THE GENESIS AND EVOLUTION OF DYNAMIC ORGANIZATIONAL LEARNING CAPABILITIES WITHIN THE STRATEGIC PRODUCT MANAGEMENT PROCESS

by

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ABSTRACT

THE GENESIS AND EVOLUTION OF DYNAMIC ORGANIZATIONAL LEARNING CAPABILITIES WITHIN THE STRATEGIC PRODUCT MANAGEMENT PROCESS

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Guy DeLoach

Researchers suggest that a new type of global enterprise will thrive in the new millennium. Organizations will build new competitive advantages by discovering, accessing, mobilizing, and leveraging knowledge. However, these new ideals and models appear to lack practical methodologies that transform knowledge-based concepts into dynamic capabilities that can be leveraged to create and sustain wealth. There is a lack of academic research on how organizations can effectively operationalize organizational learning (OL) concepts in strategic planning, a vital process for creating competitive advantage. In this study, OL dynamic capability, its resultant learning mechanism, organizational learning, and firm performance were studied by applying a mixed-model approach to an experimental and control group of junior and senior college students. The study was conducted in an industrial business environment simulated via a computer-generated decision-making exercise. The experimental model used the Global Business Game World Edition, a large-scale business simulation that requires strategic planning and efficient implementations on the part of management teams. Both perceptual and financial data were used to triangulate the effects among organizational learning, firm performance, and strategic management skill. Despite inconsistencies in implementation, this study suggests that operationalized OL mechanisms yield improvements in organizational learning and firm performance and that a fundamental order and structure process will yield an

operational framework for a dynamic and fluid system such as organizational learning. Further, the results suggest that accelerated learning rates were positively influenced by increased activity in systems thinking, action learning, spatial interrelationships, and knowledge transfer iterations. Finally, results suggest that embedding and enhancing traditional strategic planning methods with specific OL attributes related positively to increases in learning and firm performance. The study will add to the management body of knowledge by illustrating the capabilities firms use in learning to learn, identified as a need for future research. The operationalization of learning capabilities can help managers understand how organizational learning can be integrated into strategy development, execution, and evaluation.

DEDICATION

I would like to dedicate my dissertation to Dorry, my soul mate, best friend and wife, for her unending love and encouragement.

To my sons, Brian and Stephen, who engaged in countless dialogues and edits. I love you guys.

To my parents for their prayers and lifelong guidance.

And to a Jewish carpenter from Nazareth who has given me the strength and determination to complete this journey.

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Guy M. DeLoach

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CHAPTER ONE
INTRODUCTION AND STATEMENT OF THE PROBLEM

According to research, a new type of global enterprise will thrive in the new millennium. These corporations will build new competitive advantages by discovering, accessing, mobilizing, and leveraging knowledge. This new corporation will achieve and sustain competitive advantage by developing value chains with distinct core competencies; innovating through technological advances; quickly tapping emerging market segments around the world; leveraging knowledge scattered throughout its subsidiaries; and mobilizing this fragmented knowledge to generate innovations that produce, market, and deliver value on a global scale (Ricart, Enright, Hart, & Kanna, 2004). By the close of the 20th century, competitive advantage shifted from primarily tangible resources to knowledge-based strategies that deploy organizational intangible resources such as organizational learning, innovation, and customer relationships that, in turn, fuel firm performance (Rutterford, Upton, & Kodwani, 2006). This shift in competitive advantage is being driven by continual technological advancements and the demands of a global economy.

Research emerged in the latter part of the last century that offers potential breakthrough ideas for moving organizations to new levels of performance in the knowledge age (Argyris, 1977; Nonaka, 1995; Senge, 2004; Zollo & Winter 2002). However, these new models lack practical methodologies and capabilities that transform these knowledge-based concepts into dynamic capabilities. These dynamic capabilities are learned and stable patterns of collective activity through which the organization systematically generates and modifies its operating routines in pursuit of improved effectiveness (Zollo & Winter, 2002). This exploratory study

examined this knowledge gap and presents an organizational learning-based dynamic capability that systematically creates or evolves operating routines that incorporate critical OL attributes. These routines enhance understanding of the casual linkages or interrelationships between the actions organizations take and the performance outcomes they obtain.

This researcher introduced an OL-based dynamic capability founded on recent advancements in knowledge transformation and chaos theory and applied it to contemporary strategic planning methodologies to improve organizational learning and value creation. Research in organizational learning and its application to strategic planning reveals conceptual models with limited application and empirical work that rarely incorporate specific operational frameworks to be used by management (Hansen, 2004). The proposed OL dynamic capability strives to address this specific gap by transforming concepts or modifying existing methods into an operational framework or learning mechanism for organizations.

General criticism exists among researchers that strategic planning processes and their associated tools (Strengths, Weaknesses, Opportunities, Threats (SWOT), Boston Consulting Group (BCG), balanced score card, etc.) do not fully reflect or embody recent advances in organizational learning theory. The strategic planning process is a vital link to firms' acquisition, evaluation, and use of knowledge (Barney, 1991; Choo, 1998). The strategic planning process, an important aspect of knowledge management, should continually reflect advancements in organizational learning. It is hypothesized that the resultant OL learning mechanism produced from the OL-based dynamic capability will have a positive relationship to firm performance and organizational learning. This "Value T" has the potential of making a significant contribution to the strategic management literature and to future research. The graphical representation of the

comparison of multiple value generating variables forms a T-shaped grid and is thus termed "Value T." These relationships have been evaluated in the context of a simulated business environment.

Statement of the Problem

A lack of academic research exists on how organizations can effectively operationalize organizational learning concepts in the strategic planning process. This exploratory study has clear links to current interests in management research, where little attention has been paid to systematically operationalizing OL in strategic planning (Foley, 2005). Furthermore, no counter study demonstrates conclusively that firms who invest in OL methodologies realize significant returns on their investment dollars (Hansen, 2004).

This defeciency may be attributed to the nature of OL, which can be described as a fluid state, always shifting and unpredictable, albeit exhibiting order (Levy, 1994). This state of flux creates difficulties in placing operational frameworks that are repeatable and predictable in organizational learning. Further, this void is amplified by the causal ambiguity of organizational processes with respect to their performance implications (Lippman & Rumelt, 1982). This ambiguity is compounded in a rapidly changing environmental context. According to Zollo and Winter (2002), "Higher-level cognitive efforts and a more deliberate collective focus on the learning challenge may help to penetrate the ambiguity—although some part of it always persists" (p. 342).

Background of the Problem

The origins of contemporary organizational learning can be found in the basic principles of the learning curve theory as described by Arrow (1962). This theory states that production

experience creates knowledge that improves productivity. However, researchers have discovered that organizations vary dramatically in the rate at which they learn. Some organizations show dramatic increases in productivity, whereas others show very little. Research on learning rates and subsequent firm performance has led to a host of hypotheses (Galbraith, 1990; Hayes & Wheelwright, 1984; Joskow & Rozanski, 1979; Libeman, 1984). Studies from the 1970s to the 1990s focused heavily on identifying the specific factors that led to the variation in organizational learning and subsequent productivity improvements, with the firm being the fundamental unit of analysis (Argote, 1993). As the divergence in hypotheses has grown among researchers, so has the gap between theory and application as well as the ability to merge the two. Researchers in the field have developed a multitude of diverging paths striving to explain the variation in OL rates.

A review of research literature reveals that there is a void on how to operationalize OL into dynamic capabilities that will drive strategic action and subsequent firm performance in both the generally accepted theory and alternative theory. This study explored the blending of resource-based theory, chaos theory, and knowledge transfer theory. These theoretical approaches are relevant to the research problem because they exhibit the following tenets, which create a foundation for operationalizing OL and subsequently improving firm performance: concepts and models exploring the relationships of firm performance, varying rates of organizational learning, structure for dynamic complex systems, and the transfer of knowledge among and in organizations.

Purpose of the Study

It is theorized that a codified OL dynamic capability should be an integral part of the entire knowledge evolution and transformation process. According to Winter (2002), codification can facilitate the generation of new routines, or dynamic capabilities, as well as identify gaps in existing methodologies. The cognitive exercise inherent in following a prescribed flow of events enables managers to synthesize and analyze information more effectively. Thus, it is postulated that combining codification with the deliberate and systematic incorporation of contemporary OL theory will yield an OL-based dynamic capability. The resultant byproduct of the dynamic capability process can be used to improve OL and performance in the organization. Due to this postulated theory incorporating codification, a deliberate and systematic operational framework, and key OL constructs as central elements, this model is well positioned to fill the deficiencies and satisfy the needs identified in the literature review (Figure 1). Specifically, it may demonstrate how organizations can effectively operationalize organizational learning concepts in the strategic planning process.

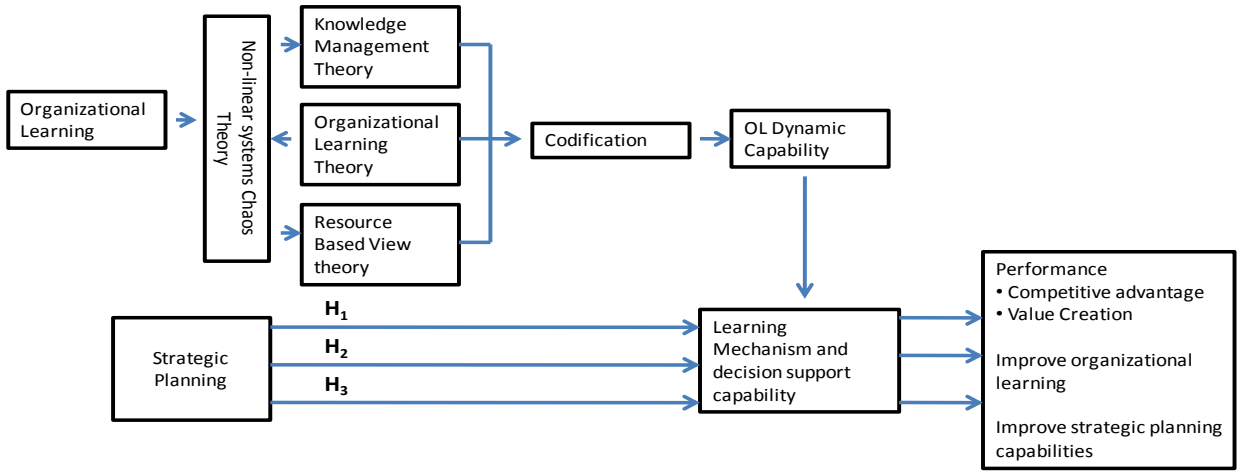

Figure 1. Proposed Theoretical Model.

The purpose of conducting this exploratory study is to advance the body of knowledge by proposing a dynamic capability based on a hybrid application of knowledge-transfer theory, chaos and systems theory, OL theory, and codification. A dynamic capability is a learned and stable pattern of collective activity through which the organization sytematically generates and modifes its operating routines in pursuit of improved effectiveness. The literature does not reveal a straightforward answer to questions of how routines, much less learning mechanisms, or dynamic capabilities are generated or evolve (Zollo & Winter, 2002). This proposed OL dynamic capability was evaluated by comparing the resultant byproduct (learning mechanism) against traditonal non-OL-based management methodologies. This dynamic capability incorporates systematic problem-solving concepts and spatial tools that may further facilitate the knowledge evolution and transformation process. The learning mechanism, a new descision support capability in the strategic planning process, was tested to determine its effectiveness, thus determining the validity of the postulated OL-based-dynamic capability and its theorectical basis. According to resource-based view theory (Quinn, 1992), an organization that learns more efficiently and transfers this knowledge more effectively is hypothesized to outperform organizations that do not possess this capability.

In summary, the purpose of this exploratory research is to deduce whether a fundamental order or structure (dynamic capability) can be established to yield operational frameworks from a nonlinear and fluid system such as OL and subsequently improve firm performance and learning. The combination of theoretical, articulated and visual approaches may allow disconnects in logic or patterns to appear more readily and can be explored more deeply. It is postulated that the visual aspects of the dynamic capability highlight systematic patterns and underlying structures

influencing desired outcomes, and is a prerequisite for predicting outputs of a chaotic system. Further, the proposed dynamic capability demonstrates a structure or pattern of deterministic steps in a systematic format with the goal of greater performance known *a priori.* This suggests that a complex dynamic system can be managed through a systematic, albeit iterative, process to achieve a specific goal.

Theorectical Support for the Study

Based on the conceptual transformation theories by Senge (2004), Nonaka (1997) and Zollo (2002), this study incorporates these concepts into an OL-based dynamic capability, which uses OL constructs as a basis. This OL-based dynamic capability attempts to fulfill the deficiencies in the body of knowledge, namely how organizations can effectively operationalize organizational learning concepts to drive performance.

The work of Senge (1990) undoubtedly has done more than most to underpin the concept of the learning organization. Senge's (1990, 2006) research strives to integrate OL principles into a transformation process through his unification theory. Senge (2006) stated, "Seeing reality systematically is seeing circles of influence rather than straight lines. This is the first step to breaking out of the reactive mindset that comes inevitably from systematic thinking" (p. 123). Senge (2006) suggested operationalizing OL via drawing casual loops that illustrate the flows of influence whereby patterns that repeat themselves are exhibited. These feedback diagrams (circles) illustrate the interrelationships of variables or actions that reoccur over time. These patterns or casual chains represent a potential structure that dictates future effects. Senge (2006) described his research as the conceptual underpinnings of building the learning organization, and further expressed the need for the development of clear methodologies to put these concepts into

practice. Garvin (2000) criticized Senge and others for not providing operational frameworks for implementing a learning organization to drive competitive advantage. Winter and Zollo (2002) called for a more nuanced assessment of knowledge transformation and the need for deliberate learning processes or codification models to be developed.

Contemporary knowledge transformation theory, developed by Nonaka (1997), further underpins the support for developing specific operational frameworks. The OL codification model builds on the existence of both tacit and explicit knowledge. Tacit knowledge is subjective and experienced-based knowledge and comprises beliefs, images, know-how, mental models and intuition, and is usually context specific. Explicit knowledge is objective and rational and can be expressed in words, sentences, procedures, and approaches. Nonaka's transformation theory contends that both forms of knowledge can be converted and represent a continuous learning loop. Tacit knowledge is transferred from one person to another initially as socialization and can be described as experiential, active, and direct interaction among individuals.

The next step of externalization is the process of making tacit knowledge explicit and is defined as the articulation of one's ideas or beliefs into a readily understandable format. This step normally includes feedback and simultaneous exchange of ideas in a group setting. The subsequent step is the combination of knowledge and is described as a process that transfers knowledge, which can be conveyed via documents, e-mail, or meetings. The key steps are the collection of relevant information, editing/processing, and disseminating knowledge in a more usable form. The last step in Nonaka's model is the internalization of information, where the understanding and absorption of explicit knowledge occurs and becomes actionable by the owner. The internalization process transfers organization and group-explicit knowledge to the

individual completing the circle. Critics contend that this and other categorical approaches are too general or abstract to use in transforming OL concepts into specific operational frameworks (Foley, 2005; Garvin, 2000; Hansen, 2004). This generalization is difficult for organizations to use because of specific guidelines in training employees on how to transform knowledge in the organization. This generalization may account for the lack of success in businesses to realize a return on investment in organization learning strategies.

Lucier and Torsilieri (1997) found that a majority of investmetns in organizational learning by organizations failed to yield adequate returns. This failure to achieve significant return on investments dollars may be attributed to the lack of OL concepts being effectively operationalized into dynamic capabilites. In summary, contemporary knowledge transformation and learning theory are foundational and support the need for additional research in this area.

Assumptions

This study uses a laboratory setting and links both internal and external validity to the subsequent findings. The validity of business simulation software, as a testing method for determining relationships between strategic planning, performance, and organizational learning, is supported by Wolfe and Luethge (2003). They stated that results indicate high firm performance is not the result of luck or random guesses and that a business simulation rewards intelligent, planned decision-making practices. Wolfe and Chanin (1993) also found that the most successful firms in a simulated environment integrated the firm's correct reading of the appropriate strategy demanded by the firm's environment with an accurate and timely implementation of that strategy.

This finding links what the organization has learned (OL) and the correct activities to engage in (strategy) with its proper implementation. These two legs operate together to drive firm performance in both the laboratory and real-world settings, whereby experimental methodologies are generalized to real-world organizations (Locke, 1986). Research by Nees (1983) and Keys and Wolfe (2004) supported the use of simulations as a research setting, with results possessing both internal and external validity and being applicable to real-world business settings.

Scope and Delimitations

This explorative research was conducted in the context of the strategic planning process—more specifically, portfolio analysis at a business unit level. The strategic planning process was chosen because of its vital link to firms' acquisition, evaluation, and use of knowledge (Barney, 1991; Choo, 1998). Portfolio analysis is an integral part of strategy formulation in contemporary management and has been credited as a vital link in establishing competitive advantage. Portfolio analysis at the business unit level has been a vital component in the strategic planning process and was chosen due to its importance in assisting organizations in knowledge management. According to Evans and Lindsay (2008), General Electric and CEO Jack Welch are good examples of a learning organization. In the 1980s GE's first cycle of learning focused on eliminating or reducing underperforming products and their associated business units. In the 1990s, the next cycle of learning targeted the simplification and elimination of non-value-added activities in the value chain functions. This cycle can be described as double-loop learning (Argyris, 1977).

