are more likely to be made that take into account the multiple and sometimes conflicting outcomes of the system (customer, financial, and technical focuses) and making trade-offs appropriate to the situation at hand. This contrasts with the logic of the functional organization that organizational business measures are the purview of management and that the performing units are responsible for their internal process measures.

Our work with design teams indicates that they are often able to adopt this new logic and envision an organization that works according to these different principles. However, there is a period where they carry both logics in their head and they may make decisions that reflect an inability to abandon fully the comfort of the old model. In addition, political pressures from organizational incumbents may lead to design compromises that weaken the new model and result in an organization plan that has elements of both architectures and conflicting logics. Nevertheless, frequently the organizational leaders agree on an image of a business unit

organization and set out to implement it. This is when true organizational learning must occur—the organization will have learned only when it has put in place new approaches that allow it to perform more effectively against its own target aspirations. Up until the implementation, the new architectures have been abstractions and blueprints, and the reality of putting the various facets in place and establishing this new way of operating awaits. Until this point, it might be said that the design team learned something, but until this learning becomes embodied in the organization it cannot be said that the organization learned.

Within the logic that underpins the new architecture it is a relatively straightforward process for the design team to describe the new attributes of the system at a level of minimal specification. In fact, the ease with which this transition can be described masks the magnitude of the transition. The transition consists of putting in place many artifacts to support the new way of operating: new measurement systems, information systems, roles and positions, coordination devices, skills and understandings, and performance management processes such as goal setting and rewards, to name a few. Some of these may be envisioned by the design team at the onset; the need for other architectural elements may only be discovered as the organization proceeds through its implementation and learning process. Thus, the specification of a "blueprint" for change simply begins the process of architecture design, and leads to a number of iterative design processes each of which requires the development of new ways of thinking and the determination of new approaches and organizational artifacts. Consequently, each of these iterative design processes requires learning by design teams and implementation requires organizational learning (Mohrman and Cummings, 1989).

The change from functional to business unit organization strikes (as do most changes in organizational architecture) at the very heart of the existing culture of the organization: its language, organizational artifacts, membership, identity, and action routines. For the change to be successfully implemented organizational members must learn to think differently about the organization, to behave differently within it, and to carry out new routines with different patterns of interaction. What has struck us in many of the sites we have studied is that the change in logic is so great that it is difficult for people who are not on the design team to accurately capture the reasoning behind the new organization, let alone to determine its

implications for their own behavior. In other words, they may have trouble with the cognitive and behavioral aspects of the transition. The implementation may also bog down when the local units have to "figure out" how to structure themselves to work effectively in the new architecture, a task made more difficult if the cognitive understanding and behavioral implications are poorly apprehended.

Insert Table 1 about here.

Table 1 shows some of the cognitive, behavioral and structural learning that is required to successfully implement a business unit organization:

Cognitive Learning: People in the mode of accomplishing their technical task and interpreting the level of their performance only through the lens of technical effectiveness may have to learn what it means to deliver value to the customer. The shift to understanding success from the viewpoint of the customer is truly a cognitive shift. Likewise, to people used to working in a functionally homogeneous setting, the notion of working cross functionally may be limited to an image of meeting together to share information. Understanding cross functional work as applying the information from multiple discipline bases to get a fuller understanding of and better course of action through different work situations represents a cognitive learning. When used to thinking of managing as something done hierarchically by others, it is necessary to learn what is meant by self-management. A typical cognitive "error" is to understand self-management as the lack of being managed. Finally, there are numerous examples of business units being set up that are composed of people who have no experience thinking about business results and who may not even understand what these results are nor how they are influenced.

Behavioral Learning: In the functional organization, people were often in situations where they did not, nor were they expected to, hold co-workers accountable for the co-workers' pieces of the work. That was the job of supervisors. The business unit organization relies on lateral coordination and integration, which requires the voicing of mutual expectations and feedback. It also requires that the unit develop a competency in cross functional conflict

resolution, since operating across the "thought worlds" of multiple disciplines is fraught with arenas for potential conflict (Dougherty, 1992). In a cross-functional business unit, leadership tends to move between members depending on the issue of concern and the various expertise bases of the members. The behavior of sharing leadership flexibly will have to be learned, if the membership of the business unit have only had experience with single point leadership. Customer service teams may never have had to solicit customer input, and may not know the questions to ask or who to ask.

