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SMALL BUSINESS TRANSFORMATION: THE MEDS APPROACH

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ABSTRACT

In today's rapidly changing business environment, small businesses must gain a deeper understanding of the future to develop strategies that will provide them with sustainable competitive advantage. The traditional approaches to strategy formulation are inadequate in an environment that is complex and dynamic. This paper investigates a "new" approach that helps small businesses "see the future." It discusses an application of the multi-equilibrium dissipative structures (MEDS) approach to strategy formulation within the context of a small business involved in medical management software development. The dissipative systems approach can be used to evaluate the critical discontinuities that a small business faces in dealing with its changing environment. The approach also provides an opportunity for researchers to further develop theory in strategy formulation in small businesses, especially those directly involved in the rapidly changing areas of global operations and technology innovations.

SMALL BUSINESS TRANSFORMATION: THE MEDS APPROACH

The complexity of the current economic, technical and political environments continues to increase at an accelerated pace. This has resulted in a dramatic growth in the number of interactions we must consider when making decisions. In addition, the predictability of the future is becoming more difficult as the types of changes taking place continue to increase. Three of these changes that we face today include increased structural complexity, an increasing global free market, and a focus on mass customization made possible due to advanced technology.

The contemporary business environment is becoming upward integrated by the formation of strong interacting industry and inter-industry clusters at national and international levels, while it is becoming downward differentiated with an increased focus on autonomous work-teams and individual customers. This is analogous to the structural changes taking place in society. A growing diversification triggered by ethnic and cultural forces coexists within an environment that is seeing simultaneous convergent integration of existing systems at higher levels of organizations as exemplified by regional economic and commonwealth systems. Surprisingly, many small businesses show very little evidence of being adaptable and flexible in an environment that is changing so dramatically.

Many countries have entered or increased their participation in the free-market global trading village during the first half of this decade. The developing nations of Asia and Latin America are now recognized as the growth-engines of the world economy. In fact, exports are the largest growth area in the United States. The interconnectedness and interdependency of major capital markets only strengthen this trend. In addition, improvements in quality and productivity are being actively sought in both leading and developing economies of the world. Yet many U.S. small businesses continue to believe that globalization of the economy is more relevant to large manufacturing firms than it is to them. Nothing can be further from business reality.

As customer needs change, processes and organizations need to be reinvented again. Consider the approach of mass customization that some firms have adopted. These firms are now beginning to focus on providing individual customization of low cost, high quality and high variety products and services. Businesses require flexible and responsive processes to be able to provide this dynamic variety. Small businesses cannot continue to claim that their size provides them with the unique advantage of providing "personal" attention and value to their customers.

Managing small businesses in such a turbulent and unpredictable environment requires a significant change in the way we view and understand them. The primary thesis of this paper is that a "new" way of thinking about strategy formulation in small businesses can be achieved through the development of a systems perspective. Current attention in the area of small business strategy formulation is typically limited to the synoptic perspective as represented by the SWOT (Strengths, Weaknesses, Opportunities, Threats) model. Emerging nonequilibrium forms of systems thinking, however, do provide alternatives that need to be investigated. Such approaches do not assume equilibrium to be the normal state of a system, and are therefore more aligned to the current reality. These theories say that while relative stability may be common, and even desired by organizations, equilibrium does not characterize the basic nature of organizations. This paper identifies and develops strategy formulation based on such a theory in a small business involved in software development.

THE EQUILIBRIUM PERSPECTIVE

Strategy formulation has traditionally been viewed as a formal planning process that outlines courses of action for managing an organization. This formal process should result in a written business plan that stimulates critical thinking, enhances communication to internal and external constituents, and provides a control mechanism for corrective action (Baker, Addams, & Davis, 1993). Typically, a firm must establish or select the directional signals that provide the understanding of an organization's scope and insight into how to conduct its operations. Formally developed and written strategic plans are preferred (Baker, Addams, & Davis, 1993), however, the formality of the process in developing the strategic plan varies across organizations. As Lyles, Baird, Orris and Kuratko (1993) suggest, the process of planning is very influential in determining the content of the plan. The strategic planning process has a direct affect on dimensions of strategic decision making such as scanning and setting objectives. More importantly is the range of considered alternatives that can be greatly influenced by the process used. It is this point that directly supports the need for considering

new approaches in strategy formulation. It is understood that this blueprint, or strategic plan, is assumed to be forward looking because ideally, it establishes organizational direction through mission statements, goals and objectives, and a strategy. Developing the widest range of feasible alternatives providing the greatest performance potential is what a new strategy formulation process can deliver.

