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OPEN SYSTEM THEORY AND ORGANIZATIONS

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INTRODUCTION

This focus of this paper is the development of a unified systems theory of organizations based on open systems theory, especially strategic contingency theory and resource dependency theory, and the concepts of systems thinking. To this end, the paper will first develop a model based on key elements selected from Lawrence and Lorsch (1986), Pfeffer and Salancik (1978), Senge (1990), the journal articles summarized in the annotated bibliography, and the expertise of the KAM writer in building decision models for managers. Then, the focus will shift to a critical assessment of the model (integrated theory) based on the six criteria for a practical theory developed in the Breadth component. The last section of the Depth paper will deal with open issues and provide suggestions for additional research and action.

ANATOMY OF THE INTEGRATED MODEL

STRATEGIC CONTINGENCY THEORY

The purpose of this section is to review the aspects of strategic contingency theory that relate

to the objective of this component of the KAM demonstration; namely, those that shed light on the development of a macro theory of organizations as social systems.

Lawrence and Lorsch (1986) found that organizational performance depended on the degree to which organizations fit their structure (and internal conflict resolution processes) to the demands of their environment:

These findings suggest a contingency theory of organization which recognizes their systemic nature. The basic assumption underlying such a theory, which the findings of the study strongly suggest, is that organizational variables are in a complex interrelationship with one another and with conditions in the environment. (p. 157).

Thus, strategic contingency theory is a broad, general theory that prescribes an approach to organizational design (i.e., design the organization to fit the environment) without specifying exactly how to do it. Several of the journal articles included in the bibliography deal with attempts by various researchers in the field to validate and extend the theory by applying it to specific situations.

Noteworthy among the studies performed for this purpose is that of Lee and Miller (1996). They examined the application of strategic contingency theory to Korean companies and found that "the match between strategy and environment was related to performance, especially in challenging settings" (p. 731). Comparing firms that used established technologies supported by the government to firms that relied on the application of emergent technologies to survive in highly competitive markets, the authors found that the former tended to choose cost leadership strategies consistent with their more stable environment, while the latter tended to focus on product innovation and superior marketing strategies in an attempt to fit their organizational strategies to the harsh realities and uncertainties of their market place.

Miller and Cardinal (1994) studied another important aspect of contingency theory, the link (often assumed to be beneficial) between strategic planning and performance. They found "strategic planning to positively affect firm performance" and that "methodological differences across studies have been largely responsible for the inconsistent findings reported in the literature and largely responsible for the debate concerning the value of strategic planning" (p. 1662). Since strategic planning is a formal manifestation of the desire of an organization to match its structure to its environment, this study lends support to strategic contingency theory.

Another important study that confirmed an aspect of strategic contingency theory is that of Amburgey and Dacin (1994). They attempted to demonstrate that strategy and structure are interrelated, that there is a time delay involved in each case, and that the first delay (between the time a new product-market strategy is defined and administrative structure changes) is shorter than the second delay (the time between a change in administrative structure and a corresponding change in product-market strategy). In this study, the authors focused specifically on the magnitude and timing of strategic change (as measured by level of diversification) and the magnitude and timing of structural change (as measured by level of decentralization).

According to the authors, their study provides "substantial support for the common conception of a contingency relationship between strategy and structure" (p. 1446). They also found (a) that diversification leads quickly to decentralization and that the reverse is true, but with a longer time delay; (b) that "strategy is a much more important determinant of structure than structure is of strategy" as indicated by a large and statistically significant term in their model for the cumulative impact of strategic changes on structural changes versus a nonsignificant correlation between the cumulative effect of structural changes on strategic changes. (p. 1446) Thus, the findings of this study support strategic contingency theory and the management rubric that "structure follows strategy."

Other researchers whose studies appear in the annotated bibliography also attempted to validate and extend strategic contingency theory. Their findings will appear as appropriate later in this

paper when the focus shifts to an attempt to synthesize a meta-model of organizations as systems based on strategic contingency theory, resource dependency theory, and systems thinking. For now, the studies of Lee and Miller (1996), Miller and Cardinal (1994), and Amburgey and Dacin (1994) will suffice as evidence that the original conception of Lawrence and Lorsch has stood the test of validation by subsequent researchers in the field of management.