Structural Learning: This learning refers to finding and applying new ways to create new patterns of behavior (routines) to carry out the work of the business unit. People who have been individual contributors in the functional organization may have had little experience coordinating their work with others, particularly not with others who perform quite different tasks. Creating flow charts, approaches to setting mutual expectations, developing systems for keeping others in the business unit whose task are no longer buffered from each other aware of real time interdependencies are all structured approaches that may have to be learned to support such coordination. Business units may develop a routine system for soliciting customer feedback. Finally, many business unit members will have operated primarily in a single function domain for most of their lives, and will have little experience making decisions that entail input from multiple knowledge bases. To be effective, they may eventually develop or adopt systematic processes for registering and taking into account each other's perspectives and information.

The learning challenges described above are true organizational challenges, Although in some cases individual education and training may provide some basic cognitive understandings or behavioral skills, the cognitive, behavioral and structural learning that is required to establish effective business units are in their essence *organizational* learning, and can't be reduced to individual skill and knowledge development. The incorporation of a new architecture changes the way a collective system operates; old routines are replaced by new routines, which is the essence of organizational learning (Levitt and March, 1988). In studying various units in organizations going through this kind of change, it is clear that *units learn* to be effective business units. Individuals can't learn that for the unit. Whole units either "get it" or they don't;

make progress at putting this new way of operating into place or don't; and, if the logic of the new architecture is sound, whole units either accomplish performance improvement or they don't. In the next section we will examine the learning processes that differentiate the accelerated learners from the others.

A Model of Organizational Learning During Transition

We have argued that organizational transformations frequently involve the introduction of complex arrays of new architectures that entail changes in the way the organization deals with the marketplace, the way it carries out its technical tasks, and the way it organizes (its social architecture) to do both. There are organization-wide aspects of this transition. In pursuing a new strategy, the organization embarks on some overarching changes such as reconfiguring its basic building block units or introducing new information systems with the capacity to integrate and distribute information. However, effectively applying and operating within an organization-wide architecture that is changing requires that each unit learn. In essence, each unit must self-design its local architecture if performance improvement is to result.

Organizational learning occurs at multiple levels—learning has to occur organization-wide as the system as a whole assumes a new architecture, and within and between units as they craft local approaches. Business units may be further composed of teams. These teams must also craft new approaches to doing work. Learning at all levels is needed. Organization-wide learning increases the capability for coordinated action across business units in implementing a strategy and leveraging and focusing the capabilities of the organization. Unit by unit and team by team learning enables performing units to find new ways to operate in the changing organizational context but in response to local tasks, the local environment, and local opportunities.

Figure 3 depicts the cycle of activities that constitute organizational learning during strategic transitions. It presupposes that the transition supports an organizational strategy and that the organization is embarking on purposeful changes in its architecture. In the typical strategic transition, there will be some array of organization-wide implementation activities—the

essence of change leadership is the crafting of these. These activities focus organizational attention on the new approaches, provide a framework for the organization to operate within, and begin the process of interpretation that is key for the organization to develop shared understandings to emerge. Common organization-wide implementation activities include the crafting and disseminating of a vision or mission statement; establishment of design teams; setting up of company-wide cascading input, orientation and education sessions; and creation of training programs, design manuals, steering committees, and participative planning sessions. These are examples of change interventions that are intended to set up dynamics of learning in the organization.

Insert Figure 3 about here.

Organizational learning is iterative. In reality, learning activities are not neat and orderly in the sense that they are cleanly masterminded in advance and rolled out, although some organizations try to do it in that way. Organizations rarely begin with a master blueprint; rather, they start out having identified key elements of the blueprint (flat structures, self-contained business units, partnerships with customers, integrated information systems) and they set activities in motion through a series of interventions intended to direct attention and activities toward this high level blueprint. Transitions occur in fits and starts, with strategy leading to organizational changes, and experience with these changes leading to ongoing learning that leads to more changes. The organizational leaders and members can't fully predict what the organization will look like. "Events are set in motion, but the orderliness they will create remains to be discovered (Weick, 1993, p. 350). Social designs are abstractions that have to be 'made' in the realm of action (Perlmutter and Trist, 1986).

An organization may reconfigure into customer teams and implement a new information system to support a new strategy of customer partnership. The organization may embark on activities to share and achieve understanding of the customer-oriented strategy, to reconfigure the organization into teams, to help the organization develop the skills to operate effectively in

teams, and to develop understanding of and skills in using the new information system. The organizational change challenge is to stimulate the implementation of new market, technical and social architectures throughout the organization. At the onset, these exist only as high level plans. Even putting people in teams does not insure that they will operate as a team. Providing a new information system does not insure that people will use it, let alone that they will use it to accomplish the performance benefits that are made possible because of greater access to information. The challenge is to stimulate the learning required for them to take form and to become the true modus operandi of the organizations. All of the implementation activities enumerated above are intended to be learning activities and learning catalysts: to help organizational members develop new understandings, learn to behave in different ways, and learn to put in place new practices.