This explorative study examined these two initial organizational learning cycles, as demonstrated by General Electric via a modified OL-based portfolio tool, which is the result of an OL-based dynamic capability. Hypothetically, the OL dynamic capability process presented in this research could be applied to other processes or concepts in the business management arena such as performance appraisal mechanisms and training methodologies. This research design controls for instructor effect by using the same instructor and simulated decision-making environment in both the control and experimental group.

Limitations

Advances in computer technology have resulted in the design of sophisticated business simulations that incorporate complex algorithms and dynamic scenarios and allow the interaction of multiple participants. These simulations incorporate knowledge of market behavior, competitive impact, and environmental influences gained from business literature. Thus, the simulation behaves like most business markets. It can operate at various levels of complexity and turbulence. It is, however, a simplification of reality containing only the major elements of the global business setting (Wolfe, 2005). The simulation re-creates the essence of real-world organizational decision making while keeping the complexity in manageable limits for participants to grasp and manipulate. Because of this real-world reality, a sophisticated business simulation is the ideal learning application because everything it presents to its participants is intangible and the team's success depends on its information-processing abilities and its ability to learn from its actions (Wenzler & Chartier, 1999). The only real assets individuals and management teams possess in a simulation are cognitive and intellectual, and those are the ultimate assets of the knowing organization that can engage in organizational learning. A

management team or individual in a business simulation can only be as good as the skills, experiences, and motivational levels they possessed at the game's beginning or later acquired based on dealings with the simulation's model. One aspect that can influence the cognitive growth rate and skills of the teams is group dynamics. The study's findings could be influenced or even skewed by potentially disruptive team dynamics.

This researcher monitored this potential effect throughout the study via team feedback sessions; however, the research does not measure the effect of group dynamics while the teams develop strategic skills or new learning capabilities. In addition, the degree to which study participants engaged in the simulation and subsequent treatments may have influenced the results. To monitor for this effect, the researcher reviewed the level of engagement by each student periodically. Individuals or teams that exhibited low levels of engagement with the simulation were noted and encouraged via the classroom teaching format.

Other limiting factors included logistical constraints imposed by the University's registration and enrollment policies and practices. They included registration, class size, enrollment conflicts, syllabus modifications, access and use of computer instrumentation, and instructor loading.

Nature of the Study

For this experiment, students in a college business class managed simulated strategic organizational decisions. For the independent variables, the student teams were divided into experimental and control groups. The control group used an array of contemporary strategic planning processes, while the experimental groups used an OL-designed planning process. The dependent variable was simulated performance of the companies, specifically their return on

assets and firm profits. The experiment used a software business simulation as a laboratory setting for the study of the phenomena outlined. Undergraduate, graduate, and executive MBA programs use business software simulation extensively. Using students as subjects provided a controlled environment and employed a research methodology widely adopted in the literature (Dickinson, Gentry, Burns, & Wolfe, 2005; Glynnn, Lant, & Milliken, 1994; Lant & Mezias, 1990; Nees, 1983; Schwenk, 1982). The student sample consisted of 68 business majors enrolled in three classes during one semester from a southern university. The study was originally designed for 22 separate management teams in identical business sectors, but due to logistical constraints imposed by the university's registration and enrollment policies and practices, only seven teams were used for in the final analysis. A prestudy period was used to acclimate players to the simulation's mechanics and ensure managers knew how to implement strategies for their company. The simulation experience was designed to require subjects to make decisions under circumstances that simulate organizational conditions; multiple controls were placed on the design to avoid confounding effects on performance. Data were collected from simulation outputs, questionnaires, and external assessment. This experimental approach was employed so that variables could be controlled systematically. The control inherent in laboratory studies increases the ability to test causal hypotheses and provides an effective method for testing, according to Schendel and Hofer (1979). The research design overcomes the two major weaknesses associated with field research: lack of control for confounding variables and possible biases in sample selection (Schwenk, 1982). The research setting uses The Global Business Game, World Edition, a business simulation that demands strategic planning and efficient

implementations from its management teams (Wolfe, 2002). This simulation has been used extensively as a training and teaching aid and has been extended into the laboratory.

Definition of Terms

Action learning. An aspect of cognitive learning that involves correcting misalignments between expectations and reality to generate more effective organizational behavior in real time (Revans, 1994).

Behaviorial learning. Focuses on the antecedents and changes in organizational structures, technologies, routines, and systems as the organization responds to its own experience and that of other organizations and its external environment (Lundberg, 1995).

Codification. The transformation of tacit knowledge into explicit written tools, such as manuals, blueprints, decision support systems, procedures, processes, and diagrams (Zander & Kogut, 1995).

Cognitive learning. Focuses on content, processes that improve the creation of knowledge in a firm, and the implementation of such creativity (Fryer, 1999).

Double.loop learning. Occurs when managers question the underlying assumptions of strategy and reflect about whether the theory under which they have been operating is still consistent with current evidence, observations, and experience. This learning dimension is integrated with single.loop learning, but managers need feedback about whether the fundamental assumptions made when they launched the strategy remain valid (Argyris, 1977).

Dynamic capability. A learned and stable pattern of collective activity through which the organization systematically generates and modifies its operating routines in pursuit of improved effectiveness (Zollo & Winter, 2002).

Explicit knowledge. Knowledge that has been or can be articulated, codified, and stored in certain media. It can be readily transmitted to others (Nonaka & Takuechi, 1995).

Intangible resources. Knowledge-based.strategies that deploy organizational learning, innovation, and customer relationships, which, in turn, fuel firm performance.

Knowledge unification and casual loops. These processes can have a + effect, indicating that changes in one variable are in the same direction as another variable. For example, an increase in one causes an increase in the other, or a decrease in one causes a decrease in the other. On the other hand, a – sign indicates that changes occur in the opposite directions. A causal loop can link across multiple variable relationships. "A causal loop in which there are an odd number of minus signs is change.counteracting, while a causal loop in which there are an even number of minus signs is change.amplifying" (Maruyama, 2003, p. 613).

Learning mechanisms. The systematic operating routines that enhance understanding of the casual linkages or interrelationships between the actions organizations take and the performance outcomes they obtain (Zollo & Winter, 2002).

OL assessment matrix. An assessment method that evaluates the presence, strengths and weaknesses of the organizational learning constructs of behavioral cognitive, action and articulation in concepts or existing methods (DeLoach, 2010).

Systematically. Orderly, structurally interrelated steps based on a network of concepts, principles and rules.

Tacit knowledge. Experiences in daily operations, usually knowledge, that is only known by an individual and is difficult to communicate to the rest of an organization (Nonaka & Takuechi, 1995).

Tangible resources. Tangible assets such as inventory, property, plants, and equipment.

Value T. This decision support capability is a byproduct of the OL codification process and incorporates key characteristics related to behavioral, cognitive, system, and action learning, which are theorized to enhance the learning and performance of the organization. Specifically, it is a portfolio analysis methodology designed for the business unit level of strategic planning.

Hypotheses and Research Questions

This explorative study presents a structure (dynamic capability process) that may translate forms of tacit and explicit knowledge into a specific OL learning mechanism that incorporates the organizational learning constructs of behaviorial, cognitive, and action learning (Figure 2). This OL-based-dynamic capability builds on previous research by Senge (2006), Nonaka and Takuechi (1995), and Zollo and Winter (2002) and is supported by Levy (1994). Each researcher proclaims the need for additional research in the development of deliberate learning processes that have potential benefits for both theory building and management. This call may be answered by postulating that an OL-based-dynamic capability can be designed and used to develop new management tools or learning mechanisms that will postively impact organizational learning and firm performance.

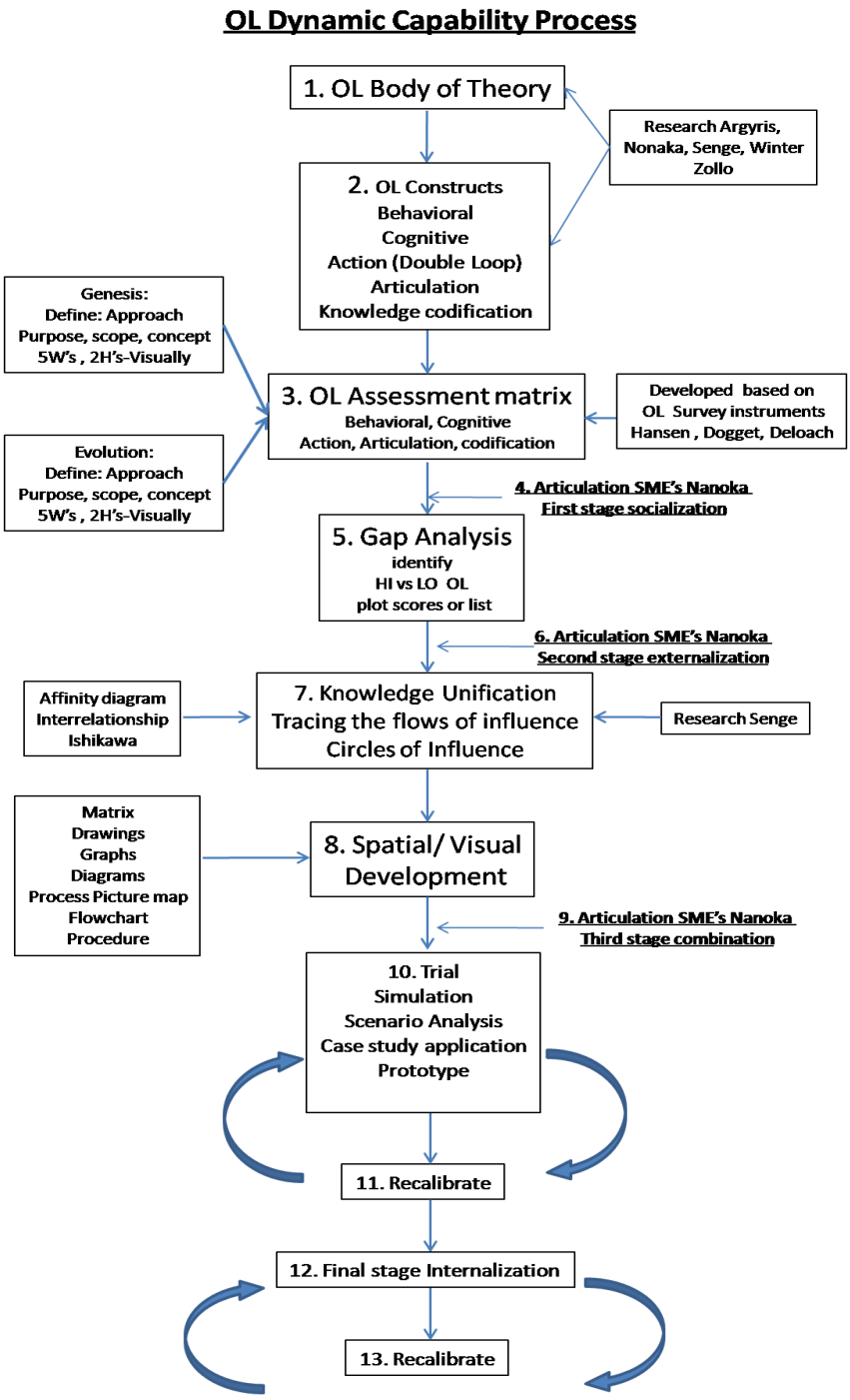

Figure 2. The OL Dynamic Capability Process.

The OL dynamic capability (Figure 2) builds a framework to operationalize organizational learning concepts into learning mechanisms, so that organizations can potentially use them to drive value creation or competitive advantage. The cornerstone of the dynamic capability is a gap analysis. Researchers are able to assess the presence and relative strengths of certain OL constructs; this is combined in a systematic flow integrating both single- and double-loop learning "eddies" throughout the process.

Dynamic capabilities and learning mechanisms must be operationalized to create or modify value approaches, disseminate their use, be leveraged across segments of the organization, and mobilize fragmented knowledge to generate innovation that drives value creation. The OL dynamic capability uses the integration of both verbal and visual dynamics. Research suggests that our minds create and analyze information more effectively using analogy, symbol, and metaphor. Bennet and Brown (2006) stated that visual recordings help illuminate group perspective and enable relational thinking to emerge organically from conversation. This visual pictorial capability highlights systematic patterns and underlying structures influencing desired outcomes. The combination of verbal and visual approaches allows disconnects in logic to appear more readily and be explored in depth by the process team members. OL has been described as a complex and dynamical arrangement of connections among elements forming a unified whole which is both unpredictable (chaotic) and patterned (orderly) (Eijnatten, 2004). Discovering a structure or pattern of deterministic variables and their relationships to operationalize OL would be of value. This research strives to fill a void in the literature, providing what the field has long lamented: a lack of "empirical insights into how firms can best

develop and enhance [learning-to-learn] capabilities" (Vornies & Morgan, 2005, p. 36). This void leads to the following research questions and hypotheses:

1. Can a fundamental order and structure (process) be established to yield an operational framework from a dynamic system such as OL? What are the deterministic steps in the process? Are there set patterns between these steps? If so, how do they enhance the organizations ability to operationalize OL?
2. What is the relationship between operationalized OL learning mechanisms in the strategic management arena and value creation? Do they improve firm performance? Are these approaches more effective than contemporary strategic management methods? Why are these approaches different and how do they achieve different performance levels?
3. Do these OL learning mechanism enhance managements skills or capabilities in strategic planning? How do they compare to traditional strategic management tools? Why do these approaches achieve different skill levels? How do they achieve them?
4. What is the impact of OL-based dynamic capabilities or learning mechanisms on organizational learning in a firm? Why do they produce different learning rates? How do they enhance learning? It is hypotheszied that a systematic process (dynamic capability) can be established to yield a learning mechanism from a nonlinear dynamic OL system. It is further hypothesized that the resultant operationalized OL learning mechanism produced from an OL dynamic capability will improve firm performance, strategic planning capabilities, and organizational learning more than traditional strategic planning methods.

$H1_0$: There is no significant difference between OL-based-business unit strategic planning portfolio analysis and a traditional business unit strategic planning portfolio analysis method.

$H1_1$: Operationalized OL-based business unit strategic planning methodologies improve organizational learning significantly more than traditional business unit strategic planning methods.

$H2_{0:}$ There is no significant difference between intentionally designed and operationalized OL strategic business unit planning processes and their traditional counterparts with respect to firm performance, specifically profit and return on assets.

$H2_1$: Designed and operationalized OL-based business unit strategic planning portfolio analysis improves firm performance significantly more than traditional business unit strategic portfolio analysis methods.

$H3_0$: There is no significant difference between OL-based-business unit strategic planning portfolio analysis and a traditional business unit strategic planning portfolio analysis.

$H3_1$: Designed and operationalized OL-based business unit strategic planning portfolio analysis will improve strategic planning skills significantly more than traditional business unit strategic planning methods.

The independent variables are in the context of business unit strategic product management as follows:

A. OL designed planning process (Portfolio Analysis) "Value T"

B. Contemporary planning process (Portfolio Analysis) BCG and McKinsey matrix

Within OL, the independent variables were measured using four constructs: behavioral learning, cognitive learning, action learning, and systems learning. Each construct was measured using multiple questions in an organizational learning survey instrument (DeLoach, 2010; Dogget, 2003; Hansen, 2004). Independent variables were measured to determine if they enhanced strategic skill levels in the management teams. The dependent variable firm performance is actual simulation firm performance. The major components are return on assets and firm profit. These measures are generally accepted in industry as key indicators of firm performance (Garrison, Noreen, & Brewer, 2006; Kaplan & Norton, 1993). Using attitudinal surveys in conjunction with a strategy selection rubric and actual performance data for measuring firm performance provided a multimethod approach that supported triangulation of understanding data. A pilot study was conducted to determine the validity of simulation design, attitudinal surveys, and data collection methods.

The laboratory-based method was ideal for testing the research questions due to the ambiguity associated with real-world management processes and their subsequent firm performance. This is compounded by the dynamic nature of OL, which is constantly in a state of flux. Within the simulation, the research design was able to control for many of the external stimuli that influence firm performance in the real world. The laboratory setting also allows the researcher to control the cognitive learning mechanisms that are introduced to the treatment groups. The ability to control these variables reinforces the use of a laboratory setting. Controlling these variables in a field context would be extremely difficult if not impractical.

Significance of the Study

This researcher studied the specific mechanisms needed to conceptualize and make OL theory operational as well grade their effect on performance, which is highly valued (Vorhies & Morgan, 2005; Weerawardena, 2003). Thus, this study of the strategy-learning-action-performance system has contributed to management research and has both a theoretical and an empirical application. The general problems organizational learning and strategic management face are (a) the existence and nature of relationships among organizational learning, (b) organizational strategy development, (c) organizational action, and (d) organizational performance.