Literature abounds showing strategic planning positively correlated to small business success (Bracker, Keats, & Pearson, 1988; Kopf & Beam, 1992; Shrader, Mulford, & Blackburn, 1989; Shuman & Seager, 1986; Robinson & Pearce, 1983; Ackelsberg & Arlow, 1985). Despite strong evidence showing links between strategic planning and successful performance, many small firms are at best sporadic in their use of such processes (Sexton & Van Auken, 1985). Small businesses, due to their lack of strategic human capital, are often restricted to the "muddling through" approach. Even small businesses with especially astute executives feel constrained for intellectual capital that can be committed to the strategy formulation process because managers invariably wear more hats. Aggravating the situation for some small businesses is the mind-set that strategy formulation is the easy part of strategic management. Small businesses with an "implementation mentality" are consequently unable to take advantage of opportunities that may be on the organization's horizon.

Strategy is a fundamental tool that helps organizations manage the complex interface with their environment. It helps identify opportunities that promote growth and promote long-term stability, thereby developing a sustained relationship between the organization and its environment. Two major aspects of strategy, strategy content and strategy making, need to be considered. The former helps identify successful and unsuccessful strategies in a given environment through the development of a typology. Miles and Snow (1978) and Porter (1980) provide the two classic strategy content models. Strategy making, however, deals with formulation and ultimately the implementation of a successful strategy, the main focus of this paper. It is strategy making that is the indispensable process that defines the path of organizational growth. In today's dynamic environment, small business managers should know how to create new and innovative directions for their firms.

Mintzberg and Waters (1985) identify two different, and nearly contradictory, approaches to strategy formulation, a synoptic perspective and an incremental strategy-making process. The synoptic perspective is a deliberate and planned process represented by acronym OSWOTS (Objectives, Strengths, Weaknesses, Opportunities, Threats, Strategy). In this process the strategic objectives of an organization are defined from the desired state that the firm wants to achieve. This is followed by developing a profile of organizational capabilities, making an environmental assessment in terms of threats and opportunities, and finally selecting a strategy that ensures the firm's objectives are attained while taking advantage of the firm's strengths and environmental opportunities. The central weakness of this approach is the reliance on a planned strategy that is dependent on the purely rational approach to decision making (Stopford & Baden-Fuller, 1990). Managers have a limited rationality due to limitations in their ability to process information that is especially constrained when dealing with small business. Quinn (1980) proposed that firms often develop strategies on an incremental basis. This incremental perspective suggests that managers proceed with full commitment to their strategies from some initial implementations. This approach provides

opportunities to make suitable adjustments over time rather than following a predesignate route. While being pragmatic, the incremental approach is typically initiated in response to current problems and is therefore limited in its ability to develop a comprehensive view of the future.

The synoptic and incremental approaches to strategy formulation do not effectively address the dynamic nature of the current business environment, nor effectively explain the way in which firms should adapt to such changes. The concept of transformation is more appealing in its ability to explain how organizations change (Loye & Eisler, 1987). Transformation is a process that preserves order, interspersed with periods of chaos, resulting in fundamental change. Such change is made possible because the organization can self-organize, reconfigure itself based on an internal reference on what the firm should become. This internal reference is firmly entrenched because farsighted organizations have a profound set of processes that result in "future state visioning" or knowing where the firm should be by a future date (Stewart, 1993). Such dynamic behavior of organizations, moving between chaos and order, can be explained using the Dissipative Structures framework. The following sections of the paper discuss strategy formulation at a small business based on this approach.

SEEING THE FUTURE

The critical significance of strategy formulation is again taking a new turn in management literature thanks to the work of Hamel and Prahalad (1994). They believe that no company exists which can get along without a well-articulated point of view about tomorrow's threats and opportunities. The key to success is in creating the future, not preserving the past. In addition, they feel that a well-articulated view by itself, does not automatically result in seeing the future. Organizations must establish effective foresight which not only sets direction, but has the potential to transform industry boundaries and create new competitive spaces. Firms that see the future get to opportunities before competitors and have better chances at securing leadership positions in their respective industries. As Hamel and Prahalad (1994) see it, ". . . the trick is to see the future before it arrives," and then be prepared to take advantage of it.