Throughout the organization there are a multitude of units that are going through these "learning opportunities" with differing levels of interest, skepticism and intent. Some are waiting with the expectation that "this too will pass"; others take advantage of the opportunity to actively set out to learn how to operate effectively in the changing organization and environment. At the local level they embark on their own learning activities that may result in them crafting their own local approaches to accomplish their targets, and in so doing they frequently generate new architectures, which may be variations on a general theme that has been created by the organization.

If organization-wide learning dynamics are in place, there will be good feedback loops so that what is being learned in different units can lead to mid-course corrections in the overall architecture and in the implementation processes that the organization is using. Furthermore, dissemination mechanisms can enable units to learn from each other—to build on each other's learning. Thus, an effective learning system to support ongoing organizational transition in a changing environment would consist of ongoing learning processes taking place at multiple levels in the organization and in an iterative manner.

The ultimate criterion is organizational performance. Performance results from the architecture of the system and the behaviors within it and with its environment. It is feedback about performance that feeds into ongoing learning and leads to a continual improvement of the

capabilities of the system through a series of changes that represent often small and incremental improvements in the way the system operates. This feedback-guided learning occurs at the unit level and at the larger organizational level. Gradually new business units will put in place the elements of their local architecture (new routines that take advantage of the information system, enable members to debate more effectively across their discipline viewpoints, build customer feedback into the ongoing interactions with customers, and so forth) that lead it to perform more effectively within its changing context. Gradually the organization as a whole will put in place the elements of an organization-wide architecture (new relationships between central and distributed units, enhanced information systems capabilities, new policies that make customer-focused activity and rapid local response possible) that provide the framework that integrates the organization, allows local self-management and self-design. Over time, as new architectures are put in place that enable and enhance performance, the organization is learning. Ongoing learning is required as the conditions of the environment change, and new routines need to be developed.

If the learning system is working, changes in performance, either in the form of negative gaps from target or large increases in performance of some performing units may achieve organization-wide attention and lead to changes in strategy or in the framework architecture of the organization. Negative performance has the potential to generate conflict that stimulates dialogue and encourages members to reflect and experiment with their own theories of action, behaviors, and the way they are organized to do work in order to devise solutions (Friedlander, 1984). This exploratory behavior may lead to novel architectural solutions. Jumps in performance results may propel further refinement and expansion of approaches that seem to be operating effectively. At the organizational level, attention may be drawn to units that are successful in implementing change to accomplish outstanding results. Other units may attempt to learn from them or the organization may change organization-wide design features or provide support to help other units learn about and adopt successful practices. This has been observed, for example, in companies where units that were early adopters of lean manufacturing techniques achieved such obvious benefits in cost of product that corporations embarked on programs to help other units move in this direction.

Dynamics of Organizational Learning

The above model of learning during transition is in a sense a normative one, in that it describes a picture of how it needs to happen. In actuality, many transitions abort before new approaches become established ways of doing business and before it is even possible to determine if these new approaches would have worked. These organizations have failed to establish an effective learning system, and have not succeeded in setting in place new organizational architectures or routines. However, there are a large number of organizations who have persevered through some version of this learning cycle, and who have learned a new way of operating, in many cases very slowly and with great difficulty.

In today's world which calls for rapid and relentless learning in order to survive competitively, a key question is whether this learning process can be accelerated. Accelerating a process depends on understanding the process you are trying to accelerate. Here we can learn by describing the dynamics that are in place in units where accelerated learning occurs. We have found that a number of conditions distinguish units that quickly learn to establish new approaches and to perform effectively within an organization that is in the midst of strategic change.

Creating Shared Meaning and Self-Designing

At the beginning of strategic transitions there is a great deal of uncertainty, not only about the rapidly changing environment, but also about how the organization is trying to respond and about the nature of the organizational transition. Orderly, predictable functioning has been made possible because through time the organization had developed shared outcome preferences and common beliefs about what causes the organization to be effective have been disrupted. Thus, shared understandings guided decision making (Thompson and Tuden, 1959). Organizational transitions disrupt this shared understanding, and require that it be rebuilt. Even the purposes of the organization may have changed, in ways that unfold as events transpire.

For example, organizations that once saw themselves existing to deliver the highest quality product and the lowest costs may not see themselves existing to deliver customer solutions. What this means is not fully apparent at the onset, and may not be accepted by organizational members. How it changes the routines of the organization that will lead to effective performance is yet to be discovered. What does it mean to deliver solutions and how should we best organize to do it are questions that will be in play during the early stages of a transition.