The study is valuable because although the research questions have clear links to current interests in management research, little empirical work has addressed how to systematically operationalize OL in strategic planning (Foley, 2005). Furthermore, there is little evidence that firms investing in OL methodologies realize significant returns on their investment dollars. Indeed, a study by Lucier and Torsilieri (1997) observes otherwise: Half of the firms in its OL study group achieved only average results; one third failed to achieve any benefit; and only one sixth achieved notable success. This failure to achieve significant returns may be attributed to the lack of OL concepts being effectively operationalized into dynamic capabilites.

A dynamic capability is a learned and stable pattern of collective activity through which the organization sytematically generates and modifes its operating routines in pursuit of improved effectiveness. The literature reveals no straightforward answer to questions of how routines, much less dynamic capabilites, are generated or evolve (Zollo & Winter, 2002). Central to the development of the OL dynamic capability is an organizational learning assessment

matrix, which evaluates the relative presence and strengths of OL constructs. This assessment identifies opportunites for improving critical aspects of OL in an operational framework. The codification process further integrates theory, problem-solvingmethodology, and spatial tools to present a new decision support capability.

The ability to study organizational learning capabilities, their design and application, and to develop better strategies is vital to business leadership today, promising no small advantage in the global economy. This study's findings have enriched an understanding of business strategy and point to how OL constructs may be articulated and codified in the strategic planning process, which may influence value creation and competitive advantage.

Summary and Overview

This chapter described a study of relationships among organizational learning, codification, organizational strategy, and organizational performance. The research questions have clear links to current interests in management research but are not readily answered by existing theory or empirical work. The study explored organizational learning as a way to create value or competitive advantage.

Chapter 2 presents a brief overview of organizational learning, focusing on structured learning associated with strategic planning and then on Nonaka and Takuechi's (1995) theory of tacit and explicit knowledge, Zollo and Winter's (2002) dynamic capability development, and Senge's (2004) knowledge unification theory. Limitations of current strategic planning methodologies are illustrated, and an OL-based portfolio analysis method is described. This analysis tool (the Value T) is based on behavioral, cognitive, and action learning. Chapter 3 introduces this study's empirical evaluation of the OL dynamic capability process and describes

the sample, instrument, and methods of data gathering and analysis. Chapter 4 summarizes results of the study, and chapter 5 presents conclusions and recommendations.

CHAPTER TWO

LITERATURE REVIEW

Introduction

There is a lack of academic research on how organizations can effectively operationalize organizational learning concepts in strategic planning. This chapter reviews the relevant literature on OL. The first section reviews the roots of organizational learning literature from its origins in the 1930s, when theory progressed from learning curves (psychology basis) in individuals to small groups and ultimately to organizations.

Section 2 traces the evolution of these psychologies into a more refined focus and sets the stage for contemporary OL. Researchers during this stage refined OL into behavioral, cognitive, and action constructs. Breakthrough research by Argyris in the 1970s developed the basis for single and double loop organizational learning models. Researchers continued to refine OL theory during the 1980s, with a systems approach being favored over mere mental models or cultural concepts. The structured approach introduces the opportunity for the operationalization of OL into actionable frameworks. Alternative contemporary theories are presented, including the argument that organizational learning is a particular form of learning developed in organizations through key individuals, which can be associated with subsequent organizational changes (Cook & Yanow, 1995). Some anthropological studies have verified what these key individuals teach the rest of the population. This phenomenon is frequently associated with renewing processes (Czarniawska, 2003). The organic and organizational design theory of OL is briefly explored and assessed in light of mainstream contemporary theories. The review of literature illustrates that there is a gap in both conventional and alternative theories of

organizational learning regarding how theory moves to specific operational framework mechanisms that can be used by organizations. These frameworks are needed by firms for the specific transfer, storage, and enhancement of knowledge. Conceptual models typically slight application and performance, and empirical work rarely incorporates models and concepts with performance (Hansen, 2006).

The work of the 1990s, including the groundbreaking research of Peter Senge, is summarized in section 3. His midrange theory strives to provide a linkage between theory and descriptors of an effective learning organization. Additional research by Nonako in the 1990s strives to explain the movement or transformation of knowledge from tacit forms into explicit forms of organizational knowledge. Work by Zollo and Winter (2002) is explored to illustrate the dynamic capabilities that organizations may use in the storage, transfer, creation, and application of organizational learning. These dynamic capabilities may lead to competitive advantage and improved performance.

Section 4 uses Senge's (1994) and Nonaka's (1997) theory as a basis to derive a hypothesis and research model that comprehensively addresses the research questions. This study introduces a dynamic capability for operationalizing OL. This dynamic capability develops learning mechanisms in the form of management methodologies that may foster organizational learning and subsequent firm performance. This section also explores organizations can apply these tools. Studies are cited that illustrate the linkage of strategic planning and the structured approach of OL and the generic weaknesses attributed to the strategic planning process among OL theorists.

The learning mechanism (Value T) produced by the OL dynamic capability process is described in section 5, which also describes the research setting by which the Value T was tested. It also presents the research method and the reasoning for its adoption versus other research methods, primarily field research, and concludes that laboratory testing is a superior method in controlling for confounding variables.

Early History of Organizational Learning

OL can trace its theoretical roots to research first initiated by psychologists who studied learning curves in individuals. They found that the time individuals took to perform tasks and the numbers of errors they made decreased as experience was gained with the task (Thorndike, as cited in Argote, 1999). Psychologists observed this same phenomenon among groups. Further research by Simon (1955) and Leavitt (1951) concluded that group learning mirrored the learning curve found in individuals. During the industrial growth of the 1930s and 1940s, many researchers focused on specific industries because of the demands and needs of World War II. Wright's (1936) breakthrough research documented a decreasing proportion of labor hours needed to complete aircraft manufacturing as the number of aircraft increases (as cited in Argote, 1999). Wright's research initiated similar studies throughout a host of industries. Searle and Goody (1945) found that the labor hours required for building liberty ships decreased by 45% and the average time it took to build a ship decreased by 75% (as cited in Argote, 1999). This early work on organizational learning curves (Alchain, 1963; Baloff, 1966; Hirsh, 1952) focused primarily on manufacturing discrete products such as planes, trains and automobiles; however, Hirschman (1964) found similar learning curves in continuous manufacturing environments.

Research continued to evolve with the introduction of new outcome measures for analyzing learning curves (Solow, as cited in Argote, 1999). These studies included various quality descriptors, number of defective parts, cycle times, and unit cost. The basic principle of the learning curve was presented by Arrow (1962), stating that production experience creates knowledge that improves productivity; however, researchers discovered that organizations vary dramatically in the rate at which they learn. Some organizations show dramatic increases in productivity, and others that show very little.

Research on learning rates and subsequent firm performance has led to a host of hypotheses (Galbraith, 1990; Hayes & Wheelwright, 1984; Joskow & Rozanski, 1979; Libeman, 1984), which were categorized by Argote (1993) as follows: (a) increases in individual proficiency including laborers and management; (b) improvements in organizational technology; and (c) improvements in structure, routines, and methods of coordination. A major focus of the research conducted from the 1970s through the 1990s was to identify the specific factors that led to the variation in organizational learning and subsequent productivity improvements, with the firm being the fundamental unit of analysis (Argote, 1993). As the divergence in hypotheses has grown among researchers, so has the inability to merge theories. This inability to consolidate theories has hindered their application to real-world scenarios.

The field has exploded into divergent paths striving to explain the variation in OL rates, with many researchers redefining what organizational learning is, other researchers focusing on organizational structure and cultural theory, still others exploring resource-based and evolutionary views, and others examining organizational capabilities in knowledge transfer. Of the major findings, differences in organizations' abilities to create, retain, and transfer

knowledge emerged as a major contributor to the variation in differing firm's ability to learn and achieve higher levels of learning and performance. For example, firms' able to retain knowledge will typically have a faster productivity growth rate than firms in which knowledge is lost (Argote, 1993).

The current study explored the emerging and blending of several major theories: resource based theory, chaos theory, systems theory, and knowledge transfer. These theoretical approaches are relevant to the research problem because they propose concepts and models exploring the relationships of firm performance, varying rates of organizational learning, and the transfer of knowledge among and in organizations, all of which create a foundation for operationalizing OL and subsequently improving firm performance.

Shift from Tangible to Intangible Assets in Competitive Advantage

During the 19th and 20th century, businesses achieved competitiveness by investing in tangible assets such as inventory, property, plants, and equipment (Chandler, 1990). By the end of the 20th century, however, intangible assets demarcated competitive advantages. As late as 1982, tangible assets represented 62% of an industrial organization's market value; 10 years later such assets accounted for only 38% of market value (Blair, 1995). A few years later, by the end of the 20th century, company tangible assets accounted for less than 20% market value (Webber, 2000). Clearly, strategies need to evolve with the environment to provide models for reading the shift from tangible assets to the new, knowledge-based intangibles that dominate the current market, such as customer relationships, innovation, service, high quality processes, and a learning organization (Rutteford, Upton, & Kodwani, 2006).

Intangible assets such as knowledge or capacity for innovation vary in their impact on

revenue and profit. According to Bucker and Huselid (1998), improvements in intangibles today occur mostly through chains of cause-and-effect relationships, involving two or three intermediate stages. Financial outcomes may therefore be separated causally from improvements in other sectors. Intangibles seldom have value by themselves and generally must be bundled with other intangible and tangible assets to create and sustain competitive advantage (Rutteford, Upton, & Kodwani, 2006).

The learning organization concept has become apparent as a form of competitive advantage known as knowledge based. This emphasis on knowledge as a potential competitive advantage (differentiation) is supported by the resourced based view (RBV) theory. One of the key resources that an organization can draw on in establishing a competitive advantage over rivals is superior knowledge (Quinn, 1992). Companies are defining themselves by the specific process know-how or competence they bring to the competitive market. Therefore, knowledge develops and enhances the basis for competition (Boynton & Bart, 1991).

RBV can be viewed as a collection of tangible and intangible assets combined with capabilities merging to develop competencies that achieve competitive advantage. Organizations emphasize that capabilities and competencies are their key to critical success (Davis & Bodkin, 1994). This unique knowledge-based capability is theorized to improve firm performance. An organization that learns more efficiently and transfers this knowledge more effectively is theorized to outperform organizations that do not possess this capability. The RBV theory explains *why* organizations vary in performance in certain metrics but not specifically *how* organizations can achieve this dynamic learning capability effectively, which is the essence of the research problem explored in this study.

Transition and Evolution of Organizational Learning

Research in the latter part of the 20th century divided OL into unique classifications and constructs. Understanding this delineation is vital to the development of an operational model that transforms and creates new knowledge in the organization. The growth in organizational knowledge can be depicted as a change in organizational behavior and cognition (Duncan & Weiss, 1979; Nooteboom, 1999; Simon, 1969). Organizational learning is based on shared experiences, norms, and understandings that foster intelligent behavior in which organizations are skilled in creating, acquiring, and transferring knowledge (Senge, 1990). The idea that the firm must act as a sensing and responding organism if it is to survive dates to the 1960s (Cyert and March, 1963).The label *organizational learning* was drawn from the world of business simulations and used by Cangelosi and Dill (1966) to describe the progressively more sophisticated decision-making behaviors engaged in by teams playing the Carnegie Tech Business Simulation (Cohen, Dill, Kuehn, & Winters, 1964).

> Organizational learning does not come by chance but is a consequence of deliberate company actions. The implicit assumption is that there is an organizational archetype and management systems that defines a successful culture of organizational learning and which can influence performance, long term effectiveness, and survival of an organization. (Kululanga, Fotwe, & McCaffer, 2001, p. 22).

Implementing organizational learning is complex due to a lack of tangible systematic approaches and associated measures of the learning capability (Goh & Richards, 1997).

The literature on this topic continues to grow rapidly, but practitioners continue to struggle with the application of organization learning concepts in companies and management

systems. Organizational learning can be depicted as a change in behavior and cognition of the organization. Empirical research establishes that organizational learning or cognition generally occurs over time. Organizations generally grow in OL over the cycle of business, with cognition changing from time of emergence through maturity. This change in behavior or cognition is exhibited in tangible benefits such as the reduction of defect rates or cycle times (Duncan & Weiss, 1979; Nooteboom, 1999; Simon, 1969). This movement in behavioral or cognition involves two processes: first, creating or transferring knowledge and other stimuli from internal and external business environments; and second, applying the acquired knowledge to ensure continued performance improvement. Measuring learning must capture these two processes that underlie OL (Kululanga, 2001). Behavioral learning focuses on the antecedents and changes in organizational structures, technologies, routines, and systems as the organization responds to its own experience and that of other organizations (Lundberg, 1995).

These theories suggest that OL is an adaptive process, and this is triggered only by performance gaps or other signals of inadequate performance (Cyert & March, 1963). In a similar way, since trial-and-error learning generates routines that tend to make an organization stable, it is only possible to spark major organizational change through significant external events (Levinthal, 1991). The use of existing information is beneficial to compare the current situation of the firm with historical and competitive information. Another dimension of behavioral learning is trial-and-error adaptability, through which learning by experience becomes embedded in the form of specific routines, systems, and processes (Feldman & Pentland, 2003). Behavioral routines, such as the strategic planning process, may provide consistency and reliability to the firm, increasing its chances for long term survival (Nelson & Winter, 1982). At

the same time, the performance and improvement of routines can lead to organizational change, expanding the potential for learning (Feldman, 2000).

Cognitive learning, one aspect of OL, focuses on content, processes that improve the creation of knowledge in a firm, and the implementation of such creativity (Fryer, 1999). By putting the right processes in place, OL can transform data into information, information into knowledge, and knowledge into action seamlessly, an asset to any company. The strategic planning process, in fact, is one of the primary means by which firms transform information into distinct, competitive advantages; and OL allows that transformation to be predicated not merely on each company's internally hoarded knowledge but on the collected external knowledge of similar firms (Garud & Nayyar, 1994; Levinthal, 1990; Lumpkin, 2005). Cognitive learning and its relationship to resource-based theory holds that the very process of knowledge creation can generate unique competencies and advantages (Lumpkin, 2005). A firm's capacity to sense and seize opportunities, to reconfigure its knowledge assets, and to develop its competencies all constitute its dynamic capabilities (Teece, 1998). OL allows organizations to take action and mobilize the tacit knowledge of their trained professionals (Kim, 1993; Nonaka, 1994). Such learning, in turn, generally leads to greater firm effectiveness and performance.

Action learning, an aspect of cognitive learning, involves the practice of correcting misalignments between expectations and reality to generate more effective organizational behavior in real time (Senge, Roberts, Ross, Smith, & Kleiner, 1994). Action learning, in contrast to cognitive and behavioral learning, focuses on moment-to-moment adjustments because of stimuli in a real time scenario. This correcting of misalignments can be further distinguished in single and double-loop learning. In single-loop learning, incremental

modifications are made to organizational behaviors that improve efficiency of organizing. Double-loop learning or transformative learning, by contrast, challenges the context in such actions are being done by continuously asking if the organization and its members are pursuing the right actions that might lead to appropriate goals (Argyris, 1977). In the context of managing a firm, it implies a willingness to revisit the basic organizational mission, goals, and strategies on a regular basis.

Single-loop learning is instrumental learning that leads to improvement in the performance of organizational tasks, changes strategies of actions or assumptions, and includes underlying strategies in ways that leave the values of a theory unchanged (Argyris & Schon, 1996). The systematic process of establishing a vision and strategy, communicating and linking the vision and strategy to all organizational participants, and aligning organizational actions to initiatives to achieving long-run strategic goals and an integrated strategic planning process (SPP) is an example of a single-loop feedback and learning process. With single-loop learning, the objectives remain constant. Departures from the planned trajectory are treated as defects, with remedial actions launched to bring the organization back onto the intended path. Deviations from the plan cause management to question whether the planned results were still desirable or if the methods are still appropriate (Kaplan & Norton, 1996). In a dynamic business environment, new strategies can emerge by capitalizing on opportunities or countering threats that were not anticipated when the initial plan is articulated. Unfortunately, traditional management systems do not encourage and facilitate the formulation, implementation, and testing of strategy in continually changing environments. Organizations need the capacity for double-loop learning (Kaplan & Norton, 1996).

Double-loop learning occurs when managers question the underlying assumptions and reflect about if the theory under which they have been operating is consistent with current evidence, observations, and experience. This learning dimension is integrated with single-loop learning, but managers need feedback about if the fundamental assumptions made when they launched the strategy remain valid. Management processes such as SPP must provide regular opportunities for double-loop learning by collecting data about strategy, reflecting on if the strategy is working and appropriate in light of new developments, and soliciting ideas broadly in the organization about new strategic opportunities and directions (Kaplan & Norton, 1996). Kaplan and Norton (1996) stated that an effective strategic learning process requires a shared framework that communicates the strategy and allows participants to see how their individual activities contribute to achieving the strategy. This double-loop learning process is enabled by a firm through a linked series of objectives and measures that are both consistent and mutually reinforcing. Leaders should incorporate the complex set of cause-and-effect relationships among outcome measures and the performance drivers of the outcomes that describe the trajectory of strategy. A strategy is a set of hypotheses about cause and effect. Cause-and-effect relationships can be expressed by a sequence of if-then statements. Understanding root causes (cause-and-effect relationships and chains of causal relationships) and not just the readily obvious symptoms are vital to organizational learning (Argyris, 1977).