Seeing the future requires a deep understanding of trends that have the potential to radically change the competitive rules of the industry. Combining creative uses of information that trends provide with consistent capability-building qualities of the firm provides the potential to create unseen opportunities. Changes in technology, demographics, lifestyles or regulations may offer openings that competitors do not see and thus, are ill-prepared to take advantage of. According to Hamel and Prahalad (1994), understanding trends means the organization has affirmative answers to: "... understanding how fast the trend is emerging in different markets around the world, the technologies propelling it, choices competitors are making, which companies are in the lead, who has the most to gain and lose, . . . and how this will influence customer demands and needs?"

The idea of seeing the future goes well beyond being customer led or customer driven. In fact, customers are sorely lacking in foresight and cannot articulate unserved needs. Firms that choose to be led by customers miss all opportunities associated with unserved customers and unarticulated needs. These firms end up being relegated to market followers rather than

market leaders. Market leaders with foresight create products that fulfill needs customers do not know they have and follow that by educating customers about the benefits of the products created. Market followers rush to create products that fulfill articulated needs of already served customers. In short, followers fall into the trap of making insignificant changes to product offerings already articulated in the market. While these arguments are intuitively appealing, there is a need to develop an appropriate theoretical foundation. The dissipative structures approach provides a suitable model. It is briefly described below, and some strategies of HealthWare, Inc. are discussed on this basis.

MEDS: MULTI-EQUILIBRIUM DISSIPATIVE STRUCTURES

Traditional methods of explaining the working of organizations are built on the premise that stability and equilibrium are the "normal" conditions. Contemporary systems thinking, on the other hand, suggests that change is the natural condition of a system, especially in a complex environment that changes rapidly and in quantum leaps. The dissipative structures approach is one such non-equilibrium theory in contemporary systems thinking. It says that systems continually evolve through a series of equilibrium levels by refining their adaptive abilities and improving their chances of survival. This results in a metamorphosis or transformation of the organization that involves a significant alteration of its structures and processes. The social, political, and cultural aspects of the organization are also affected. The dissipative structures model considers such regularly occurring change as a natural response to internal and environmental conditions (Sheldon, 1980). Such regularly occurring transformation was described by the theory of dissipative structures initially in the fields of physics and biochemistry, for which Prigogine received a Nobel Prize in 1977 (Prigogine & Stengers, 1984). The model was then shown to be applicable to social systems (Zeleny, 1980).

According to Jactsch (1980) there are three types of assumptions about organizational change. These are the deterministic, equilibrium, and the dissipative approaches. From the deterministic perspective, there is an underlying order to the environment. Management therefore should understand this order and design their organizations to cause ever-increasing order. This deterministic "Newtonian" model then gave way to the equilibrium perspective. This approach emphasizes order and regularity while recognizing that external orderliness can change. Management's role according to this approach is to continuously find an equilibrium between the organization and its environment. The typical strategic management models, such as the OSWOTS model, adopt this underlying approach to organizational change. These models are derived from an open systems perspective with an assumption of adaptation to environmental conditions. The equilibrium approach does not describe transformational, discontinuous change in the structural and cultural systems of an organization because of uncontrollable environmental turbulence (Tichy & Ulrich, 1984).

Leifer (1989) discusses two basic consequences that arise from the equilibrium approach to explaining organizational change. The first is that the organization is viewed as distinct from its environment. The organization is also considered to often be at odds with its environment, which is also a source of disturbance to be adapted to. The second consequence is that the goals of organizations are determinateness and certainty. These can be achieved only when there exists an environmental order, however complex, which organizations attempt

to match. The concepts of determinateness, certainty, and the distinction between organization and environment, may not accurately describe today's world. Limits to growth, scarcity, decay, and conflict have created persistent problems of randomness, indeterminacy, and ambiguity in the environment (Scott, 1987). Rifkin (1981) explains this situation using the concept of entropy. Entropy in organizations is the tendency for self-destruction. It is the tendency for usable energy in closed systems to become less available as work in the system continues. This would ultimately lead to the destruction of the system, unless there is an exchange of energy from the environment that changes the structure of the organization.