RESOURCE DEPENDENCY THEORY

Pfeffer and Salancik (1978), like Lawrence and Lorsch (1986), also subscribed to the notion that organizations are constrained by their environments: "organizations could not survive if they were not responsive to the demands of their environments" (p. 43). However, they took the relationship between the organization and its environment several steps further when they argued (based on open system theory) that (a) "an organization's attempts to satisfy the demands of a given group are a function of its dependence on that group relative to other groups" (p. 45); (b) that the managers of organizations attempt to manage their external dependencies to gain a measure of control over the groups (organizations) they depend on and to ensure the survival of their organizations; and (c) that the issue of who makes those decisions is determined by the distribution of power in the organization. Pfeffer and Salancik (1978) claimed that:

A focus on the "how" of change leads one to consider who brings change about and who resists it. We assume change is a consequence of individual decisions and the actions taken by specifiable individuals. If change is a consequence of decisions, who is empowered to take actions which alter the organization becomes critical. One is inevitably led to consider who controls the organization and how such power and influence distributions arise. (p. 227)

Pfeffer and Salancik (1978) postulated that two variables intervene between environment and strategy. Their model suggested that the environment (a source of uncertainty, constraint, and contingency) impacts the distribution of power and control within the organization, which affects the selection and removal of executives, which influences organizational actions and structures. (p. 229)

The research reported in several of the journal articles in the annotated bibliography validates, extends, or applies resource dependency theory. Finkelstein (1997) first used the same database as Pfeffer and Salancik to examine merger patterns in light of resource dependency theory and found a statistically significant resource dependence effect. However, "the strength of the resource dependence effect became quite muted...as successively more precise methods (to correct for six methodological issues raised about the original study) were applied" (p. 779). Then, Finkelstein tried to extend the original study by analyzing interindustry transactions and mergers (the two main variables in the original study) over a longer (45-year) time period using a more elaborate model and more precise research methodology. The findings of this extended study (that a statistically significant but small resource effect

coefficient in the model) only partially supported the resource dependency theory and led Finkelstein to conclude: "As Pfeffer first established more than 25 years ago, interindustry transactions and mergers are significantly related, but this appears to be subject to many other influences that require investigation in the future" (p.808).

Guthrie and Olian (1991) studied the selection of general managers in terms of resource dependency theory. They developed and tested hypotheses about the relationship between contextual factors (i.e., environmental instability, strategy, organizational performance, and size) and the characteristics of General Managers selected to head business units (i.e., organizational familiarity, functional experience, and age). Their findings suggest that environmental factors do influence the type of GM selected, as proposed by Pfeffer and Salancik (1978) (p. 263).

Similarly, Hilman, Cannella, and Paetzold (2000) studied the role of corporate directors. They concluded that: "the composition of boards will change to reflect the shift in resource needs confronting the firm. With a shift from regulated to a deregulated environment, firms tend to strategically alter the composition of their boards" (p. 252). This supports the view of Pfeffer and Salancik (1978) that "organizations use their boards of directors as vehicles for co-opting important external organizations with which they are interdependent" (p. 167).

Thus, important studies have examined and, to a certain extent, validated resource dependency as a viable open system theory. With a high degree of confidence, therefore, the next section applies the insights of resource dependency, along with strategic contingency theory and systems thinking, to the development of an integrated, macro view of organizations as social systems.

COMPONENTS OF THE INTEGRATED MODEL

A first order model of an organization as an open system consists of a simple feedback diagram indicating the reciprocal relationship between the environment, on the one hand, and the organization on the other. Also included in this model are a delay between a change in the environment and its corresponding impact on the organization, and a similar, but different, delay between a change in the organization and its impact on the environment. In other words, when the environment changes, the organization perceives the change only after some time elapses. Then, after some degree of organizational processing occurs, the organization formulates and implements a strategic response that ultimately affects (changes) the environment.

A simple, yet important, enhancement to this two-stage model incorporates a subsystem model for the internal machinations of the organization in response to a stimulus from the external environment. The components of this subsystem model are the focus of the next few pages, which describe and explain them one at a time.

THE ORGANIZATIONAL SUBSYSTEM – STRATEGY AND STRUCTURE

Within the organization, a complex set of interrelationships exists among a number of

factors. For the development of a macro model, it is important to include all of, but only, the most important ones. The first of these key variables in the organizational subsystem are strategy and structure.