The organizational learning literature emphasizes the importance of organizational culture to learning (Schein, 1992). Learning is based on shared experiences, norms, and understandings that foster intelligent behavior (Senge, 1990). However, many researchers criticize the abstract nature of this cultural approach to learning. They argue that learning can be

better studied and promoted by undertaking a structural approach (Zollo & Winter, 2002), which they call organizational learning mechanisms: institutionalized and procedural arrangements that allow organizations to systematically collect, analyze, store, disseminate and use information relevant to the effectiveness of the organization, such as the strategic planning process in a company (Lipshitz, Popper, & Oz, 1996). Although a cultural approach emphasizes creating shared and functional norms among workers, the structural approach denotes a reliance on formal rules and procedures to enable learning. Lipshitz et al. (1996) proposed that OL, a form of competitive advantage, is promoted by undertaking a structural and systematic approach, which they called "organizational learning mechanisms" (Kululanga et al., 2001, p. 22).

In summary, firm competiveness and subsequent performance are improved by organizational learning because of the RBV theory. OL can be further separated into the basic constructs of behavioral, cognitive, and action learning. Research also indicates that these constructs can be promoted using a structural and systematic approach, but the research does not provide a clear framework for transferring the differing constructs of OL into learning mechanisms such as organizational routines, processes, or management tools.

This lack of operational frameworks may also be contributed to the ambiguity of organizational processes with respect to their performance implications (Lippman & Rumelt, 1982). This ambiguity is compounded in a rapidly changing environmental context.

> Higher-level cognitive efforts and a more deliberate collective focus on the learning challenge may help to penetrate the ambiguity-although some part of it always persists. It is important to note that only a small fraction of articulable knowledge is actually articulated, and that organizations differ substantially on the degree to which they

> transform potentially articulable knowledge into articulated statements. (Zollo & Winter, 2002, p. 342).

In addition, many organizations fail to translate OL concepts into actionable frameworks due to cost in time, resources, capital, and cognitive effort required. Many organizations are resource restricted and may not readily see the return on investment. Organizational learning has been described as a fluid state, always shifting and unpredictable (Eijnatten, 2004). This state of flux creates difficulties in placing operational frameworks on OL and may be unique for each organization. Therefore, conceptual models typically slight specific operational frameworks, application and performance and empirical work incorporates models and concepts with performance rarely or incompletely.

Alternatives and Objections to Conventional OL Theory

The most critical objection to the learning organization concepts has been raised by Salaman and Butler (1994), who argued that not only do employees resist organizational learning, the learning organization concept ignores the way that power is exercised and the behaviors that are rewarded and penalized. Many contemporary organizations are controlled by executives who make decisions based on short-term profits, which may be in direct contrast to establishing cultures or methodologies that encourage or sustain OL. Argyris (2001) described limits to organizational learning in two groupings of physiological categories: individual and organizational. The first regards the individual barriers to organizational learning, consisting of defensive strategies to avoid vulnerability, risk taking, embarrassment, and incompetence. The second group relates to the universal phenomena that Argyris called defensive organizational

routines or organizational barriers, and this can produce breakdowns in the learning process. Defensive organizational routines consist of policies, practices, and actions that strive to avoid embarrassment or threat to its members. These formal and informal organizational routines work as internal barriers to self-understanding and self-examination; so in some cases ,it is a miracle if organizational learning takes place (Greives, 2008).

Alternative theories include the argument that organizational learning is a particular form of learning developed in organizations through key individuals, which can be associated to subsequent organizational changes (Cook & Yanow, 1995). Some anthropological studies have verified that these key individuals learn to teach the rest of the population. This phenomenon is frequently associated with renewing processes (Czarniawska, 2003). Typically, alternative theories in OL focus on managing chaos and indeterminacy, flattening hierarchies, decentralization, empowerment of people, teamwork and cross-functional teams, network relationships, adoption of elaborate technologies, and new forms of leadership and mentoring (Mirvis, 1996; Steingard & Fitzgibbons, 1993). Chaos theory is one of the promising frameworks that may describe the dynamics and complexities of organizational learning.

Chaos theory is the study of complex, nonlinear dynamic systems and demonstrates how a simple set of deterministic relationships can produce patterned yet unpredictable results (Levy, 1994). The ability to discovering fundamental order and structure behind complex events such as OL has potentially large benefits for operationalizing OL. Research in this area emphasizes that there is a surprising degree of order in chaotic systems. Short-term forecasting is possible in a deterministic system given the conditions at a certain time. Levy (1994) held that a carefully constructed model of a complex system with accurately specified starting conditions can yield

useful forecast for several time periods. Determining these fundamental structures, relationships, and patterns may be instrumental in developing models to enhance organizational learning.

Each of these learning modes in one way or another is concerned with learning that is not easily orchestrated or controlled by management. From this perspective, the manager can help create conditions that might encourage the opportunities for OL to occur, but one cannot totally determine or mandate these conditions, nor make them emerge through conventional OL strategies (Grieves, 2008). Such conventional OL strategies essentially rely on tools or methods principally directed towards enhancing "revealed learning" or learning that is trainable and transferable (Jones & Hendry, 1994).

There is a gap in the body of knowledge on how to operationalize OL into dynamic capabilities that will drive strategic action and subsequent firm performance in both the generally accepted theory and alternative theory. This study focuses on the conventional methodologies of OL, which allows management to have greater control in orchestrating learning. Section 3 includes contemporary work on the conventional concepts and their application of OL.

Theoretical Basis of Model

Theory seldom explores the relationship of learning to specific operational frameworks or tangible outcomes. A meta-analysis of 78 articles by Templeton, Lewis, and Snyder (2002) indicated that only 10% discuss organizational learning in the context of operational frameworks or a specific transference process. Of these articles, one dominant transformation process theory emerges: acquisition, distribution, interpretation, and memory (Huber, 1991). Huber's distribution process includes the sharing, transferring, or transmitting of knowledge to evoke changes in cognition or behavior. More recent researchers have expounded the work of Huber to

include application and protection. Gold (2001) defined the application of knowledge as the storage, retrieval, and use of knowledge. However, these macro models do not resolve the specific transformation process needed to operationalize OL into a management process. Research continues to evolve, and Nonaka and Takeuchi (1995) presented a conceptual model of learning transformation.

The basis of Nonaka's (1995) work is the existence of both tacit and explicit knowledge. Tacit knowledge is the subjective and experienced based knowledge internally held in the individual comprising beliefs, images, know-how, mental models, and intuition and is usually context specific. Explicit knowledge is objective and rational and can be expressed in words, sentences, procedures, and approaches. The theory contends that both forms of knowledge can be converted and is a continuous learning loop. Tacit knowledge is transferred from one person to another initially as socialization and can be described as experiential, active, and direct interaction between individuals. The next step of externalization is the process of making tacit knowledge explicit and is defined as the articulation of one's ideas or beliefs into a readily understandable format; this normally includes feedback and simultaneous exchange of ideas between individuals in a group setting. The subsequent step is the combination of knowledge and is described as a process that transfers knowledge, which can be conveyed via documents, e-mail, or meetings.

The key steps are the collecting of relevant information, editing or processing, and disseminating knowledge in a more usable form. The last step in Nonaka's (1995) model is the internalization of information: the understanding and absorption of explicit knowledge that is actionable by the owner. The internalization process transfers organization and group explicit

knowledge to the individual, completing the circle. Critics contend that this and other categorical approaches are too general or abstract to use in transforming OL concepts into specific operational frameworks (Hansen, 2004). The work of Senge (1990) undoubtedly has done more than most to underpin the concept of the learning organization. Senge (1990, 2006) tried to close the gap of integrating OL principles into a transformation process through his unification theory. He stated, "That seeing reality systematically is seeing circles of influence rather than straight lines. This is the first step to breaking out of the reactive mindset that comes inevitably from systematic thinking" (p. 152). Senge (1990) suggested operationalizing OL via drawing casual loops that illustrate the flows of influence whereby patterns that repeat themselves are exhibited. These feedback diagrams (circles) illustrate the interrelationships of variables or actions that reoccur overtime. These patterns or casual chains represent a potential structure that dictates future effects. Senge (1990) described his research as the conceptual underpinnings of building the learning organization, and further expressed the need for the development of clear methodologies to put these concepts into practice. Garvin (2000) criticized Senge and others for not providing an operational framework for implementing a learning organization to drive competitive advantage. Winter and Zollo (2002) called for a more nuanced assessment of knowledge transformation and the need for deliberate learning processes or codification models to be developed. In addition, chaos theory, a promising new framework that accounts for dynamic evolution, emphasizes the importance of developing guidelines and decision rules to cope with complexity and the fluid nature of OL (Levy, 1994).

OL Dynamic Capability Process Overview

Codification is an integral part of the entire knowledge evolution and transformation process. According to Winter (2002), codification can facilitate the generation of new routines, or dynamic capabilities as well as identify gaps in existing methodologies. The cognitive exercise inherent in following a prescribed flow of events enables managers to synthesize and analyze information more effectively. Based on the conceptual transformation theories presented by Senge (2004), Noanka (1997) and Zollo (2002), this research combines these concepts into a systematic codification process that uses OL as a base for the evolution and generation of learning mechanisms. This integration of theory through codification yields an OL dynamic capability (Figure 3). The OL dynamic capability creates a platform for learning and a pattern of collective activity through which the organization systematically generates and modifies its operating routines, tools, processes, or systems in pursuit of improved effectiveness.

The cornerstone of dynamic capability is a gap analyses that assesses the presence and relative strengths of certain OL constructs; this is combined in a systemic flow integrating both single and double-loop learning "eddies" throughout the process. Dynamic capabilities and learning mechanisms should be operationalized to create value across segments of the organization. The OL dynamic capability process uses the integration of both articulation and visual dynamics. According to research, our minds create and analyze information more effectively using analogy, symbol, and metaphor. Bennet and Brown (2006) stated that visual recordings helps illuminate the groups perspective and enables relational thinking to emerge organically from conversation. This visual pictorial highlights systematic patterns and underlying structures influencing desired outcomes. The combination of articulated and visual approaches

allows disconnects in logic to appear more readily and can be explored in depth by the team members. The dynamic capaibility strives to arrange a structure or pattern of deterministic variables (process steps based on specific theories) in a systematic format that has the goal of greater performance known a priori. A complex dynamic system thus can be managed through a systematic, iterative process to achieve a specific goal.

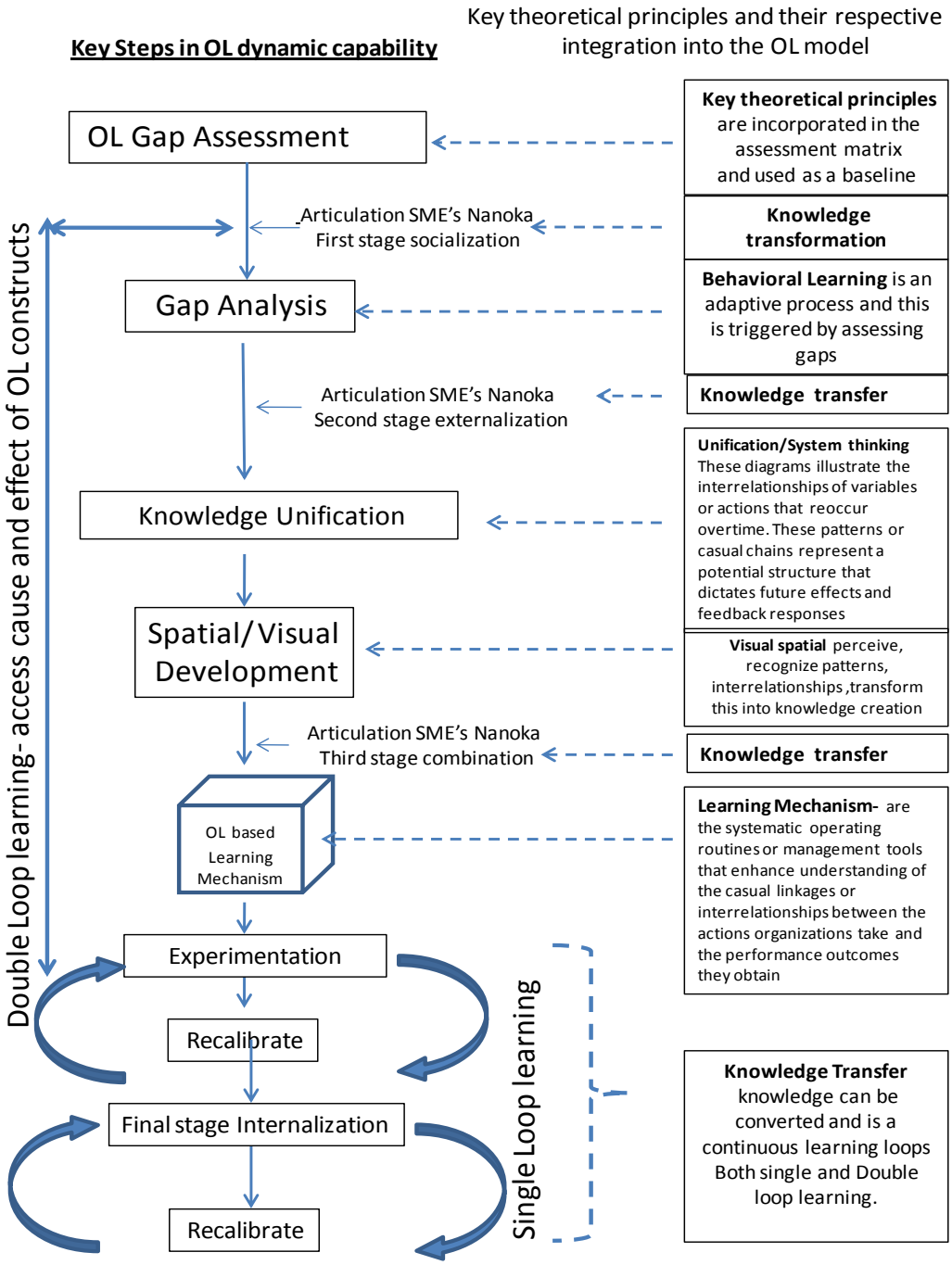

Figure 3. Integration of Key Theoretical Concepts.

The OL dynamic capability process illustrated in Figure 3 builds a framework to operationalize organizational learning concepts into learning mechanisms so that organizations can potentially use them to drive value creation or competitive advantage. Learning mechanisms and dynamic capabilities should be operationalized to create value approaches, disseminate their use, be leveraged across segments of the organization, and generate innovation that drives economic wealth. The dynamic capability process uses the integration of both verbal and visual dynamics. The combination of verbal and visual approach allows disconnects in logic to appear more readily and can be explored in depth by the team members. The OL dynamic capability process is outlined as follows:

> Step 1**(Theoretical foundation)**, presents the theoretical basis of the model. Theories presented by Senge (2004), Noanka (1997), and Zollo (2002) are supplemented by original work and combined into a systematic codification process that uses OL constructs as a foundation for the evolution and generation of dynamic capabilities.
>
> Step **2 (Key theoretical principle)** intertwines the broad and conceptual theories of OL into a core theoretical basis comprised of the OL constructs of behavioral, cognitive, and action learning (i.e. double-loop learning), articulation, systems theory, and codification. These theoretical constructs form the underpinning to the codification model and subsequent OL assessment matrix.
>
> Step 3 **(OL assessment)** is the foundation of the OL dynamic capability process (Appendix B). The OL assessment matrix is an assessment tool that gauges new or existing approaches against a standard of OL elements encompassed in the major constructs of OL. This matrix was developed by DeLoach (2010), using research by Hansen (2004) and Doggett (2006). It measures the presence, absence, and relative strength of OL variables in a given approach. This is administered in the first stage of Nonaka's tacit to explicit movement.
>
> Step 4 **(Knowledge transfer)** introduces Nonako's (2000) spiral process described briefly as follows: Members engage in "dialogues" (articulation) between the tacit and explicit ways they hold knowledge; they engage in practices which first disembody and then reembody tacit knowledge. The spiral describes stages in a process by which knowledge is converted first, among various tacit forms, second, from tacit to explicit states, third, among competing explicit possibilities, and, finally, from explicit existence

back to tacit knowledge. Step 4 uses the socialization stage whereby a diversified team of subject matter experts describe their experiences with the new or existing approach.

Step **5 (OL gap analysis)** is a formal gap analysis performed by each member of the team. The results are graded quantitatively and qualitatively, plotted, listed, or summarized in a table with each grading members comments.

Step 6 **(Knowledge transfer**) is the articulation of tacit knowledge that is converted to explicit knowledge comprehensible to others, particularly through the contradictions found in the OL assessment matrix, metaphor, and analogy. Team members work with one another to articulate understanding, points of view, ideas, interrelationships, and relevant facts concerning the approach definition and OL variables. Team design should include members that have strong intra and interpersonal as well as systematic and verbal skill sets. Research has shown that teams lacking in intra and interpersonal skill sets are impaired in the area of double-loop learning (Chawla, 2006).