The capacity of an organization to adapt depends on its technical and human resources, and its ability to learn from experiences. However, organizations reach a point when internal or external fluctuations are extreme, resulting in unstable structures and scarce resources. This critical condition is called a bifurcation point, and is an opportunity for an organization to transform itself. It is the point at which the organization's coping mechanisms are just exceeded (Leifer, 1989). According to the dissipative structures model, instability at the bifurcation point could lead to entropic behavior or transform the organization and result in new configurations. That is, beyond the bifurcation point the system may either collapse or may reestablish itself with a new stable form and a more evolved structure. The internal rationale of the organization, and not the external environment, is considered the primary governing factor in this change. The key concept of the dissipative structures model is that upon reaching the bifurcation point, the organization needs to operate in a manner that reflects a transformation in style and behavior (Leifer, 1989).

A transformed system is stable until the next bifurcation point is reached, and the transformation or decline of the system happens. Organizations are therefore guided from chaos to order to chaos again. Out of this fluctuation arises an increased ability to cope with greater complexity. The organizations whose management have superior abilities in understanding the future environment and succeed in articulating values and principles to guide actions which lead to the future will find sustainable competitive advantages (Stewart, 1993).

The key assumptions of the dissipative structures paradigm are (Leifer, 1989):

- (a) The environment is not munificent, does not promote growth, is not stable, and is not ordered.
- (b) The normal evolution of organizations goes from transformation to transformation.
- (c) Order by fluctuation means that an organization's order is transformed when it experiences far-from-equilibrium conditions.

The small business discussed next faces an increasingly turbulent healthcare, software, and technological environment. The recent transformations that this company underwent, and those that it faces in the future, are discussed within the framework of the multi-equilibrium dissipative structures model (MEDS). These illustrations can be generalized according to Leifer (1989) by identifying four stages of transformation derived from the MEDS approach. They are:

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- (a) The first stage is to be able to identify current events or future requirements that are/will overwhelm the normal capacity of the firm to adapt itself effectively. If required, the firm should develop the skills to "see the future." Another prerequisite at this stage is that the system participants should be educated to decommit themselves from existing processes and values so that the firm can transform itself when required.
 - (b) The second stage involves using radical strategies driven by the firm's need to restructure. The structural changes are made internally to effect the transformation. This helps reframe what is considered true by reestablishing the firm's sense of its future.
 - (c) The firm is involved in establishing the new structure in the third phase. Here the firm has to simultaneously establish its structure and carry on its operations. In doing so, the firm continues to maintain continuous entropy production as it continues to work, but should also dissipate the accruing entropy through exchange with the environment in restructuring. The inner non-equilibrium is thus maintained, and this in-turn maintains the exchange process with the environment. A (dissipative) structure of the firm is therefore constantly renewing itself to maintain a transformed and more effective way of operating.
 - (d) In the fourth phase, the new structure is operationally stabilized, and the new characteristics of functioning are established with the understanding that this new structure of the firm is to be held lightly to enable the next cycle of transformation. In addition, the firm can make subsequent transformations more efficient as it learns from past transformation processes.

As previously stated, systems undergoing such change generate a high amount of internal activity, and are characterized by a high degree of energy exchange with the environment to fuel this internal activity (Leifer, 1989). Such systems are called dissipative as they attract resource from the environment to create new inner arrangements of their elements, and by that avoid the potential of decay or disintegration. For HealthWare (the small business discussed in the case below), stagnating sales and inability to understand the market led to change. A new marketing manager was hired and charged with the responsibility of analyzing market potential. This person brought in new approaches in managing and identified critical information that helped to explain current performance. A better understanding of the current situation increased the acceptance for change and provided opportunity considerations that previously would have been considered unthinkable. The key to redefining direction is to position the organization to take advantage of the opportunity when it finally appears, not to select opportunities that currently exist. The entropy that has accumulated in the organization is dissipated through this exchange with the environment, by that giving this systems perspective its name.