As mentioned earlier, an important study that confirmed an aspect of strategic contingency theory is that of Amburgey and Dacin (1994). They found that strategy and structure are interrelated, that there is a time delay involved in each case, and that the first delay is shorter than the second delay. Because of the longer delay (and consequently greater decay in the effect of one on the other), they also found that "strategy is a much more important determinant of structure than structure is of strategy" (p. 146). Thus, the findings of this study support strategic contingency theory and the management rubric that "structure follows strategy."

THE ORGANIZATIONAL SUBSYSTEM – FEEDBACK

Senge (1990) provides additional support for this important part of the subsystem model: "In systems thinking, feedback...means any reciprocal flow of influence. In systems thinking it is an axiom that every influence is both cause and effect. Nothing is ever influenced in just one direction" (p. 75). Hence, the feedback loop between strategy and structure becomes the first element of the organization subsystem model.

The research described in many of the journal articles in the annotated bibliography also supports the importance of incorporating feedback loops in a systems model. Arogyaswamy and Barker (1995), based on a model of firm turnarounds that included a number of intervening variables necessary to capture the two-stage (i.e., decline-stemming and recovery) feedback nature of the process, demonstrated that many of the existing (linear) models of turnaround fail to capture the complexity of the process thus leading to confusing and contradictory results.

Earlier studies, because they assumed a simple, time-sequential, two-stage process, suggested, that "managing decline takes precedence to recovery strategies when entering a turnaround situation (...this is the notion of 'stopping the bleeding' followed by repositioning to restore health)" (p.516). The current research, based on a more sophisticated feedback model, supported the more realistic proposition that "decline stemming strategies and recovery strategies can occur simultaneously, often impacting each other" (p. 516). The implication of this proposition, which is supported by the findings of the study, is clear.

Effective management of decline must go beyond making hard (decline-stemming) decisions based on financial analysis to include (complementary) symbolic and substantive actions by managers towards employees and external stakeholders. (p. 519).

This study shows the power of properly specified feedback models to yield realistic answers to complex questions.

THE ORGANIZATIONAL SUBSYSTEM – INTERVENING VARIABLES

Contingency or intervening variables play an important role in the proper specification of a model. Miller and Cardinal (1994) built an

"encompassing" contingency model to try to explain the inconsistent findings about the relationship between strategic planning and firm performance reported by earlier researchers. Their model included such explanatory factors ("substantive contingency variables") as firm size, capital intensity (vs. labor intensity) of the firm, and environmental turbulence. As a result of using a more precise model and addressing a number of methodological issues with the earlier studies, they found that "strategic planning positively influences firm performance" (p.1649).

Kald, Nilsson, and Rapp (2000), based on a review of the literature, synthesized a strategic contingency model for use in future quantitative studies. Their main thesis is that "studies which consider only one strategic variable may lead to erroneous conclusions about the relationship between strategy and management control" (p. 197). To that end, the authors hypothesized that three strategic variables (strategic pattern, position, and mission) influence (and are in turn influenced by) the actions of organizational decision makers as they attempt to manage (i.e., control) their product offerings. This richer analytical framework, while not yet tested on empirical data, appears to point researchers in a new and promising direction. Once again, a model that incorporates intervening or contingency variables appears to offer something more to build a theory on than earlier, less well conceptualized, models.

Based on the benefits of incorporating contingency factors into a model, as evidenced by these studies and recalling the caveat of Senge (1990) that "nothing is ever influenced in just one direction" (p. 75), the model of the organizational subsystem includes two additional, intervening variables (staffing and systems) in a simple feedback loop. The primary relationship of these intervening variables to strategy and structure is as follows: strategy influences selection influences structure influences systems influences strategy.

The simple notion behind this organizational subsystem model is that a major change in the environment demands an organizational response. This typically results in the formulation of a new strategy to cope with the external threat or opportunity confronting the organization. If the new strategy is substantially different from the existing strategy, a change in organizational leadership may be required. Either way, the new (or existing) leadership will make the necessary changes in structure and support systems (often including the acquisition of emergent technology) to equip the organization to meet the challenges of the new external reality. As the organization begins to implement its response, its impact is felt both externally (by the environment) and internally (as the leadership measures the efficacy of its strategic thinking and begins the cycle anew).

THE EXTERNAL MODEL – THE ORGANIZATION-ENVIRONMENT INTERFACE

Lemak and Bracker (1988) developed and tested a strategic contingency model that relates the structure of a multinational corporation to several internal and external strategic factors: (a) generic corporate strategy, (b) management orientation, a variable that captures the degree of

control exerted by corporate over international operations and (c) so-called "domain parameters" that represent "a subset of the overall environment which is defined by product markets, services offered, and customers served" (p. 523).