Step 7 **(Knowledge unification)** places the relative strengths, weakness, or absence of variables and objectives of the approach into an interrelationship or spatial diagram (Figure 4). This step is designed to visually identify critical patterns, casual relationships, feedback loops, and integrate systems' thinking as a framework for seeing interrelationships and patterns of change versus static snapshots. Interrelationships are designated by positive or negative signs. Team members, working as a group, establish relational aspects between existing approach variables, and casual loops between weak or missing key OL variables identified via the OL assessment matrix. New or improved elements to the approach are proposed by the team to strengthen missing gaps in the OL categories in the context of value creation for an organization. Example: The major variables of the existing approach are listed in a circular pattern. The OL construct variables are added to the circle. Arrows of interrelationships are drawn between variables. + and - signs can indicate positive or negative influences; circles between variables can indicate chains or spirals to indicate paths. The thickness of lines can indicate relative strengths or weakness of relationship. The number of arrows going from or into a variable can indicate level of importance or hierarchy of variables. Absence of arrows can indicate opportunities for improving OL capabilities. Gaps of potential interrelationships are explored with numbers on arrows being assigned to new ideas of interrelationships. A table is constructed of numbers and corresponding brainstormed interrelationships and potentially new causal chains or linkages.

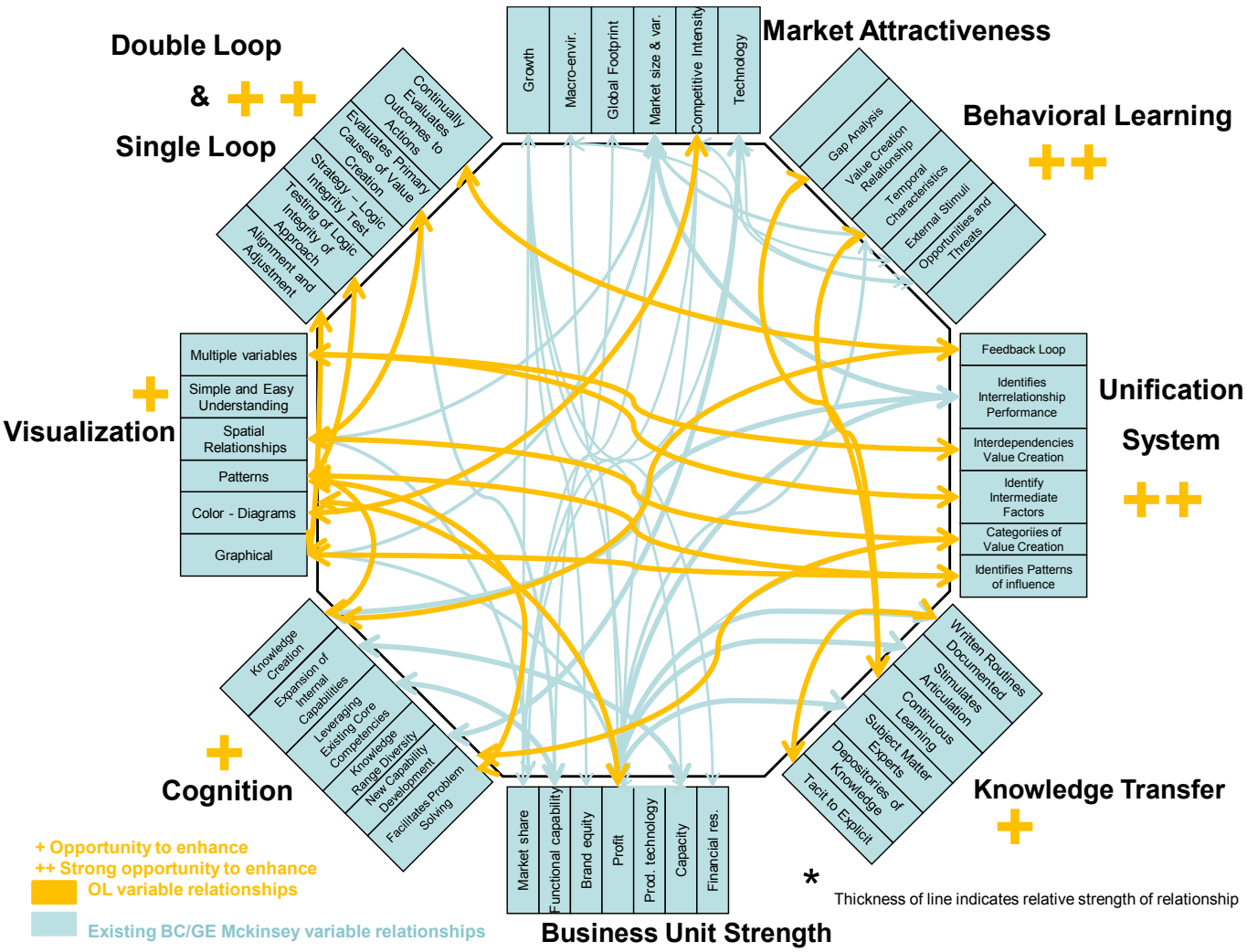

Figure 4. Interrelationship Diagram.

Step 8 **(Spatial/visual development)** involves the transformation of concepts ideas, interrelationships into an operational framework based on visual or written questions. The elements or ideas represented in the interrelationship, affinity, or Ishikawa diagram can be married with graphs, matrices, drawings, process picture maps, flow charts, written procedures, and so forth. This marriage provides supportive data or logic that either reinforces or weakens causation of relationships.

Step 9 **(Knowledge transfer)** is the external articulation and combination of this newly explicit knowledge. In the form of visual cues (spatial diagrams, flowcharts, procedures, routines, etc.) the new or modified approach becomes widely disseminated, discussed,

redesigned, and modified using members of the organization outside of the immediate team. This sometimes uses a murder board or swarm technique.

Step 10 (**Continual learning loop)** is the new or modified approach using small tests, prototypes, case scenarios, or simulations.

Step 11(**Continual learning loop)** recalibrates the approach; readjusting or modifying based on trial results.

Step 12 **(Application)** is the application or internalization of the approach by the organization. All members of the organization use and live with the dynamic capability in their daily activities. Internalization converts the changed, explicit knowledge again to a tacit form, this time held by many people. It then becomes clear how knowledge thus built into a process, product or a service, actively solves perceived problems.

Codifying Contemporary OL Theory

In a global competitive context, managers need dynamic tools to synthesize and analyze complex and shifting variables effectively. This research explores combining key theoretical OL principles into an OL-based dynamic capability process that can create or improve management tools and methodologies, thus assisting managers in their drive to create and sustain competitive advantage. Senge (2006) described this need to generate more effective tools for leaders by incorporating a systems thinking approach. He described systems thinking as the cornerstone that underlies the basis of his research for the learning organization. He suggested that the failure to produce breakthroughs in competitive advantage via many strategic planning processes is because of the lack of incorporating a systems thinking approach. More specifically, these traditional management methodologies are designed not to facilitate multiple variables or high levels of complexity defined as detail complexity. Senge introduced a second aspect of complexity that he described as dynamic complexity, situations whereby cause and effect are subtle and where the effects over time of interventions are not obvious.

Conventional strategic planning methods are not equipped to address dynamic complexity (Senge, 2006). Actions taken by an organization can have significantly different effects over or space, including potential global market segments or venues of operations. Many strategic planning processes merely explore linear cause-and-effect relationships and take static snapshots. Senge further expanded on his definition of systems thinking as an initial feedback response that reveals how actions reinforce or counteract each other. It leads to an understanding that patterns or structures reoccur temporally. This learned ability is a method of describing complex interrelationships. An organization that can develop this dynamic capability might be able to use it as a competitive advantage.

General criticism exists among researchers that strategic planning processes and their associated tools do not fully reflect or embody recent advances in organizational learning theory such as dynamic complexity and feedback responses. Table 1 presents stages of the strategic planning process, their deficiencies, and potential OL improvements. The strategic planning process is a vital link to firms' acquisition, evaluation, and use of knowledge (Barney, 1991; Choo, 1998). The strategic planning process, a pillar of knowledge management, should continually evolve to incorporate advancements in organizational learning. This literature review has established a clear relationship between OL and the SPP. Because of this important link, this research includes a segment of the SPP to test the process, specifically portfolio analysis. The OL dynamic capability process assesses and enhances the portfolio tools, BCG matrix ,and GE/McKinsey matrix with valuable OL attributes at a heightened state. According to research, successful firms perform an analysis of their portfolios, which includes the assessment of external and internal variables against various generic strategies. The methods implemented by

many organizations include the Boston Consulting Group (BCG) matrix, competitive strength matrix, and the more developed GE McKinsey matrix (David 2006). These methods have been in existence since the 1970s and continue to be taught in universities and used in business today. However, weaknesses exist in these managerial methods that may hinder effective knowledge evaluation, formulation, and transfer. They have also failed to keep pace in the development of new learning organization concepts such as chaos theory.

In the 1980s, GE's first cycle of learning focused on eliminating or reducing underperforming products and business units. In the 1990s the next cycle of learning targeted the simplification and elimination of non-value-added activities in the value chain functions. Portfolio analysis was a vital management tool used in this transformation and value creation at GE (Evan & Lindsey, 2008). It is postulated that the resultant learning mechanism produced from the OL dynamic capability will have a positive relationship to firm performance and organizational learning. This newly developed learning mechanism, Value T, is a byproduct of the dynamic capability and incorporates key characteristics of OL not exhibited or fully exhibited in the traditional portfolio tools.

Table 1

Strategic Planning Deficiencies

Stages of the Strategic Planning Process	Deficiency	Organizational learning improvement
Strategy Formulation • Develop Vision and Mission • External Assessment • Internal Assessment • Establish Long term Objectives • Generate, evaluate, and select strategies	Unfortunately traditional management systems do not encourage and do not facilitate the formulation, implementation and testing of strategy in continually changing environments. Organizations need the capacity for double loop learning (Kaplan & Norton, 1996). The strategic planning process, in fact, is one of the primary means by which firms transform information into distinct, competitive advantages; and OL allows that transformation to be predicated not merely on each company's internally hoarded knowledge but on the collected external knowledge of similar firms (Levinthal, 1990; Garud & Nayyar, 1994; Lumpkin, 2005	**Double loop learning theory** Learning occurs when managers question the underlying assumptions and reflect about if the theory under which they have been operating is still consistent with current evidence, observations, and experience. This learning dimension is integrated with single loop learning, but more importantly managers need feedback about if the fundamental assumptions made when they launched the strategy remain valid. **Single Loop learning theory-** correcting of misalignments by incremental modifications made to organizational behaviors that improve efficiency of organization **Behavioral learning theory** – suggest that improvements can be made to existing strategic methodologies by enhancing the triggers or signals of performance gaps or inadequate performance. The use of existing information is beneficial to compare the current situation of the firm with historical and competitive information with prediction into the future.
Strategy Implementation • Implement Value Chain Strategies • Tactical level	There exists significant causal ambiguity of organizational processes with respect to their performance implications (Lippman & Rumelt, 1982). This ambiguity is compounded in a rapidly changing environmental context. Further, Zollo & Winter (2002) state "higher-level cognitive efforts and a more deliberate collective focus on the learning challenge may help to penetrate the ambiguity	**Cognitive learning** focuses on content, processes that improve the creation of knowledge within a firm, and the implementation of such creativity (Fryer, 1999). By putting the right processes in place, OL can transform data into information, information into knowledge, and knowledge into action seamlessly, an asset to any company. **Dynamic capability**- capabilities are the systematic operating routines or management tools that enhance understanding of the casual linkages or interrelationships between the actions organizations take and the performance outcomes they obtain
Strategy Evaluation • Measure and Evaluate performance	Traditional strategic management methodologies are designed not to facilitate multiple variables or high levels of complexity defined as detail complexity. Senge (2006) This dynamic complexity is subtle and the effects occur over time and are not obvious.	**Visual spatial intelligence theory -**Ability to perceive, recognize patterns, interrelationships ,transform and modify those patterns and relationships into new cognitive understanding **Unification/System thinking theory** Systems thinking can be described as an initial feedback response that reveals how actions reinforce or counteract each other. It leads to an understanding that patterns or structures reoccur temporally. This learned ability is a method of describing vast interrelationship and their associated patterns. An organization that can develop this dynamic capability might be able to utilize it as a competitive advantage.

Hypothesized Relationships

It is theorized that the OL dynamic capability process should be an integral part of the entire knowledge evolution and transformation process. According to Winter (2002), codification can facilitate the generation of new routines or dynamic capabilities as well as identify gaps in existing methodologies. The cognitive exercise inherent in following a prescribed flow of events enables managers to synthesize and analyze information more effectively, thus combining codification with the deliberate and systemic incorporation of OL constructs, which should yield an improved learning output.

This proposed OL dynamic capability may reach beyond the strategic management sphere and enhance a host of other management areas. including human resource processes, information technology, or even research design techniques. This consideration suggests that an operational model or process (dynamic capability) can be established to yield a learning mechanism from a nonlinear dynamic OL system. It is further hypothesized that the resultant operationalized OL learning mechanism produced from an OL dynamic capability will improve firm performance and organizational learning more than traditional strategic planning methods. This subsequent systematic and operationalized OL mechanism should be more effective in driving OL and performance than outputs that have not undergone deliberate and systemic OL evolution. Figure 1 is an integrated schematic view of the relationships expressed in the proposition.

Product Portfolio Analysis: The Value T

From the OL dynamic capability a product portfolio analysis and planning tool (Value T) has been developed. Appendix E describes in detail how the OL dynamic capability was used to

develop the Value T. Appendix F exhibits the usage, variables, and characteristics in detail. A brief summation of the Value T incorporates the following key theoretical concepts:

- Systems thinking – feedback response and dynamic complexity.
- Double- and single-loop learning.
- Behavior learning – temporal qualities, gap assessment to external and internal stimuli.
- Visual intelligence.
- Tacit to explicit knowledge transfer.

The Value T strives to take extremely complex variables and combine them into a graphical or visual representation that enables managers to grow in their organizational learning abilities. The completed Value T in Figure 5 illustrates multiple products in a consumer industry at various price point market segments. As an example, Whirlpool the consumer product giant, could use this tool to evaluate several existing brands, strategies, actions, and performance over the course of seasonal and market cycles in a particular strategic business unit.

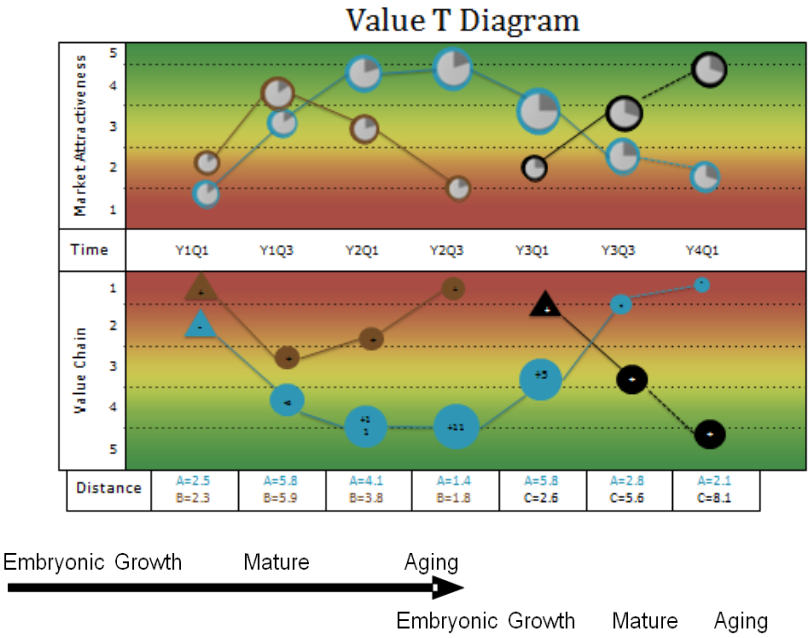

Figure 5. The Value T Diagram.

The key OL theoretical principles that form the foundation of the OL dynamic capability are translated, integrated and exhibited in the OL learning mechanism, Value T, in Figures 6-9.