The meanings of the old system were embedded in the culture of the organization: in its language, its action routines and its material artifacts (Weick and Westley, 1996). Organizational learning requires that new meanings get embedded in altered language, routines and artifacts. These are collectively held meanings, and organizational learning is a collective process. The understandings and meanings that people attach to the new purposes and to the new architectures that the organization is striving to put in place are as much a result of the activities that are unleashed by the introduction of change as they are of a predetermined set of meanings that the management team or design team intends. During times when agreement about purpose and about cause and effect fall apart, the organization needs to operate in a way that enables interpretation to take place. People need to engage in processes that allow a new shared agreement to emerge (Weick, 1993). Units that learn quickly do so because they engage in processes that enable members to affix meaning and to effectively design and put in place new approaches that they continuously improve as they gain experience. Thus, units learn by self-designing.

Process Attributes of Accelerated Learning

There are five major attributes of the processes that characterize accelerated learning settings. These are described briefly below along with examples of the forms they take.

1. Accelerated learning units engage in rich *dialogue* that results in assigning collective meaning to the events that are transpiring. Dialogue is conversation that brings in the multiple perspectives of the various members of the unit and is able to transcend

individual views. The importance of dialogue as a key mechanism for continual generative learning has been underscored by Senge (1990) particularly for group or team learning. Senge, synthesizing the work of several scholars, suggests that dialogue enables the creation of a common pool of meaning that goes beyond any one individual's understanding. Through dialogue individuals gain insights that cannot be achieved individually and a new collective understanding comes into being that is based on the development of common meaning. In fast learning units, we witnessed dialogue about purpose, goals, and priorities. These were recurring conversations that were triggered by such events as a request from a customer that fell outside the normal set of activities or a change in competitors' offerings. There is also dialogue about the meaning of the new words being used in the organization. What does it mean to be self-managing? What does customer focus really entail? When faced with decisions about where to focus or how to proceed, these units pull together appropriate people to examine what course of action fit best with what they are trying to accomplish, and in so doing they establish meaning about purpose and a new understanding of what actions would lead to desired outcomes. The meaning established through dialogue becomes part of the embedded meaning that provides a new set of shared expectations and new agreement to underpin action routines. Without this dialogue, a unit can not establish new ways of operating It might resort to old ways of doing work that they already know: for example, "even though we're in a team now, we'll just all do our usual tasks and our leader will play the role our supervisor used to play." Alternatively, a unit might meet continuously and make decisions about particular aspects of the work but not put in place a shared meaning that would allow routines to take over. For these groups, the process of obtaining consensus becomes a never-ending drain on time and energy because no shared understanding is created.

2. Fast learning units engage in *value referencing*: They consciously focus on the valued outcomes they are trying to accomplish (their mission and goals) and on

feedback about how well they are achieving them in their performance. Feedback is an important learning process since it reveals cause and effect relationships (Senge, 1990). Although slower learning units may receive as much feedback about outcomes as faster learning units, there is marked difference in the attention they pay to it. Fast learning units tend to discuss the results and problem-solve about how they can improve them. They discuss an expanded set of values, including the social values having to do with teamwork and responsibility between members. They consciously articulate the norms required to operate effectively to achieve their values. By continually paying attention to these valued outcomes, they are incorporated into the culture and become shared outcome preferences.

3. The fast learning units engage in more ways to *learn from experience*. This might include conscious experimentation, whereby a unit tries out a new approach and assesses it before incorporating it into the routines of the unit. It often takes the form of sharing successful or unsuccessful approaches between members or developing documentation of approaches that work and incorporating them into the unit's practices. A unit might have a time during regular meetings for sharing "what's neat that we've discovered this week" or "failures we've learned from". Or, norms may develop to use e-mail or groupware to draw to the attention of the group materials that have been developed or processes that have been used that might be applicable in other unit activities. These practices make it more likely that new routines will be introduced and become part of the "way we do work".

4. The fast learning units take a *more systemic view* of their unit and of the larger organization of which they are a part—they see it all as nested systems. They consider a balanced set of outcomes and costs, and make decisions based on how they would affect performance overall, not based simply on the piece parts. In designing a component, for example, a unit would consider cost, performance, the project time table, maintainability, and future technology directions. Learning

occurs in the nexus of these issues, where novel approaches are required in order to balance and achieve multiple outcomes. They do not talk in terms of a narrow task, such as soliciting new business, but in systemic terms, such as soliciting new business that would enhance ROI. They do not talk solely in terms of the performance of their unit as a system, but in terms of how their unit is fitting into a larger organization and contributing to a set of systemic goals at the higher system level. Taking a systemic view leads a group to pay attention to more aspects of the system and opens up a number of new avenues for improving performance. Systemic thinking enables appreciation of the whole vs. the parts and creates a framework for seeing interrelationships rather than things, for recognizing patterns over time rather than static snapshots at a point in time (Senge, 1990).