The authors integrated the findings of previous theoretical and empirical studies into a model "which reflects a holistic, dynamic view of multinational corporations" (p. 521). By incorporating a variety of internal and external explanatory variables into the "structure follows strategy" format of the classic theory of organization design, they captured the essence of strategic contingency theory as espoused by Lawrence and Lorsch (1986) and created a prescriptive model which assumes that effective performance depends on the fit between the organization and its environment.

The macro view of organizations as social systems under development in this section of the Depth paper incorporates the underlying structural features of the Lemak and Bracker model. In effect, their study validates the macro view of strategic contingency for a specific case (i.e., multinational corporate structure).

By integrating the four components described in the previous paragraphs (i.e., the strategy-structure link, the notion of feedback loops, the intervening variables of selection and supporting systems, and the strategic contingency connection between the environment and the organization), an integrated model of organizations as systems emerges.

THE INTEGRATED MODEL

The integrated model of organizations as social systems has two basic parts: (a) a simple feedback loop that connects the environment to the organization and the organization to the environment in a way that incorporates the nature of delays inherent in both connections (Figure 1), and (b) an organizational subsystem model consisting of another simple feedback loop that connects strategy to selection to structure to systems to strategy (Figure 2).

Both the external feedback loop between the environment and the organization and the internal feedback loop between strategy and structure are balancing (stabilizing) loops in the systems thinking sense. According to Senge (1990), "balancing feedback operates whenever there is a goal-oriented behavior. If the goal is to be not moving, then balancing feedback will act the way the brakes in a car do" (p. 79). When an organization responds to changes in its environment by adapting its strategy and structure to fit the new contextual demands, it is exercising goal-oriented behavior. Similarly, when an organization responds to changes in its environment, it seeks to match its leaders, structures, and supporting systems to the demands of its new strategic direction and, thereby, achieve its goal of internal coherence. Thus, both the internal and external feedback loops in the integrated model are stabilizing or balancing loops.

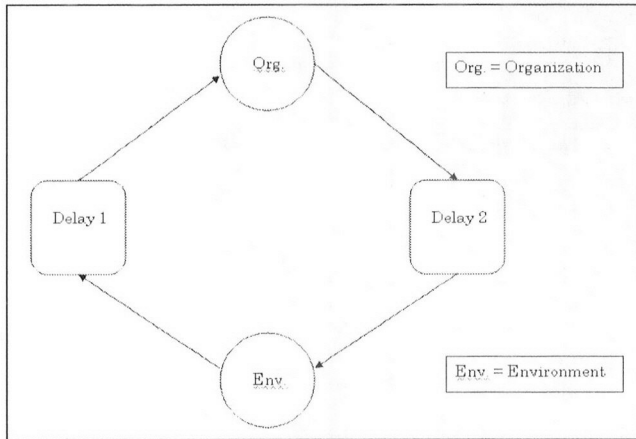


Figure 1. Integrated Model of an Organization as a Social System.

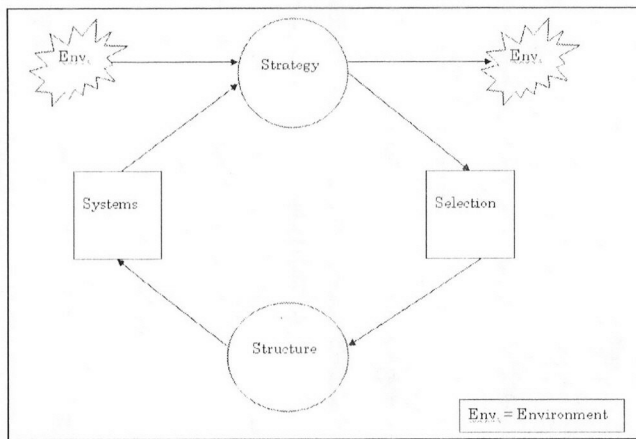


Figure 2. Organizational Subsystem Model.