COMPANY PROFILE

HealthWare, Inc. is a small software developer that provides products to small office health service organizations such as physicians and dentists. The company has been in business five years and has twenty-three employees. The facility currently used to house all operations

is a leased small suite of offices located in a small rural community. The current office space offers no room for expansion that makes further hiring difficult. The most recent annual sales level was \$1,750,000 from an asset base of \$242,000. Sales growth was 14% over the previous year and the company may be profitable for the first time. HealthWare initially had two products and was considering expansion into one or more additional lines of business. One current software product, an office practice system, helps office managers of healthcare professionals operate their office systems. Typical customers include physicians who run their own small clinics and have few employees. This product provides computerized accounts receivable tracking, computerized medical claims processing and offers a variety of office practice applications, such as patient account management, which can eliminate the need for paper filing systems. The second product line is a claims management system that electronically transmits medical claims from physicians to service bureaus and billing centers. This service is sold to physicians who pay for claims management on a per claim charge basis. Consequently, physicians or their offices do not have to actively manage collections from patients and third party payers such as insurance carriers. Both products are sold primarily through resellers who sell multiple product lines to physicians and small clinics. Technical assistance to customers is done primarily over the telephone. The organizations' target customer base is considered nationwide.

The management at HealthWare, Inc. believed that these products were unique and that competition was limited. Consequently, they focused extensively on product development and generally neglected all aspects of environmental scanning. A "seat of the pants" approach was used to assess competition and market potential. The general feeling was that HealthWare products were superior and customers would purchase superior products. The key to success was believed to rest with getting enough of a physician's time to express the benefits of the product that would sell itself. Industry assessment was generally lacking in all aspects of operating the firm and the top-level management team committed most resources, financial and human, to product development.

HealthWare's sales performance was stagnating at under \$1,500,000 annually despite improved product features for both primary products. Following intense analysis of the firm by the CEO of HealthWare, a marketing manager was hired to help promote the firm's products. This manager immediately conducted a thorough market analysis for HealthWare as prescribed by traditional strategic planning with the following results:

- (a) Market saturation was approaching 80 percent for both the firm's products.
- (b) Many competitors existed, most with a primary emphasis on marketing and promotion.
- (c) Product buyers were price conscious and gaining in sophistication about products.
- (d) Less than two percent of the physicians in any given year were in the market to purchase the firm's current products.

Despite limited increases in sales (dollar and unit), the long term outlook for HealthWare was marginal at best. Having a wealth of technical expertise and high quality products, management realized that it needed a new view of where the company was heading.

ATTEMPTING TO REACH EQUILIBRIUM AT HEALTHWARE

Following an agonizing process of challenging the current thinking about HealthWare as a firm, several alternatives were developed which might ultimately impact the company's direction. All alternatives take advantage of the high quality technical capability of the firm. This was based on an application of a synoptic perspective (OSWOTS Model) in HealthWare's strategy formulation, and has resulted in decisions to develop the following products and services:

Pharmacy Claims Management Option: The company decided to produce a software system for pharmacies that would provide electronic claims transmission for collections from third party payers. An environmental study found that no other company is currently providing this service. Therefore, an opportunity was identified. The company's technical strengths and experience in developing similar products for medical practitioners provided a sound basis for deciding to follow such a strategy. Also, an added strength was that a distribution channel for the product was already in place.

Hospital Claims: It was decided that HealthWare create an electronic clearinghouse receiving claims from hospitals. The process would involve tracking claims, collecting claim data, forwarding claims to third party payers (such as Insurance companies) and receiving payments for claims for distribution back to hospitals. It can be seen that this concept is an extension of the one described above, and is made feasible because of similar strengths that the company currently possesses. Following this strategy is only an extension of providing a claims management service that is already being provided for individual medical doctors and dentists. It exploits an opportunity that exists, but one that is being pursued by other competitors.

Electronic Document Interchange (EDI): HealthWare proposes to create and market a software program to upload data from competing medical management systems for use with any of the claims processing systems available to primary healthcare providers. This approach is an attempt to seize an opportunity created by the fact that many independent software developers have been creating standalone products with little emphasis on system integration from the perspective of the customer. While HealthWare's technical strengths are again the basis, there are a couple of existing threats. These are the existence of other established EDI software developers, and the fact that many other organizations are established in the field of system integration.