5. Fast learning units open themselves up to information from outside the unit through *open-loop learning*. Information from customers, suppliers, other parts of the corporation, and technical and industry sources are infused into the deliberations of the unit, providing an external grounding and perspective that prevent the group from engaging solely in self-referenced activity. Seeing the service through the eyes of the customer, or seeing the product through the eyes of the repairman enable the unit to develop novel approaches that are more directly linked to the environment. In some cases this occurs by having customers or suppliers on the team; some units have members make regular visits to customer or end-user facilities; some send members to conferences to gather "intelligence". Some units appoint different members to keep track of developments in the environment and bring information back to the group. External focus leads to the exploration of novel approaches rather than focusing primarily on simply introducing incremental change (March, 1993).

6. Fast learning units have many structural *bridges both within and across units* that enable ongoing connectedness and prevent the compartmentalization of work.

> Internal bridges provide the foundation for learning processes by creating task-related connections and overlap among members. This might be facilitated by cross training that permits flexible transfer of tasks between members; fuzzy assignments, that lead to overlapping responsibility and ongoing interaction; sub-teams with joint accountability for some piece of the work; and liaison positions and overlapping membership in the various teams that compose the unit. Between units, knowledge sharing bridges are particularly important. These include regular cross-unit reviews and lessons learned to enable units to learn from each other's experience; networked information systems that provide well indexed sources of knowledge generated throughout the organization; councils and interest groups for sharing best practices and infusing discipline or problem-centered knowledge. But there are also task-oriented bridges across units such as joint planning and review mechanisms, integrating teams that have members of multiple units whose task is to integrate the interdependent work of the units, and supplier-customer teams. Such bridges make it less likely that groups will settle quickly into rigid patterns by building in interactions that expand perspectives, provide ongoing feedback and make it more likely that new practices will be introduced and shared meaning will emerge and evolve.

These processes that underpin rapid learning contribute to the ability of a unit to achieve the shared meaning and to self-design new performance routines. The six conditions apply equally at all levels of analysis. The organization is a set of nested systems where a division of a company might be composed of a number of business units or regions, each of which is composed of a number of teams or work groups. The development of new shared meaning and new performance routines are equally applicable and necessary at all levels. It is the shared meaning across business units that enables a division to operate in an integrated way and to apply its resources optimally to a number of environmental opportunities and requirements. The division must have in place processes that enable it to self-design division-wide routines. The

business unit and sub-group level have the same requirements for developing a locally held shared meaning and for ongoing self-designing at the local level.

The learning processes described above clearly represent a resource commitment. It takes time and energy to reflect, dialogue, bridge, and learn from experience. Generally organizations in a turbulent environment have a premium on cycle time, a shortage of resources compared to the tasks that need to be accomplished to deal with rapidly changing environmental resources, and a great deal of embedded knowledge about how to do things the old way. If organizational units do not take this time, they will slip back into carrying out old routines in new units. They will continue to work sequentially even though placed in concurrent engineering teams. They will continue to have people do narrow jobs even though everyone is given the same job title and is expected to develop generalist knowledge. They will continue to focus on product performance and schedule even though they are being provided with data indicating that customers are dissatisfied with product cost and service. Alternatively, they will become increasingly ineffective since old routines have been disrupted and new routines are not put in their place. This may be masked for some period of time, since the organization can still rely on its embedded knowledge base and on people to do what they know how to do despite organizational impediments; but ultimately the system will become underorganized to carry out its mission if no self-designing occurs within the new architecture.

A striking pattern that has emerged in our work is that fast learning organizations and units have figured out a way to embed learning in their day-to-day work. They review customer data as a regular part of their ongoing meetings. They solicit customer input as they interact with customers to get their work done. They build reflection and action planning into project review sessions. They include a review of lessons learned as the first step in a new project. Although they use special "offsites", design meetings, and improvement projects as effective tools when periods of intense focus on learning are required, even these are built into the new routines of the organization. For example, a self-design meeting is part of the start-up of every new project. Or, problem-solving meetings are automatically triggered by unanticipated quality problems in the field and the documents generated to solve the problem are automatically shared with others who face similar situations. In this way, learning routines are built into the

work performing routines of the organization, rather than being seen as extra. This is increasingly important as accelerated learning and knowledge management become the basis upon which an organization competes.