Another important characteristic of the integrated model is the role of delays in amplifying the impact of the organization on its environment, and vice versa. At the macro level, an environmental change (such as the early introduction of a breakthrough product by the competition) will not immediately impact the organization. However, as sales of the competing product begin to erode the market share of the company, the situation begins to approach crisis proportions. Thus, after a measurable delay during which the organization first perceives then acts to assess the threat, the erosion of market share grows in magnitude. Likewise, the problem continues to escalate while the organization develops its strategic response, decides who is going to lead the counterattack, reorganizes to enable the maximum coordinated response, and develops the necessary infrastructure (technology, information systems, administrative systems, etc.) to support the new strategic initiative. This additional internal delay is captured at the macro level in the integrated model as the delay between the organization and its environment. At some point, if they have fit their strategic response to the new demands of the environment, the organization should begin to see a decline, or even a reversal, in the trend of market share erosion.

This situation can, of course, work in the favor of the organization if it seizes the initiative from its

competition. To continue the example, if the company makes the breakthrough and brings its product to market well ahead of the competition, its competitive advantage will be sustained for the combined length of time of the two delays in the system: (a) the delay on the part of the environment (the competition) in perceiving the threat to them posed by the new innovation, and (b) the delay on the part of the environment (the competition) in responding to the now perceived threat.

In summary, the structural building blocks of the integrated model (its variables, feedback loops, and delays) dictate the nature, timing, and magnitude of organizational responses to environmental changes and the corresponding impact of these organizational initiatives on the environment. Collectively these components specify a model that is a dynamic, holistic, integrated, macro view of organizations as social systems.

PERSPECTIVES ON THE INTEGRATED MODEL

When viewed from the perspective of system theory, the integrated model is general enough to encompass the concepts of open system theory, such as the strategic contingency theory of Lawrence and Lorsch (1986) and the resource dependency theory of Pfeffer and Salancik (1978), and the system dynamics point of view inherent in the system thinking approach of Senge (1990).

When viewed through the lens of management theory, the integrated model encompasses the crucial role of organizational leaders who, once selected, must match the strategy, structure, and supporting systems of the organization to the environment in a timely and effective manner.

When viewed from the perspective of chaos theory, the integrated model encompasses the notion of an adaptive organization. That is, one that adapts itself by matching its structure (and strategy) to the demands of the environment, thus increasing its viability and the odds of its long-term survival.

Therefore, although it is very general, the integrated model provides a framework that is consistent with a broad spectrum of widely accepted and largely tested theories. Nevertheless, the practicality of the theory is still in question.

THE ACID TEST OF THE MODEL

The integrated model is a general framework that is applicable to any number of research or management situations. The true test of its practicality, however, is the degree to which it satisfies the six criteria originally developed and applied in the Breadth component of this KAM demonstration.

CRITERIA FOR EVALUATING SYSTEM THEORIES AND MODELS

The six criteria for evaluating the practicality of the integrated model (and a key question which encapsulates each) are:

1. Simplicity (Is the model easy to understand?)
2. Completeness (Are all of the important phenomena included in the model?)
3. Robustness (Does the model hold up to extreme tests of its validity?)

4. Adaptability (Is the model flexible enough to accommodate new discoveries?)

5. Controllability (Is it clear how to apply the model to solve problems?)

6. Applicability (Does the model help managers to find practical solutions to real problems?)

The first four criteria deal with the ability of the model to encapsulate reality in a comprehensible, believable manner, while the final two criteria focus on the efficacy of the model as decision-making/problem-solving mechanism. The following sections will examine the integrated model from the perspective of how well it satisfies these criteria for effective decision-making models.

PRACTICALITY OF THE INTEGRATED MODEL

Since it is, in part, an open systems model and since it is a macro, conceptual model, the integrated model is basically simple. As shown in Figures 1, the model consists of an external feedback loop, which captures the reciprocal relationship between the organization and its environment, and an internal feedback loop, which captures the process that takes place inside the organization in response to an important change in the environment. The time required to complete the steps in this internal loop, which links changes in strategy to structure through the intervening variables of selection and supporting systems, is the cause of the lag or delay in the external loop between the organization and its environment.

The integrated model includes all of the relevant factors necessary to understand the dynamics of the interaction of an organization and its environment. Hence, it meets the requirement of completeness. This is not to say that the model includes all of the variables necessary for the analysis of a specific situation (such as firm turnarounds or the choice of corporate directors). Nevertheless, the model is flexible enough to allow a manager or researcher to specify any number of relevant variables (as needed) for a specific analysis or research project.