Create Windows Version of Existing Products: HealthWare would like to exploit its technical strengths and focus on enhancing existing products. A current weakness is that their products are based on the DOS operating system for personal computers. With most users moving their other applications to a Windows operating systems environment, new and existing customers want windows based medical software systems. The company's technical strength can be channeled toward the development of such products. If HealthWare can deliver such a product ahead of its competitors, it can gain some competitive advantage. However, a significant threat is the development of advanced personal computer operating systems such as MicroSoft's Chicago and the development of alternate operating systems for the PowerPC

microprocessor that is jointly being developed by IBM, Apple, and Motorola. Such a rapidly changing technological landscape makes it essential to be able to "see the future," rather than just respond to the current situations.

All the above strategies focused on developing new products and services based on the existing technical strengths of the company. Such a development effort will place an undue strain on the company's existing technical resources. This is especially true because the proposed products need to be developed and marketed rapidly to sustain any advantage that they may produce. The company is taking advantage of existing opportunities that are already apparent to industry observers and consequently, major players already in the market will also be pursuing these opportunities. An additional weakness is the fact that all these strategies for developing new products are based on exploiting the existing environment. Such an approach is inherently limited because the existing environment is also dynamic, and will have changed by the time HealthWare implements the above strategies. Therefore, while the above strategic initiatives appear "logical," they are unlikely to produce a significant and sustained competitive advantage for HealthWare. A different approach to strategy formulation should be pursued.

BIFURCATION POINTS AT HEALTHWARE

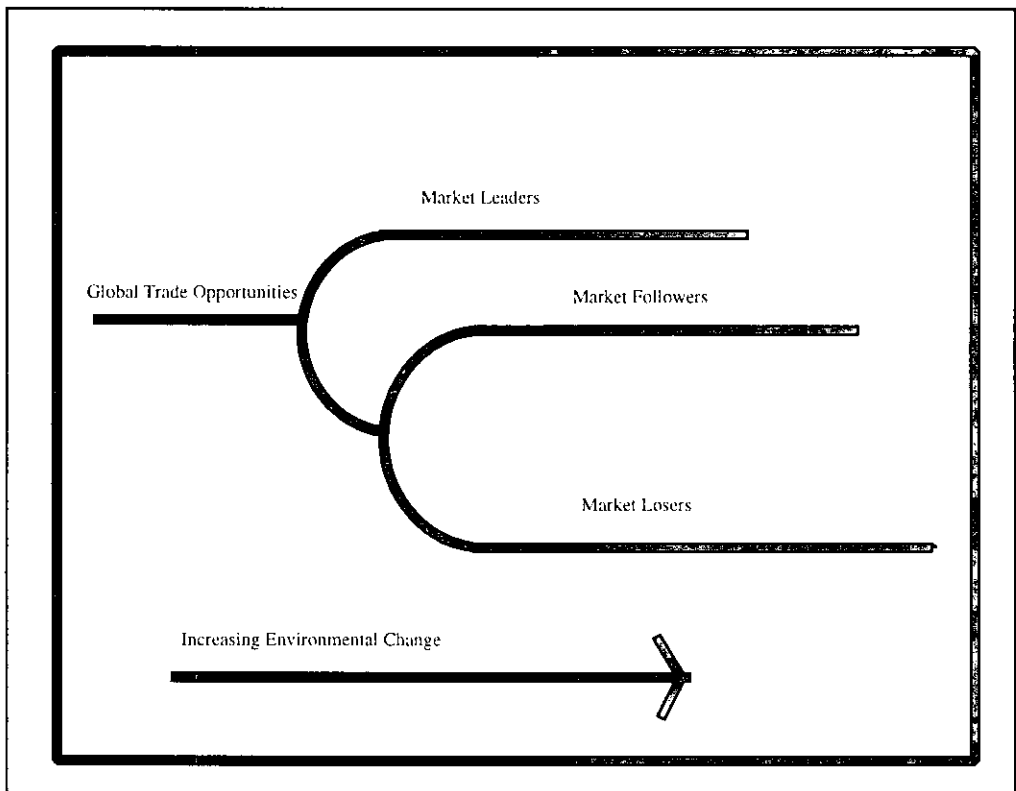
Hamel and Prahalad (1994) consider that "today's implementation failures are really yesterday's failures of foresight in disguise." This foresight is based on an organization's insights into the implications of the trends in areas such as technology, regulation, lifestyle preferences, and demographics. Senior management needs to be concerned with distinctive and farsighted views about the future as opposed to being conventional and reactive. Firms need to focus on how to get in front of the competition rather than on how to catch up. To be able to achieve this, these strategy gurus suggest (among other things) the ability to identify "discontinuities" and to have prolonged intelligent debates on current market related trends and creative implementations on how to gain advantages. They also say that the future is to be found in the intersection of changes at each of the critical discontinuities. Those organizations that can develop foresight will lead, while the rest can only hope to be good followers.