Future Challenges: Learning in The Reconfigurable Organization

Although the above discussion has been couched in terms of learning during transition, it is clear that in a turbulent environment transition never stops. Organizational forms by necessity have to become fluid and transitory, shifting shapes continually. Structures will evolve into a myriad of constantly shifting teams, partnerships, inter-firm alliances and spin-off units (Nadler, Gerstein and Shaw, 1992) and multiple forms will co-exist in the same organization (Quinn, Anderson, and Finkelstein, 1996). Continuous improvement will be a necessity at the corporate level, the business unit level, and the process level.

Organizations will have to build in the ongoing process capability to design and enact constantly adaptable architectures to meet changing performance demands. The routines and artifacts of the organization will have to include learning routines and artifacts. The metaphor of constantly adaptable architectures is well illustrated by the Japanese scholar Maruyama's comparison of Western and Japanese architectures (Maruyama, 1994). Maruyama argues that Western architecture is based on principles of similarity, repetition, opposition, and stability. By contrast, Japanese patterns emphasize interaction, complementarity, continuity and convertibility. This is exemplified by traditional Japanese houses in which internal horizontal boundaries and to a more limited extent external boundaries can be re-shaped to fit various functions.

A similar notion is the 'platform organization' (Ciborra and Schneider, 1992; Ciborra, 1996). The platform organization draws its name from the architecture of computer work stations where a number of work stations act as computing platforms capable of being radically reconfigured for many different uses. Rather than a stable architecture, the platform organization can be visualized as having the learning ability to reconfigure its resources and capabilities in fundamental ways based on changes in the environment.

Given this trend of continual architectural reconfigurations, the elements and processes of learning that were presented in the previous section will become increasingly important. Furthermore, the organization will need to develop institutional capabilities for on-going learning. They will have to explicitly manage their learning processes by creating an infrastructure and mechanisms to support purposeful learning. The previous two sections which present a model of organizational learning and its process dynamics also suggest the nature of the market and social architectures that would specifically support an ongoing, continually learning organization. By building the same learning attributes that facilitate its learning during transition into the architecture of an organization it can become a continuously learning organization.

Earlier sections, however, omitted discussion of the nature of a technical architecture that might support the continually learning organization. We address that omission here. New information technologies can play a key role in establishing these capabilities by creating new technical architectures to underpin new social and market architectures. There are four domains in which information systems are evolving to the point where they can become an integrated part of the architecture of the learning organization:

1. *Mechanisms for thinking, reflection and interpretation*: Experiential learning theory suggests that learning is a continual process of thinking, deciding, acting and reflecting on the consequences of action for future actions. This sequence was implicit in a number of the learning dynamics mentioned earlier. A problem organizations often run into is that cross-discipline groups of people often have trouble dealing with their different and potentially contradictory views of the same situation (e.g., Dougherty, 1992). Furthermore, individuals who have to join together to self-design are sometimes in different locations. Group ware and other kinds of software applications are getting to the point of sophistication where they can be used to aid collective thinking (Malone, Lai and Fry, 1992; Boland, Tenkasi and Te'eni, 1994; Dykstra and Carasik, 1991). Many of these software applications use various tools and objects such as cognitive maps or cause and effect diagrams to help individuals surface their specific

perspectives and unique understandings of a situation and engage in mutual dialogue to arrive at a shared interpretation.

2. *Mechanisms for Capturing and Distributing Organizational Knowledge:* Organizations are increasingly supporting or replacing knowledge based routines in specific domains of human expertise with computer based expert systems and distributing such expertise across the organization to increase efficiencies and reduce processing errors. For example Merrill Lynch captures and distributes the firm's knowledge base through software and leverages its professional intellect in very creative ways (Quinn et al., 1996). Financial specialists create a scientific knowledge base for making investment decisions and create proprietary software systems that distribute the resulting investment recommendations to brokers at retail outlets who create further value by customizing the central investment advise to meet the needs of clients. The knowledge system ensures that all brokers adhere to the current regulations, make no arithmetic or clerical errors and provide customers with the latest market information. This system is an example of the kind that are emerging in many arenas that encode a part of the knowledge base of the firm in a way that is robust and can be made widely available no matter how the firm changes its architecture.

3. *Mechanisms for Encoding Organizational Memory*: Organizational memory and knowledge are closely related concepts. As organizations change architecture, they must maintain the ability to be self-referencing—to learn from the system's historical memory and embedded knowledge. Organizational stories and examples are an important medium for transmitting cultural and technical knowledge (Brown and Duguid, 1991). They can be stored in centralized data bases, perhaps in the forms of pictures which graphically illustrate past quality defects or product solutions as well as in the form of text that can be referred to if people want to learn from the past. Roth and Senge (1996) have suggested creating organizational learning histories that describe work issues and learning experiences from multiple and often contending perspectives,

and consequently can capture and convey the complexity of real situations in participants' words.