Balancing feedback loops are stabilizing loops. Since the integrated model consists of two balancing loops, it is inherently stable and, hence, robust. Hence, even a large perturbation in one of the system variables (such as a major change in the environment or on the part of the organization), since it will not alter the underlying structure of the model, will not destabilize the system for an extended period of time. As a result, the dynamic behavior pattern of the system will remain basically the same.

As many of the journal articles cited in this paper demonstrate (e.g., Amburgey and Dacin (1994), Guthrie and Olian (1991), and Miller and Cardinal (1994)), the open system model is flexible enough to accommodate a wide variety of different applications. Since the integrated model is a synthesis of the open system model (i.e., the environment influences the organization which, in turn influences the environment) and the system dynamics model of Senge (1990) (which has feedback loops and delays as its basic structural elements), both of which are very flexible constructs, it can easily be modified (by the addition of new variables and additional loops and delays) to incorporate new discoveries or hypotheses. Therefore, the integrated model is

adaptable.

The integrated model, because it is a simple, two-loop feedback model, is easy to understand and manipulate. Therefore, it is highly controllable. This is in contrast to many conceptual models, which are often overly complicated and appear to the user to be more like a "black box" than useful frameworks for making sense of a confusing real world situation.

Finally, the integrated model, because it is applicable to real world situations, holds the promise of helping managers to find practical solutions to real problems. For example, a hypothetical application of the integrated model might be to analyze what would happen if a key player in an oligopolistic market merged with another key player to become the dominant player in the industry. The first step would be to identify and operationalize the key variables in the model, calibrate them using data analysis techniques, and then assess the changes in the market (competitive environment) by means of "what if" analysis. A companion analysis could then determine the sensitivity of the new market equilibrium to changes in the various model parameters.

Since it is a dynamic system model, the integrated model would not provide specific predictions. Rather, it would show the impact on the behavior pattern of the system caused by the initial perturbation (the merger) for various assumed-to-be likely responses of the competition. This would suggest the most beneficial course of action for the company to take to maximize its long-term gain from the merger.

One caveat is in order. The notion of applicability, when applied to a general theory or model like the integrated model, does not take into account the difficulty of translating the general theory into a workable model. While building a model of the type described earlier might be challenging, it is still theoretically doable. And if completed, it could provide insights of the type described above. Hence, according to the definition of the sixth criterion, the integrated model is applicable to real world problems.

In summary, the integrated model meets the acid test of the six criteria of a practical theory developed in the Breadth component of this KAM demonstration.

CONCLUSION

In the Breadth component of this paper, a critical assessment of the pros and cons of general system theory, open system theory, and system thinking suggested that a combination of the last two would best serve as a foundation of a macro view of organizations as social systems.

In the Depth section of this paper, a synthesis of certain salient features of each of these two system theories, open system theory (especially strategic contingency theory and resource dependency theory) and systems thinking, led to the development and conceptual testing of a dynamic, holistic, system theory, called the integrated model.

In the Application section of this paper, the focus will be a study of a single organization, Digital Equipment Corporation using the integrated model (unified system theory) as an instrument to

help understand and critically assess the quality of the decisions made by the organization in response to pressures from its environment. This will serve as a final test of the integrated model and will complete this KAM demonstration.

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UNCOVERING NEW SMALL BUSINESS OPPORTUNITIES FROM LOOKING AT TREND FORECASTING

By Bilal Haidari, Metropolitan State University

INTRODUCTION:

In the course of researching and preparing to write my final research paper "Uncovering New Small Business Opportunities – From Looking at Trend Forecasting", I was able to receive a new "magnifying glass" of sorts, for helping me to examine some of the important trend forecasting information that is becoming more widely available today.

Additionally, I have also become more inspired by this period of personal examination involving Trend Forecasting. And I believe it is entirely within this journey that I will also continue to uncover new opportunities that lie ahead. This research has brought me closer to being able to identify pathways for viewing business futures also. The maturity that may come from

harnessing some of this knowledge in a more productive way will also prove helpful to me as I seek to design and manage new personal businesses in the future also. This journey has certainly moved me in a fast-forward position too. As I am only just beginning to undertake more ongoing searches for uncovering these types of new opportunities before they unfold to my competition! It is in this process too, that I have become more hopeful for being able to confidently create and sustain my future small businesses in the future.

Again, I know that my research has really only begun...the real work, I have discovered, will require my ability of applying well researched and competitive strategies that are aimed full force at gaining important advantages in various diverse