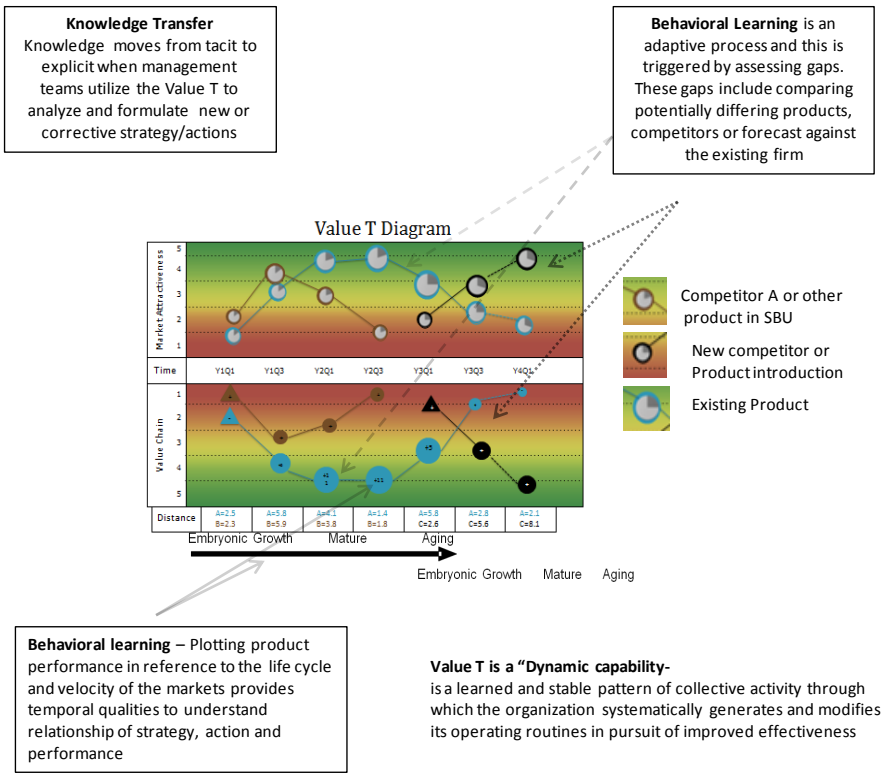

Figure 6. Behavioral Theory Representation.

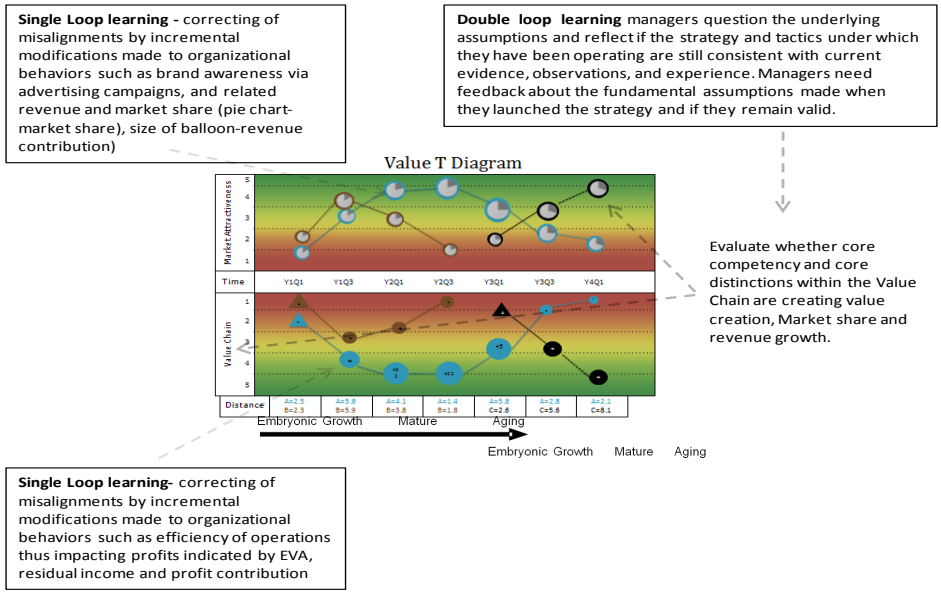

Figure 7. Single and Double Loop Demonstrated.

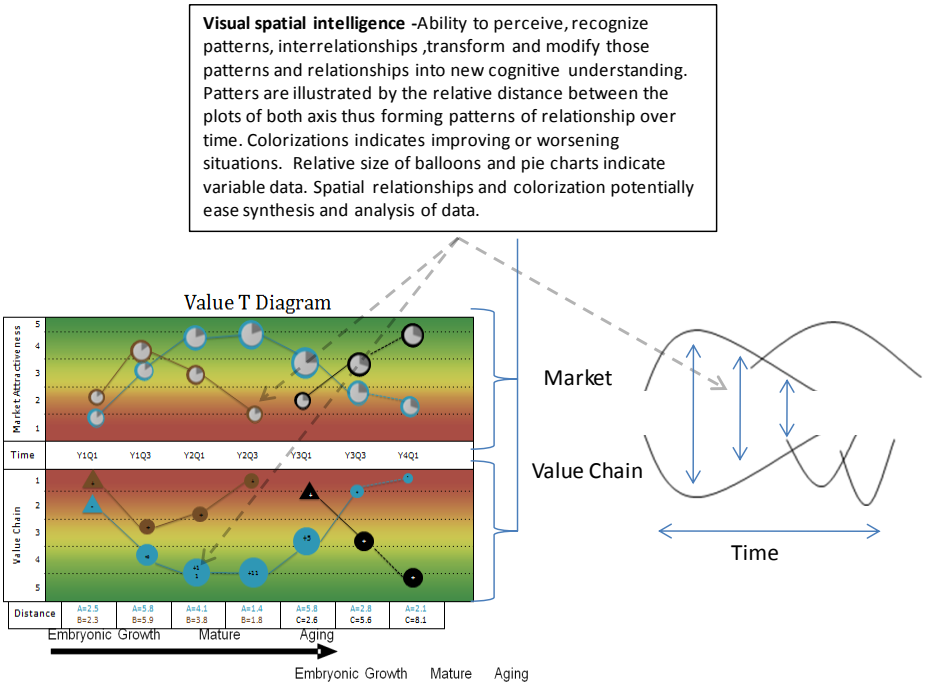

Figure 8. Visual Theory Relationship.

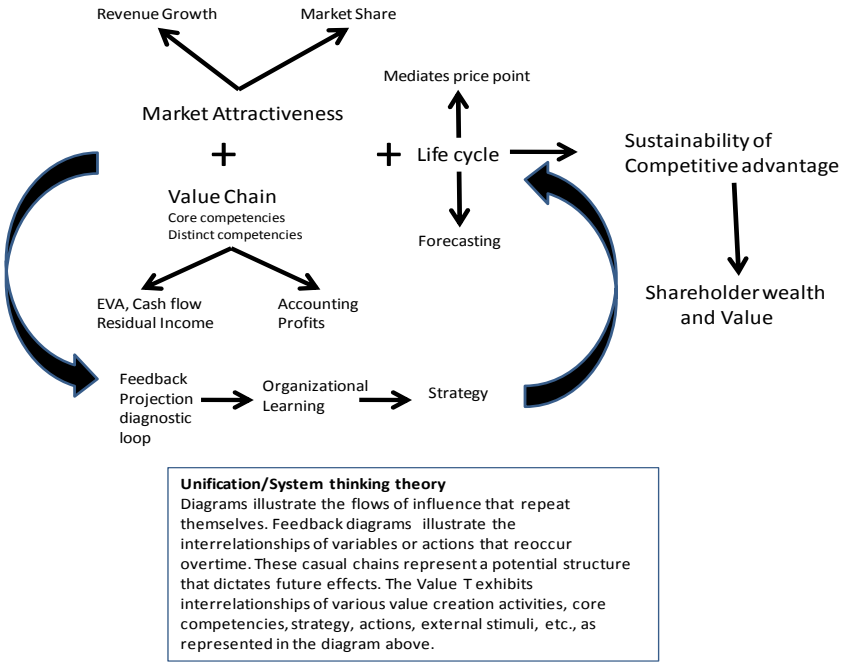

Figure 9. Unification theory.

Research Methodology

An experimental approach is employed so that variables can be controlled systematically. The control inherent in laboratory studies increases the ability to evaluate causal hypotheses and provides an effective method for testing, according to Schendel and Hofer (1979). The research design overcomes the two major weakness associated with field research, surveys, and focus groups. These designs can be flawed due to a lack of control for confounding variables and possible biases in sample selection and among sample populations (Schwenk, 1982). Field research indicates that obtaining sensitive and complex data identifying optimal measures for business performance is inherently problematic. Lopez (2005) stated, "Given the potential competitive implications, and difficulty of revealing and data mining such information, it is not surprising, that much of the OL and strategic management field research does not include direct data on firm performance indicators" (p. 123). Instead of asking respondents directly to report objective measures of their firm's performance, a more indirect approach for collecting data has been used. Respondents submit their perceptions of their company's performance in terms of profitability, sales, and growth. Studies (Dess, 1987; Powell, 1992; Powell & Dent-Micallef, 1997; Spanos & Lioukas, 2001) have measured firm performance in conjunction with limited published performance indicators via the New York Stock Exchange or other public venues. This research method is prone to low response rates, bias in perceived performance, and inability to isolate key variables and certain external stimuli.

Alternative research methodologies (e.g., a series of case studies, one in-depth case study, or use of a convenient event) are plagued with an inability to fully study the relationship and interactions of OL strategy and performance, which are central to the research questions. The

ability for managers to enhance performance is central to sustaining competitive advantage. These methodologies lack the ability to study the unique dynamic interactions of variables over time. The ability to observe treatments in a dynamic environment is critical to understanding causation and causal linkages of factors. Learning evolves in a time continuum. Strategy and action are linked through a progression of single and double-loop learning that occurs over time. Static or a series of static events do not lend themselves to understanding variables that evolve in a dynamic or fluid state.

The use of a simulated business environment is supported by Wolfe and Sutcliffe (1994), who concluded that a simulated environment is ideal for testing organizational learning and the mechanisms needed to assist that learning. The label *organizational learning* came from the world of business simulations when used by Cangelosi and Dill (1966) to describe the progressively more sophisticated decision-making behaviors engaged in by teams playing the Carnegie Tech Game (Cohen, Dill, Kuehn, & Winters, 1964). Also ,the RAND studies in the early 1950s on organizational learning created an analog simulation to study the U.S. early warning system.

A similar study to this research design conducted by Lock and Chesney (1991) used business simulations for exploring the relationships of business strategies on firm performance. They stated, "There are several reasons to believe that the results of this study have external as well as internal validity" (p. 36). First, the simulation used here included many major decisions found in real organizations and incorporated a highly dynamic task environment that simulated random change. A comprehensive review of numerous organizational behavior and human resource management goal setting studies by Locke (1986) indicated that researchers have

obtained the same basic results for studies conducted in the laboratory and the field. Thus, the results of using experimental methodologies are generalizable to real-world organizations (Locke, 1986). Further research supports the use of simulations as a research setting with results having both internal and external validity (Keys & Wolfe, 1990; Nees, 1983; Nees, Schwenk, Keys, & Wolfe, 2004; Schwenk, 1982).

To conclude this section, theory suggests that systematic codified OL dynamic capabilities can effectively synthesize and analyze knowledge, which are vital elements in organizational learning. The OL dynamic capability process presented integrates components of learning, behavioral, cognitive, systems thinking, and action. Because it incorporates codifications, a deliberate operational framework, and key OL constructs as central elements, this model is well positioned to fill the deficiencies and satisfy the needs identified in the literature review. The literature reveals a gap in both conventional and alternative theories of organizational learning in the context of operational framework mechanisms. To date, there has been little empirical test of specific operational OL codification frameworks (Hall, 2006). Chapter 3 offers such a test by operationalizing the proposition derived from the hypothesis and via statistical analysis test the hypothesis. Chapter 4 includes reports and results of the empirical test, and chapter 5 contains the results and implications.

CHAPTER THREE

METHODOLGY

Introduction

Chapter 3 describes the hypotheses, instrument, and methods of data gathering and analysis. This research hypothesis states that there is an approach to operationalizing OL, specifically that a codified OL dynamic capability can be configured that systematically operationalizes organizational learning concepts. Furthermore, the study focuses this concept in the area of strategic planning. The proposed OL dynamic capability may have the capability to evolve or enhance existing management tools, processes, mechanism, or systems into learning mechanisms that incorporate key OL constructs. These enhanced learning mechanisms may improve OL or advance performance in the organization. If the subsequent enhanced learning mechanism is able to improve OL, decision making, and subsequent actions, it may validate the ability to operationalize OL in certain organizational contexts. The enhanced learning mechanism produced by the postulated OL dynamic capability is termed the Value T and is a business unit portfolio analysis tool. Further, it is hypothesized that this new learning mechanism will improve OL and firm performance more than traditional portfolio tools that have not been operationalized with specific OL constructs. The experiment was applied in an undergraduate university setting using regularly scheduled semester courses. Students were configured randomly into control and experimental groups and evaluated using attitudinal surveys, a strategic-tactical scoring rubric and simulated firm performance.

Description of Research Design

The empirical testing of relationships of an OL dynamic capability, its resultant learning mechanism, OL, and firm performance were studied by applying a mixed-model approach to an experimental and control group of undergraduate students in their junior and senior years of study. The study was conducted in an industrial business environment that is simulated via an elaborate, long-term, computer-generated decision-making exercise. This university setting used base curriculum courses as part of a bachelor of science in business administration degree program. The classes are specific to teaching the concepts of strategic and tactical planning and their application to an international business setting and part of the progression of required courses. A business simulation environment has been an effective and routine aspect of the classes for several years. This classroom environment—incorporating lecture, case analysis, and simulations—has proved effective in the transfer of knowledge to students per university evaluation tools and major field test studies. These unique and distinct classes share the same web-based business simulation platform. The student teams are distributed across different business sectors in the simulation, with class content focused on differing functional areas of knowledge. The use of the same web based business simulation platform can create an opportunity for students to participate in multiple business sectors of the simulation at the same time due to dual enrolment across classes.

The semester courses used Wolfe's (2002) Global Business Game World Edition (GBW), which is a large-scale business simulation that requires strategic planning and efficient implementations on the part of its management teams. Undergraduate, graduate, and executive MBA programs use the simulation extensively. Advances in computer technology resulted in the

design of sophisticated business simulations that incorporate complex algorithms and allow the interaction of multiple participants. Moreover, it is the most sophisticated business simulation available and is far more complex than the Carnegie-Tech Management Game used by Cangelosi and Dill in their pioneering study of organizational learning. The most sophisticated simulations of this type are the GBW edition (Appendix D). This comparison matrix indicates the GBW offers the greatest number of decision choices and strategic options available for testing this study's hypotheses, thus making it an excellent testing platform. A brief description of the simulation is detailed below:

> Within the simulation the students take over an established company in the television set segment of the Video Equipment Industry. The company has a strong reputation and in good financial condition. Its goal is to take advantage of new business opportunities and increase wealth for themselves and the company's shareholders. Student teams compete at the global level by marketing and selling their products in up to six countries. Just as in the real-world global business environment, students weigh the pros and cons of manufacturing the goods in their home country versus offshore production. They learn to manage and optimize their firm's distribution channels through the network of international distribution centers, company owned and independent wholesalers and sales offices. They face the challenges of just-in-time supply throughout the world by managing their firm's logistics and shipping options. The Business simulator delivers well balanced strategic exercise by giving students equal amount of exposure into each business function of an international company. In order to be successful, students must master strategic level decision-making in marketing, logistics, distribution, production and quality control, as well as finance. (Innovative Learning Solutions, 2010)

The GBW design incorporates knowledge of market behavior, competitive impact, and environmental influences gained from business literature. Thus, the GBW world behaves globally like most business markets. It can operate on various levels of complexities and turbulence (Wolfe, 2005). It was operated in its most dynamic and complex state striving to emulate real-world possibilities.

An experimental approach was employed so that variables could be controlled systematically. According to Schendel and Hofer (1979), the control inherent in laboratory studies increases the ability to evaluate causal hypotheses and provides an effective method for testing. The research design overcomes the two major weaknesses associated with field research, surveys, and focus groups: lack of control for confounding variables and possible biases in sample selection and among sample population (Schwenk, 1982).

Field research indicates that obtaining sensitive and complex data identifying optimal measures for business performance is inherently problematic. Lopez (2005) stated, "Given the potential competitive implications, and difficulty of revealing and data mining such information, it is not surprising, that much of the OL and strategic management field research does not include direct data on firm performance indicators" (p. 123). Instead of asking respondents directly to report objective measures of their firm's performance, a more indirect approach for collecting data has been used. Respondents submit their perceptions of their companies' performance in terms of profitability, sales, and growth. Research studies include various measures of firm performance in conjunction with a limited array of published performance indicators via public data venues (Dess, 1987; Powell, 1992; Powell & Dent-Micallef, 1997; Spanos & Lioukas, 2001). This method has been shown to produce low response rates, bias in perceived performance, and an inability to isolate key variables, confounding variables, and certain external economic stimuli. The use of a controlled simulation environment corrects this situation. Wolfe and Sutcliffe (1994) concluded that a simulated environment is ideal for testing organizational learning and the mechanisms needed.

In the present study, students worked as management teams in the marketplace of the business simulator. An industry in the simulation includes six companies all vying for the same markets if chosen by each firm. Each team was responsible for managing a company for a period of up to eight simulated quarters. Decision makers were presented with internal and sales data as well as inflation, financial indicators, and gross national product figures. In addition, decision makers purchased additional research survey reports on evolving market behavior and competitive activities. These reports and studies were generated from competitor activity and were unique to each industry or each set of six competitors.