The dissipative structures approach can provide a theoretical basis in strategy formulation that helps managers understand discontinuities that occur in their organizations. The unique feature of this process is to see implications of trends that may result in opportunities if the organization is positioned appropriately at that future point in time. Figure 1 illustrates a firm's ability to address the discontinuities created at the different bifurcation points within the context of managing global trade opportunities. As previously stated, HealthWare is facing stagnating growth and intensive competition. Under the traditional OSWOTS process, opportunities are primarily generated from current strengths where managers limit their scope when generating potential opportunities. Incremental strategy formulation is also limiting because managers are hesitant to dramatically alter direction and feel that an anchoring and adjustment procedure reduces risks associated with developing opportunities. While these approaches to strategy formulation are not inherently wrong, the possibility of limiting the range of opportunities does exist. On the other hand, the dissipative structures orientation recognizes that organizations reach a point where the organization's coping mechanisms are exceeded and this is normal (Leifer, 1989). Consequently, managers

need to recognize that these situations offer the chance for redefining what the organization can do. Therefore, the need to see options that may become opportunities if the organization is appropriately positioned comes from an effective understanding of seeing the future (Stewart, 1993).

FIGURE 1

BIFURCATION POINTS AND STRATEGY



One critical dimension of strategy formulation is the direction in which global trade agreements, domestic legislation, and demographics are headed. As new opportunities are being developed, even before they become business realities, organizations face discontinuity. A discontinuity may be viewed as the bifurcation point that an organization has reached along a specific dimension. Those firms that can develop creative products and services from the opportunities that do not yet exist, have a strong possibility of becoming the market leaders. Those that hesitate or are not capable of such innovation face a second discontinuity or bifurcation point when they have the possibility to effectively follow the leaders. If they fail again, the organizations face a real threat of being marginalized or removed from their market.

All the critical discontinuities that face a company can be evaluated in this manner using the dissipative structures approach.

HealthWare adopted this approach in developing strategies that would have been difficult to generate under the previous formulation process. In other words, hiring the new manager, more accurate assessment of current market potential, and understanding implications of external information trends not previously considered, allowed HealthWare to expand the list of alternatives to take advantage of opportunities not yet materialized. The organization's CEO realized that the technical strengths of current products were not enough to ensure success, by that, minimizing resistance to considering new alternatives.

HealthWare has begun to adopt the MEDS approach to strategy formulation. It has recognized one bifurcation point and has acted to address the challenge it faces in marketing. Other bifurcation points may also be identified when the firm can "see the future." The possible situations are discussed below, with initiatives that the firm could take to adapt its internal structure and make successful transformations.

Marketing: This situation has been discussed above but is repeated for completion. The CEO has been the main decision-maker, as is typical in many small businesses. The increasing complexity of the business environment placed insurmountable constraints on the effective decision-making capability of this individual, and ensured that the existing approach to managing the firm was ineffective. A marketing manager position was created to provide the company with relevant expertise and guidance. This has structurally altered the makeup of the firm providing new adaptive mechanisms to deal with its business environment. It has also allowed the firm to behave in a qualitatively different manner as illustrated by the development and execution of effective marketing strategies.

Technology/Innovation: The marketing expert ensured that the firm developed capabilities in this facet of doing business. The technological environment, to the contrary, has continued to develop at a radical pace. While the firm has software product development experts, the CEO was the primary source for developmental ideas. This was adequate in the first few years of operating the business when the primary focus was developing application software for standalone personal computers. This arrangement became a significant problem, typical of many small businesses. Today the firm lacks the technical expertise to effectively evaluate the current and future directions that technology will take. For instance, the rapidly emerging client-server technology is bound to radically change the way in which professionals could use their small office computers in the future. It could be envisaged that independent medical practitioners could be linked to server machines from which they could run the required application software for their business. This would result in the licensing of software according to usage, and not necessarily the sale of individual licenses as is currently being practiced. It would also require HealthWare or other providers to setup servers that provide services to many networked individual medical practitioners. Such innovations cannot be generated and carried out without the leadership of individuals with expertise in the management of innovation and technology. HealthWare faces such a bifurcation point today and will need to restructure themselves accordingly. The hiring of a technical innovation management expert would be appropriate at this juncture.