4. *Mechanisms for Experimentation:* Technical simulation programs have become standard tools for developing new products and making scientific breakthroughs. These programs embed and employ the latest algorithms and knowledge base of a field. In the future, it is possible that organizational design principles will be understood richly enough to enable the establishment of simulations that can aid the self-design process. One organizational simulation software package that has been field tested is HITOP (Marjchzak and Gasser, 1992). With it groups can simulate the consequences of various organization design options and use the predicted consequences to inform their ultimate design decisions. Such software packages provide an electronic 'practice field' (Roth and Senge, 1996) for design experimentation. Likewise, computer-aided system dynamics simulations could compress time and space to quickly allow group members to role play in a simulation of the new organization to see the effects of different operating assumptions on desired objectives. These practice fields would be designed learning spaces where people can experiment, make mistakes, accelerate learning and test new behaviors.

As information systems are becoming key elements of the technical architecture in the conduct of business in the firm and integral to work routines, organizations are working to make them instruments of learning. In distributed and dynamic organizations, sharing data sets and lessons learned, solving problems through electronic mediation, and moving knowledge wherever it is needed will become mainstays of an organization's ability to be flexible and yet maintain and increase the knowledge it applies to succeeding in today's environment. A near term challenge is to determine how the technical architecture can be interfaced with the social and market architectures to enable organizational learning through new people/machine interfaces and appropriate combinations of human and computer systems and processes.

Conclusion

We have argued that organizational transitions involve changes in three intertwined aspects of an organization's architecture: market, technical and social. Strategic transition often involves replacing a well understood architecture that has generated a complete culture with a new architecture that is based on a different logic and requires cultural change. Transition entails changes in cognitive understanding, behavioral patterns and structures of the organization. We believe that the transitional process is a form of organizational learning, and that learning dynamics need to be established in the organization. As an organization sets out to put in place a new and broadly specified architecture, its meaning and form will evolve through the processes by which organizational members interpret and make sense of the change, and institute new ways of doing work. The creation of a new shared meaning and the self-design of new ways of doing work are the essence of learning for transition.

Finally, we argue that learning processes are fundamental organizational capabilities for the future, as organizations in a shifting environment take on a variety of forms through time. The capability of the organization to continually reconfigure itself is critical to ongoing survival. Much of this chapter has dealt with the collective processes that have to be established. We also speculate that advanced information systems will play an increasingly critical role in learning in the reconfigurable, flexible organization of the future.

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Table 1

Sample Learning Challenges in Moving

from a Functional to a Business Unit Organization

NEW UNDERSTANDINGS

What it means to:

deliver value to the customer

work cross-functionally

self-manage

be accountable for business results

NEW BEHAVIORS

holding team members accountable

sharing leadership

soliciting customer input

cross-functional conflict resolution

NEW STRUCTURES (formal or informal approaches to establish patterns of interaction) FOR:

coordinating activities

tracking and reviewing business performance

soliciting customer feedback

making decisions in a cross-functional arena

Figure 1
Learning Domain of Organizational Transitions

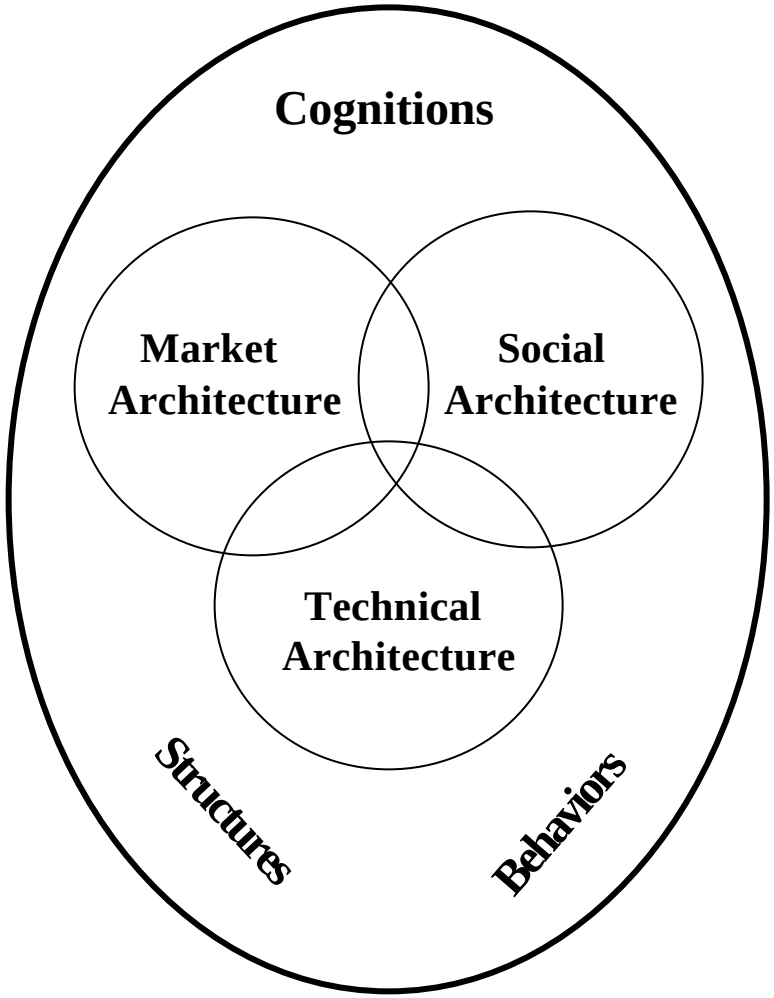
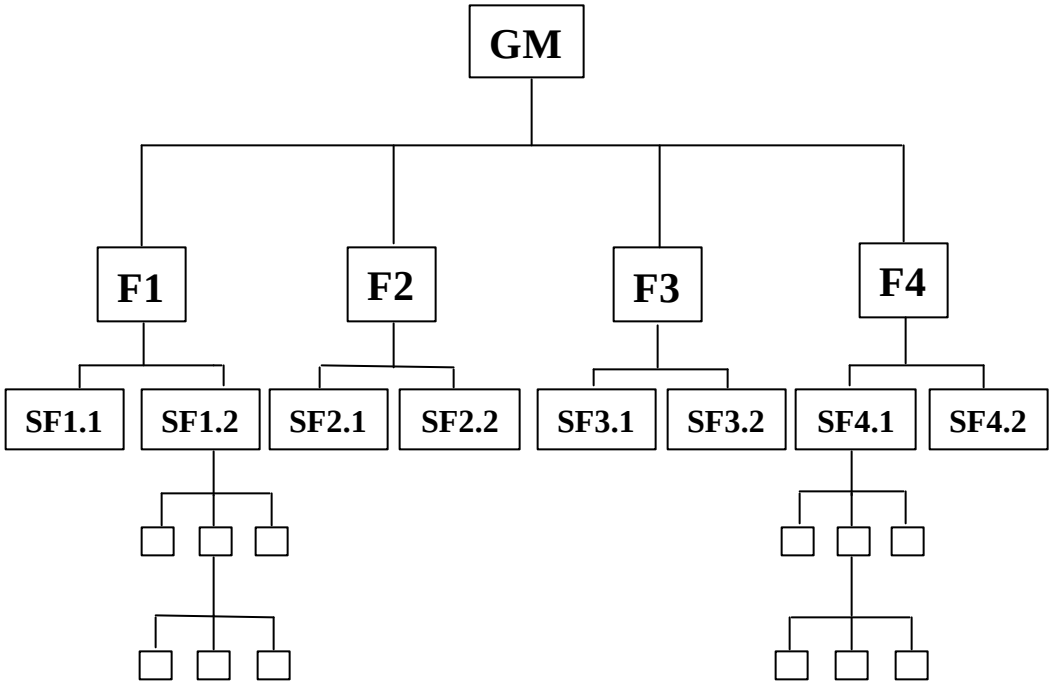
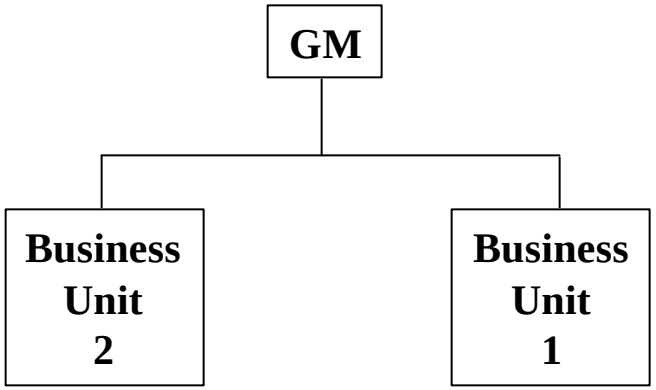


Figure 2

Example: Organizational Transition

Functional Architecture → **Business Unit Architecture**





Cross Functional
Some Multi-Skilling
Teams
Jointly Accountable
For *Business* Results

F = Function
SF = Sub Functional Discipline

Figure 3
Organizational Learning During Transition