Using students as subjects provides a controlled environment and employs a research methodology widely adopted in the literature (Dickinson, Gentry, Burns, & Wolfe, 2005; Glynnn, Lant, & Milliken, 1994; Lant & Mezias, 1990; Nees, 1983; Schwenk, 1982). Ample evidence has been presented authenticating the effectiveness of computer-based general management games as vehicles for teaching strategic management (Faria, 2000). The student sample incorporated 65 business majors enrolled in three classes during one semester from a private university. They managed 23 separate management teams in identical business sectors. These management teams (firms) comprised 2 to 3 students each. Figure 10 illustrates the study group breakdown. Due to logistical constraints imposed by the University's registration and enrollment policies and practices, only seven teams were used in the final analysis.

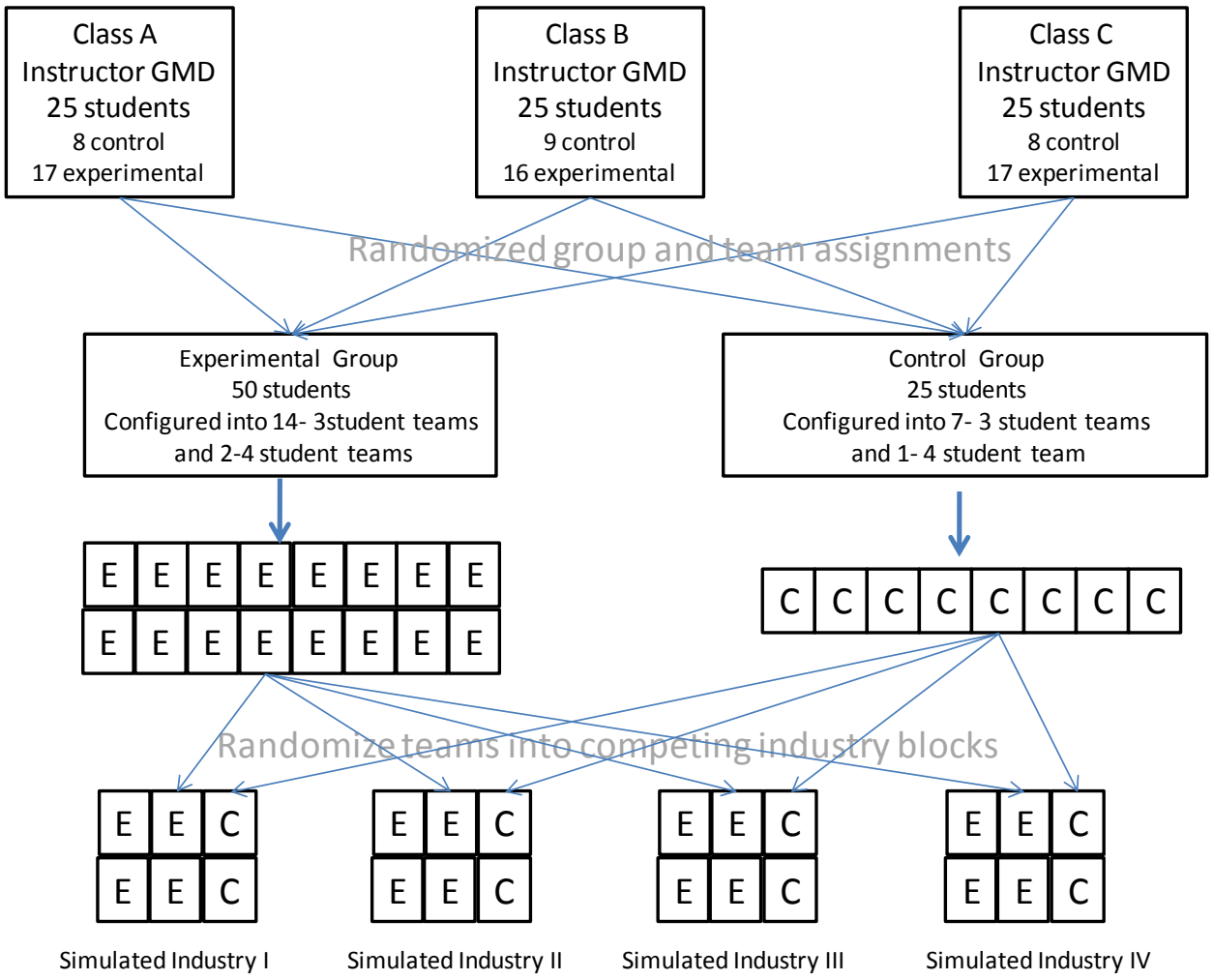

Figure 10. Study Group Segmentation.

An initial equilibration phase (Figure 10) of the simulation was used to acclimate players to their team members, apply strategic planning principles, incorporate market data, and navigate the simulation. This equilibration phase used the Americas edition of the Global Business Game simulation for four decision periods. After this initialization experience the study groups engaged in the World Edition, whereby longitudinal qualitative and quantitative data were gathered at prescribed frequencies in the simulation. Both editions have identical navigation controls, report

functions, and decision formats. They differ in the span of markets, global distribution, location of manufacturing opportunities, and types of products. The simulation experience was designed to require subjects to make decisions under circumstances that simulate organizational conditions; multiple controls were placed on the design to avoid confounding effects on performance. Data were collected from simulation outputs, questionnaires, and external assessment by the researcher in the form of team reports. Using students in a simulated business environment and strategic management research spans over 25 years and is a proven research platform (Faria, 2000).

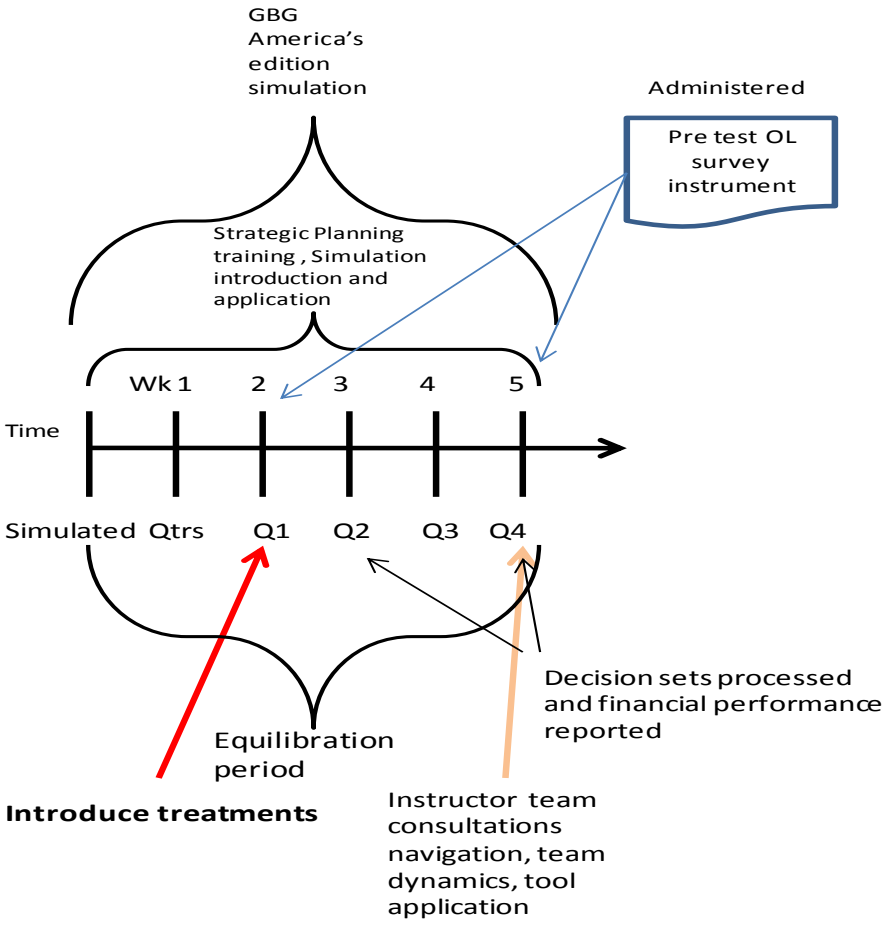

Figure 11. Equilibration Period.

The simulation experience is designed so that subjects are required to make decisions under circumstances that simulate real-world scenarios:

1. Company history and economic and sales data from the player's manual are available via the simulations website. Each team had ample time to become familiar with the strengths and weaknesses of their company, the impact of past strategy, and competitors' products and marketing strategies. An initial, required management report (SWOT experiential exercise) from each team at the end of this period (1 week) ensures that teams analyzed historical data and were familiar with the simulated business environment reports.
2. During the simulation's equilibration and actual study phases, teams prepared action plans and decisions for each quarter. Three to four days after receiving performance results, teams prepared plans for the following quarter. Using this procedure simulates the time and delay inherent in real-world business planning, allows participants to analyze and discuss performance results of past strategy and new research information, and allows recycling through the decision process if necessary before final strategy changes are made for the period (Haskell, 1987).
3. Subjects participated in the simulation during their junior and senior year of studies. Thus, decision makers were subjected to many other obligations and time pressures besides those of the simulation. Decision making, therefore, took take place in the midst of interruption, delays, time constraints, and conflicting priorities and schedules—an environment consistent with the brevity, variety, and fragmentation of effort that characterizes managerial work (Mintzberg, 1976).

The simulation began with teams (firms) in equal starting positions in the market. Initial starting positions included historical data in the player's manual. Customized reports, specific to their situation, provided each team vital operational information and corresponding marketing research data. Subject teams developed their initial strategy for the first quarter based on this historical data and operational instructions provided in the student manual. Performance results and marketing research information were generated following input of the selected strategy by each of the six teams in their industries. In subsequent play, confidential data were provided to subjects in each company at no cost; additionally, teams had the option to purchase selected marketing research reports. All objective data were captured in a database for future analysis.

Internal and External Validity

The validity of business simulation software as a testing method is supported by Wolfe and Luethge (2003). They stated that high game performance is not the result of luck or random guesses and that a business simulation rewards intelligent, planned, decision-making practices. Demonstrated results provide further credence to the notion advanced by Bonoma (1985) and tested in a game context by Wolfe and Chanin (1993). In this test, it was shown that outstanding simulated company performance is brought about through the careful integration of strategy and tactics.

Cangelosi and Dill (1965) found that as simulated firms became more organized in their planning processes they became more capable over the course of their life cycles. This finding supports the validity of using a simulated business software model in a controlled experiment format for determining casual effects in the planning process. Wolfe (2003) stated further,

> We are not questioning the value of simulations as learning tools for participants, but we are observing that their value as experimental laboratories for research purposes may be limited to such areas as examining the organizational learning process, testing of management systems, leadership ascendancy and group decision-making dynamics (p. 73).

Because the situation into which the players are placed demands the production of a real decision that has consequences for the group and each member has partial bits of knowledge that may or may not be shared or invoked, group dynamic processes must come into play.

The realistic *tabula rasa* created by a simulation, in an observable laboratory setting, also generates archival decision inputs and company results, tracking a firm's evolutionary processes from team growth to maturity. The simulated environment is ideal for testing organizational learning and the mechanisms needed to assist that learning. A similar study to this research design by Lock and Chesney (1991) used business simulations for exploring the relationships of business strategies on firm performance with a sample of 102 graduating seniors representing 34 organizational teams across three class sections.

First, the simulation used here included many major decisions found in real organizations and incorporated a highly dynamic task environment that simulated random change. Second, participants were free to make their own decisions. And although the initial conditions of both the simulation and the participants were identical, except for the goals assigned to participants, the firms emerging at the end of the game were different from each other and yet had strategies highly similar to those found in the theoretical literature. There are similarities using three different measurement approaches. Finally, the goal-setting results should also be generalized to

real-world organizations. A comprehensive review of numerous organizational behavior and human resource management goal setting studies by Locke (1986) indicated that researchers have obtained the same basic results for studies conducted in the laboratory and the field. Thus, the results of experimental methodologies are generalized to real-world organizations (Locke, 1986). Further research supports the use of simulations as a research setting with results having both internal and external validity (Keys & Wolfe, 1990; Nees, 1983; Nees, Schwenk, Keys, & Wolfe, 2004; Schwenk, 1982).

For the purpose of validity and credibility, this study employed previously established means to measure each construct. Similar studies used these measurement items and discovered them to be both valid and generalized. Organizational learning was measured via a survey instrument (Appendix A) used in research by Hansen and Sobera (2003), Doggett (2004), Hansen (2004), and Choo (1998). Choo's research followed Devilles (1991) recommendations for scale development. Choo developed an attitudinal survey for determining the relationship of OL constructs. Factor structure of questionnaire items was tested through exploratory factor analysis (EFA) using principal components extraction with varimax rotation, assessing both scree plots and eigenvalues to identify the appropriate number of factors and evaluate adequacy of extraction. Convergent validity of scale items were assessed using confirmatory factor analysis (CFA). Corney and Lee's (1992) criteria were applied to evaluate convergent validity of factor loadings. Discriminate validity was assessed by identifying whether any items load substantially on more than one factor, as well as by evaluating among the factors. To assess power, Cohen's (1977) work was applied and the validity of the instrument was rated at .87.

The Strategic Management Skills Questionnaire (Appendix A) was created and used by Stumpf and others in New York University's Management Simulation Projects Group (Dutton & Stumpf, 1988; Stumpf, 1988a, 1988b, 1990). Two expert game players obtained scores of 86.7 and 93.3 on the Strategic Management Skills Questionnaire during its test phase of the initial studies. Subsequent research has provided evidence that the instrument exhibits consistent validity (Wolfe & Chanin, 1993).

Reliability

Reliability can be defined as the consistency of measurement, or the degree to which an instrument measures the same way each time is used under the same conditions (Rubin 2010).. Several controls were placed on the design to avoid confounding effects on the experiment and enhance its reliability:

1. Each company and student had equal Internet access to all internal (for their company) and external (marketing and benchmark research) data.
2. Each company made decisions in the same time frame: one set of decisions every three to four days. No team was allowed to submit its decisions past the deadline.
3. Each company began the simulation experience in an equivalent position to its competitors in terms of product strength and financial position.
4. Special measures were taken to avoid the possibility of collusive efforts in either data analysis or decision making among companies. Only the researcher had access to distinct company identifications for control purposes. Simulation feedback was distributed only on presentation of an identification number unique to each company by the software design. This precaution was taken to avoid theft or casual perusal of competitive

information. Each team player had a unique password that they created to access firm data. Each company action was compared to others to determine degree of similarity. Within similar action plans, supports for actions were investigated to ensure linkage among analysis, decisions, and actions. Even though these precautions were taken, collusion across teams occurred among six students who were dual enrolled in two of the classes using the simulation.

5. It was vital for the reliability of the experiment that each player actually (a) use the management tools for each and every decision round made in the experiment (b), use the management tools correctly, and (c) be actively engaged in the simulation program. If these factors were not controllable, the experiment would not have been able to determine if the Value T or traditional methods were related to differences in company performance or OL, thus confounding the results. To ensure these variables were controlled, team interviews took place after four quarters of the simulation, and a strategic position paper was written outlining strategy and role of treatments in the strategic planning process (SWOT experiential exercise incorporating treatments). In addition, action plans recorded on the associated tool were compared to actual actions taken in the simulation. The researcher used the activity function of the simulation to determine level of engagement by team and player. Each team was also trained and tested in using and understanding the various management tools prior to the experiment to ensure they were able to use the tools correctly. Players were prepared technically regarding the game rules, operations, and possible strategic moves via a precalibration period.

6. A pretest of the strategic planning model tools, both control and experimental, was administered prior to the simulation beginning to ensure student knowledge and understanding of the strategic planning processes.

Prior to being introduced to the business simulator, all subjects completed 3 weeks of traditional case and lecture study in strategic planning and analysis. Students were randomly assigned to a team that managed one of six companies in identical industries, so teams competed against one another in a given industry.

Previous research using these measuring instruments has demonstrated consistent Cronbach alpha coefficients. Pre-, intermediate and posttests were computed for correlations in OL constructs and strategic skills, and were segmented by each student and each individual firm. Estimates for reliability were determined across segments.

Target Population

The study population consisted of full-time junior and senior business students enrolled in three courses: strategic management and two sections of production and operations management, thus creating an opportunity for students to be enrolled in two of the three classes simultaneously. Participants were divided into a control and an experimental group. Prerequisite courses included Principles of Accounting I and II, Production and Operations Management, Principles of Marketing, Organizational Behavior/Human Resource Management, and Principles of Business Management. Each industry's participants were analyzed statistically regarding grade-point average, test grades, age, and the proportion of business school majors (accounting, business administration, and computer information systems). This analysis was completed after

randomization to ensure that the teams were not skewed. Drops and incompletes were monitored to ensure no statistical impact on population demographics occurred.

Treatment

It was hypotheszied that a systematic process (dynamic capability) can be established to yield a learning mechanism from a nonlinear dynamic OL system. It was further hypothesized that the resultant operationalized OL learning mechanism produced from an OL dynamic capability will improve firm performance, strategic planning capabilities, and organizational learning more than traditional strategic planning methods.

$H1_0$: There is no significant difference between OL-based-business unit strategic planning portfolio analysis and a traditional business unit strategic planning portfolio analysis method.