Customer Service: Current methods of customer service are primarily based on a telephone help-line. This structure is not adequate to service customers in the future, as customers are becoming more educated in technology and more demanding in quality of service with respect to response time and technical-quality of service. In addition, if the company product-line is enhanced as discussed above, on-line computer-based methods would be required. This will require a significant restructuring of hardware and technical-skills mix of existing customer service personnel.

Product Distribution: Current product distribution is primarily through resellers who also deal with competitors' products. As the traditional medical software (for independent physicians) market is saturated, such methods will not continue to be effective. Also, if the nature of the products (licensing of services on client-server architecture) or the types of customers (other health-care providers such as home-health professional) change, the use of different distribution channels may become essential. This would lead to the restructuring of product distribution channels such as the development of in-house approaches like direct marketing.

New Customers: An increase in family practice and home-healthcare could result in the need to develop products for health-care professionals on the go. That is, a variety of products that can be used on lap-top computers, on patients' home computers, or through other technology medium such as the evolving concept of electronic commerce on the internet. HealthWare should significantly change the technical skill-mix of its current software development staff to be able to produce products for this future. Other examples of issues under consideration by the company in building new structures to develop new customers are briefly discussed below:

Clearing House for Home Health Agencies: HealthWare proposes to create an electronic clearinghouse receiving claims, collecting claim data, forwarding claims to third party payers (such as Insurance companies) and receiving payments for claims for distribution back to providers. This requires the development of alliances with firms that have the required hardware configurations. It is an example of positioning the company to develop a leadership position based on demographic trends and changes in healthcare policy that will lead to a significant growth in home-based healthcare.

International Venture: HealthWare intends to develop and market accounts receivable software for the Mexican medical market. This alternative would entail working with venture partners familiar with the Mexican market. Currently HealthWare is working with a major accounting/consulting firm in Mexico City. This illustrates how a small business can develop a strategy to take advantage of opportunities created by global trade agreements, the North American Free Trade Agreement (NAFTA) in this instance. NAFTA represents a bifurcation point in global trade that HealthWare is addressing positively, an approach that could lead the firm to a market leadership position in the field of medical management software in Mexico. It could eventually place the company in an established position to expand into the growing Latin American market where no competitors currently exist.

These examples of strategy formulation by HealthWare illustrate the significance of developing an ability to "see the future" and provide real-world applications of bifurcation points and the dissipative structures approach to strategy formulation. The primary emphasis is on restructuring the company on a continuous basis to provide it with mechanisms to cope with an ever changing business context. It also de-emphasizes the notion that the primary objective for the company is to reach an equilibrium with its environment. The dissipative structures approach provides a framework in which a firm can continually develop its ability to deal with increased complexity.

CONCLUSIONS

This paper discusses an application of the dissipative systems approach to strategy formulation within the context of a small business involved in medical management software development. The limitations of the traditional synoptic approach to formulating strategy are also discussed. The dissipative systems approach can be used to evaluate the critical discontinuities that a small business faces in dealing with its changing environment. This would enable organizations to develop a foresight that will help the successful formulations of strategic initiatives.

Dissipative structure models take on an increasingly significant role as we continue to realize that traditional coping mechanisms are not serving organizations facing rapid and intense environmental-induced changes. The difficulty in applying such models is that they are foreign to the way most managers are trained (Leifer, 1989). Small business managers, however, may be more open to new thinking on strategic issues because they are less constrained by company history and bureaucracy. Considerations of systems thinking is also moving from theory to application as illustrated by applications to resistance to change (Goldstein, 1988), organizational self-renewal (Nonaka, 1988), and general management concerns (Peters, 1987). The approach could be further researched as an appropriate framework in which to further develop theory in strategy formulations in small businesses, especially in the rapidly changing areas of global operations and technology innovations. The purpose of this paper is to illustrate the applicability of this contemporary model to small businesses. More research in applying this model to small business is essential to understand and improve the dynamism of this sector, as it will continue to encounter greater environmental turbulence as we enter the next century.

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