$H1_1$: Operationalized OL-based business unit strategic planning methodologies improve organizational learning significantly more than traditional business unit strategic planning methods.

$H2_{0:}$ There is no significant difference between intentionally designed and operationalized OL strategic business unit planning processes and their traditional counterparts with respect to firm performance, specifically profit and return on assets.

$H2_1$: Designed and operationalized OL-based business unit strategic planning portfolio analysis improves firm performance significantly more than traditional business unit strategic portfolio analysis methods.

$H3_0$: There is no significant difference between OL-based-business unit strategic planning portfolio analysis and a traditional business unit strategic planning portfolio analysis.

$H3_1$: Designed and operationalized OL-based business unit strategic planning portfolio analysis will improve strategic planning skills significantly more than traditional business unit strategic planning methods.

The independent variables in the context of Business Unit Strategic product management were as follows:

A. OL designed planning process (Portfolio Analysis) Value T

B. Contemporary planning process (Portfolio Analysis) BCG and McKinsey matrix

The treatments associated with the independent variables were introduced during a special training session held outside of normal class schedules to enable complete randomization of control and experimental teams across the classes. The control group was trained in the traditional BCG and GE/ McKinsey portfolio methods (David, 2005). Appendix C contains an instructor lesson plan that outlines the special training session. The experimental group was trained in the OL-based learning mechanism Value T, as described in chapter 2 and Appendix F. Both treatment groups were tested during the equilibration phase of the study to ensure synthesis and the ability of the teams to apply the treatment in the simulation correctly.

Control and experimental groups underwent identical strategic planning education, with the exception of portfolio analysis tools, for the first 5 weeks of the semester. Their competency in understanding the strategic planning process was evaluated by multiple choice quizzes. The entire study population achieved a grade higher than 70%. The strategic planning treatment for

both groups was based on a strategic planning model developed from Malcolm Baldridge Award-winning companies and generic models from the literature (David, 2005). Appendix C consists of the specific treatment of both control and experimental groups.

The dependent variable firm performance constituted actual simulation firm performance. The major components were return on assets and firm profit. Tactical performance indicators for quality, delivery, and financial strength were also reported quarterly. These measures are generally accepted in industry as key indicators of firm performance (Garrison, Noreen, & Brewer, 2006; Kaplan & Norton, 1993). The simulation software generated firm performance every quarter, both individually for the quarter and cumulatively. This allowed analysis of longitudinal data throughout the study. Using an attitudinal survey in conjunction with a strategy selection rubric and actual performance data for measuring firm performance provided a multimethod approach that supported triangulation of data.

Instrumentation

Central to the research analysis were the organizational activity reports, which described strategies, analysis of performance data, functional organizational activities, treatment use, and tactical implementation. These reports were submitted longitudinally across the research study, making it a powerful format for studying the process. An example of a team activity report is included in Appendix J. Other sources included research journal notes, team debriefings, attitudinal survey data (Appendix A and B), simulation activity reports, and team member discussion. For the H_1 hypothesis, organizational learning was measured via a 7-point Likert scale (Appendix A). The variable of OL had five constructs: behavioral learning, knowledge transfer, systems theory, and cognitive learning. Each construct was measured using questions on

the OL survey. This instrument is similar to those used in other studies (Choo, 2002; Dogget, 2003; Easterby-Smith & Araujo, 2000; Hansen & Sobora, 2003; Tippins & Sohi, 2003; Zollo & Winter, 2002). Subjective attitude and use data from the management teams were collected by questionnaire after the first two quarters and subsequently every two quarters (as indicated in Figure 12), allowing pre-, intermediate and post data analysis. Additional information concerning potential covariates of attitude and use was collected to eliminate potential competing explanations. Attitudes on team strategy and actions were also studied. These attitudes were an essential component of evaluating a successful strategic planning model. This was achieved via scheduled team reports. Specific questions (Appendix A) were asked to ensure consistency in these sessions. Sections of this instrument captured respondents' perceptions of their firms' strategy, tactical decisions, and actions in the context of OL. The instrument has been validated using factor analysis and correlational analysis in previous studies (Doggett, 2004; Hansen, 2006).

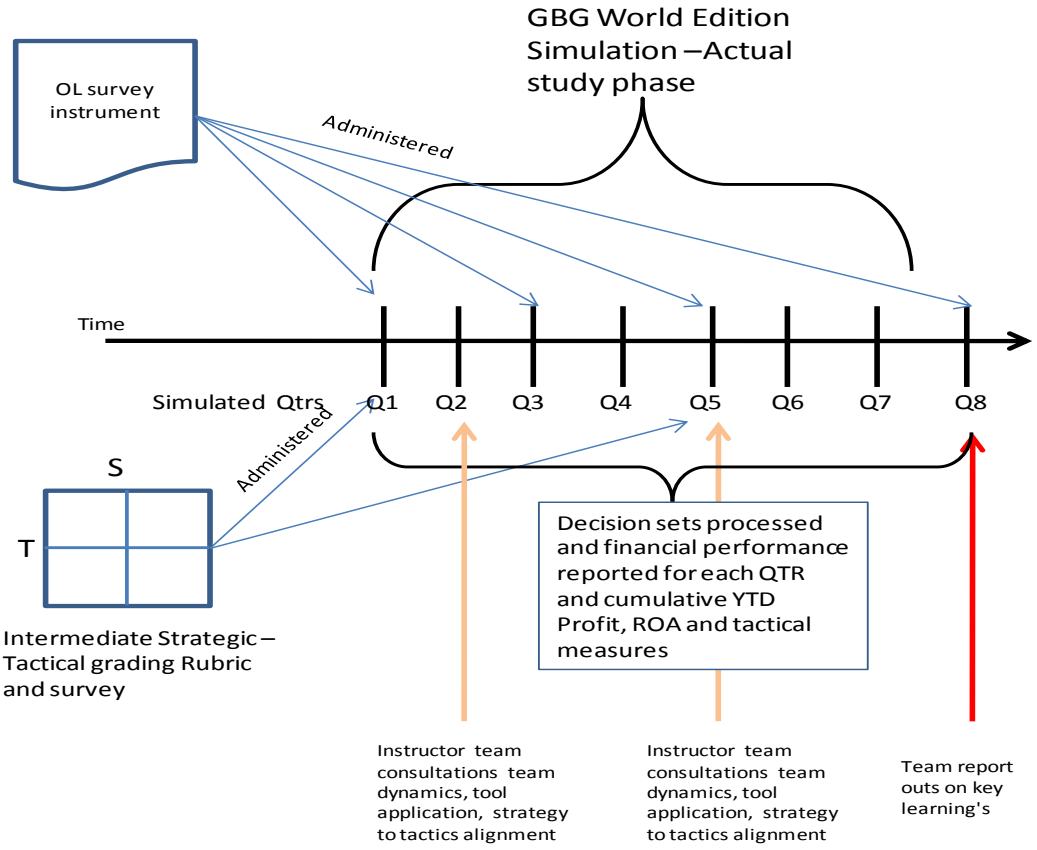

Figure 12. Key Study Milestones and Logistics.

The H_2 hypothesis was measured using each team's simulated firm performance. The firm's profit and ROA were weighted equally and an index was generated by the software giving a rank order index of each team's performance, which was used to determind statistical significance. The business simulation software automatically produced a facilitator report every quarter.

For the H_3 hypothesis, an integrated functional and strategic management skills rubric and survey were used to measure the effect. The two independent variables were measured in both functional and strategic skill development and facilitation. The strategic skill level was determined before, during, and after via a strategic management skills questionnaire developed by New York University's Management Simulation Projects Group (Dutton & Stumpf, 1988;

Stumpf, 1988a, 1988b, 1990). The survey was administered longitudinally across the equilibration and experimentation phases of the study in order to determine changes in player strategic skills and tool use.

Data Collection Procedures

Data were gathered using an electronic surveying instrument that was web hosted by the research university. This collection mechanism has been used extensively in research as a data collection forum. Each student had independent access to this site with password protection. This forum allowed complete confidentiality of survey answers and kept electronic records of completion rates and time stamps of each instrument record. The forum electronically calculated statistical parameters for the responders and segmented students into identifiable categories as outlined by the research design. Survey instruments were administered per time intervals, as indicated in Figure 8. Simulation results were computer tabulated automatically for each quarter and were part of a comprehensive facilitator report available through the software. The respondents had 7 calendar days in which to complete the instrument. Each student was e-mailed when the survey was due and had automatic e-mail reminders until their assigned survey was completed.

Data Analysis Procedures

The study's variables were assessed through multiple screening methods prior to in-depth analyses. Distributions were inspected for range and completeness, normality, outliers, and multicolinearity. Data fell into normal distributions, with no out-of-range values, for all source variables used in constructing the study's control factors, dependent variables, and factor scores. Normality was assessed for all variables. All variables were screened for the presence of outliers,

both univariate and multivariate. Univariate outliers were tested by examining standardized scores of all firms along each variable, and multivariate outliers were evaluated. A conservative cutoff of $p < .05$, as suggested by Tabachnik and Fidell (1996), was used.

Each industry's participants were analyzed statistically prior to the start of the simulation in order to obtain homogeneity between control and experimental groups. Striving for normality in the distribution of students was important for controlling for confounding variables. This analysis and potential redistribution of students was limited to the constraints of the classroom setting. The researcher strived to balance the groups without undue stress to the student. It was paramount that academic integrity and a positive engagement of students were maintained throughout the study. As a result, student learning took priority over the requirements of the research design, which led to some student assignments that partially contaminated the results. Placing students in groups outside their selected classes may have had a negative impact on attitudinal data. Group demographics included the following variables: grade-point –average, age, country of origin, gender, and proportion of specific business majors.

The sample size of 65 and 23 teams provided an adequate quantity for statistical analysis. Major studies with similar simulations used sample sizes ranging from 50 to 102 (Chesney & Locke, 1991; Nees, 1983). This sample size is primarily a result of class size, limitations of the number of virtual companies in the simulations, and the academic calendar year. However, the number of responses may affect the study's inferential power, or ability to detect significant relationships among the study's variables. To assess probable power, Cohen's (1977) research was used. To cross-validate the OL construct, Pearson correlations were calculated between the construct answers derived from the questionnaire and corresponding financial measures obtained

from the GBG simulation. Hypothesis 1 was tested using parametric matched-pair *t* tests of significance per treatment group. Survey data were clustered by construct and a summative value was used for analysis for each construct category.

Hypothesis 1 tested the degree to which organizational learning is affected by the unique treatments of the independent variables. Differences in early to end means were calculated to determine level of change between treatment groups with paired *t* test applied to determine statistical significance.

Hypothesis 2 tested the relationship of the unique treatments and their effects on simulated firm performance. The treatment group means were listed and compared for ROA and Profit via an independent *t* test to determine statistical significance. This analysis compared end of simulation performance by treatment. Spearman rhos were calculated to determine correlations between each of the supporting organizational learning constructs and simulated firm performance. Rank order was established among firms across industries in order to combine the results.

Hypothesis 3 was tested using parametric matched-pair *t* tests of significance of means per treatment group. Hypothesis 3 portrayed the degree to which strategic skills are affected by the unique treatments of the independent variables. In addition, differences in early-to-end means were calculated to determine level of change between treatment groups, with paired *t* tests applied to determine statistical significance. Questions and scores on the survey were clustered into specific categories to give a summative value, which enabled use of parametric measures in the analysis.

In order to understand the correlation between specific strategic skill sets and firm performance a Spearman rho was conducted. To determine univariate effects for each dependent variable (OL, strategic skills, and performance) an ANOVA was performed using SPSS.

Pilot Study Findings

Due to the potential complexity and dynamics involved in administering a simulation in a university setting, a pr-study was conducted in the spring semester of 2010 to educate the researcher and evaluate an initial design of the study. This research administrator was coached and assisted by the software designer, Dr. Joseph Wolfe, to ensure proper instrument use, study design, and facilitation. The prestudy population consisted of three classes with 76 junior and senior students for 12 weeks. The key findings are summarized below and were used to redesign the target study for greater reliability and validity. The researcher, university department chair, and the simulation's designer, made the following determinations based on interviews, student team surveys, and focus groups:

- **Intermediate measure** – An instrument was needed to enhance the initial research design's ability to measure the portfolio tool's capability in helping teams choose the appropriate strategy. A method was also needed to determine the quality of strategic decisions. The results from this instrument can be analyzed and correlated with the actual firm performance and OL instrument.

  Action: The researcher added a strategic skills survey instrument with analysis of team activity reports. This enabled triangulation of the data by determining the correct and quality of the strategic decision made by the teams.

- **Equilibration phase** - A calibration phase was needed prior to measuring the OL constructs, firm performance, and quality of strategic and tactical decisions. The prestudy revealed that simulation navigation was a major factor and potential confounding variable in simulated firm performance. In addition, team interviews and on time submitted decision sets revealed that interpersonal and team dynamics were in a state of flux and did not appear to stabilize in the teams until after the initial 4 weeks.

  Action: A 4-week calibration phase was introduced to equilibrate the student teams in reference to team dynamics, software navigation, and tool use. This was achieved by having the study's subjects play the America's Edition for familiarization purposes before engaging in the game's World Edition.

- **Instrument** clarification - Survey focus groups revealed confusion on certain questions. It was determined that students lacked the basic knowledge to understand OL terminology and concepts to adequately respond to certain survey questions consistently. Although instruments had been validated by previous studies, there was an opportunity to enhance the question syntax to ease understanding.

  Action: The wording of certain questions was changed for better understanding, and an OL education segment was added to the 6-week initial student training component and calibration phase. Rewording of specific questions was reviewed with student teams for better understanding.

- **Randomization of control and experimental groups across classes** - Individual classes received differing lectures due to instructor conflicts with class schedules,

campus activities, or unexpected demands. Differing learning rates were noticed among classes by instructors due to significant changes in demographic makeup, specifically the concentration of international students in one class.

Action: Introduce experimental and control portfolio training in special sessions, whereby control and experimental groups were mixed across classes. The study population was divided into 14 experimental teams and seven control groups across the study population and class segmentation.

The following items were also identified as a result of the prestudy:

- Payment of simulation costs influence timing and level of individual student software engagement. The university made the payment.
- Class grading affects level of student engagement. Assign grade based on level of participation.
- Quizzes ensure synthesis of general SPP and OL knowledge by students at key milestones.
- Clarity of when decision sets are due by teams needs to be reinforced with high visibility. The research employed automatic e-mail reminders.
- Dual enrollment was not discovered until after the fact. Corrective actions were developed to address deficiencies in the initial study design.

Role of Researcher

The role of the researcher in this study was two-fold:

1. The researcher was the principle administrator of the study, including data collection and analysis. In this capacity the researcher gathered data via team interviews, surveys, presentations, and question-and-answer sessions at prescribed intervals. Team interviews were conducted via a scripted procedure to ensure uniformity across team sessions. Anonymity was ensured with coded identifiers in statistical calculations and summations. Teams and individuals were created with a randomized number generator. The electronic instrument used for data collection did not allow for independent editing, manipulation of answers, or calculations once the collection format was established.

2. The researcher was the instructor of the three classes that participated in the study; thus, there was the potential for instructor bias in treatments. The clas room environment and content were scripted via a class syllabus, with oversight by the researcher's department chair. An independently administered class evaluation was used to determine if these classes exhibited any statistically different characteristics versus other classes in or external to the study.

Protection of Human Participants

This study conformed to all research guidelines as proposed by the Baker College Institutional Review Board (IRB). In order to protect the rights of human participants, the following steps were taken:

Subjects identified

- Source and selection criteria of subjects were fully identified as university students enrolled in normal academic studies.
- The instructor of the classes was also the researcher.

Informed consent form

- All relevant informed consent forms were filled out (see Appendix H).
- Consent forms were based on Baker College sample.
- Appropriate language was used.
- Sample questions were included and explained.
- Withdrawal notice was included in packets.
- University department granted independent approval.

Procedure outlined

- Step-by-step description of each procedure step was provided in the class syllabus and letter to participants (see Appendix G).

Confidentiality

- All forms and data were kept under strict security. Written documentation was stored in a locked file cabinet only accessible via a locked office. Only the researcher and department chair had access to information. All electronic data were encrypted and protected via a password and only available to the researcher. Confidentiality was explained in procedures and consent forms. Final individual grades and names were not released. All analysis of data used coded information to ensure privacy.

Risks

- There was no impact on final grade due to answers on attitudinal survey or the simulation results. There was no adverse risk to the student's academic program.

Benefits

- Students enhanced their understanding and application of organizational learning concepts, which is valued by business in the real world. In addition, students were able to learn new strategic and functional methodologies that will enhance their understanding of strategic and tactical business planning.

Summary

This chapter summarized the methods used in a study of the relationships among organizational learning, OL operationalized dynamic capabilities, and subsequent learning mechanism, as well as their relationship with firm performance in the context of a simulated industrial environment, allowing for control of contextual factors not addressed by prior field research. Figure 13 illustrates the research design. This study thus provided a conceptually focused yet empirically extensive and rigorous test of the effectiveness of a proposed systematic OL dynamic capability and its subsequent learning mechanism, Value T, for value creation and sustainment.

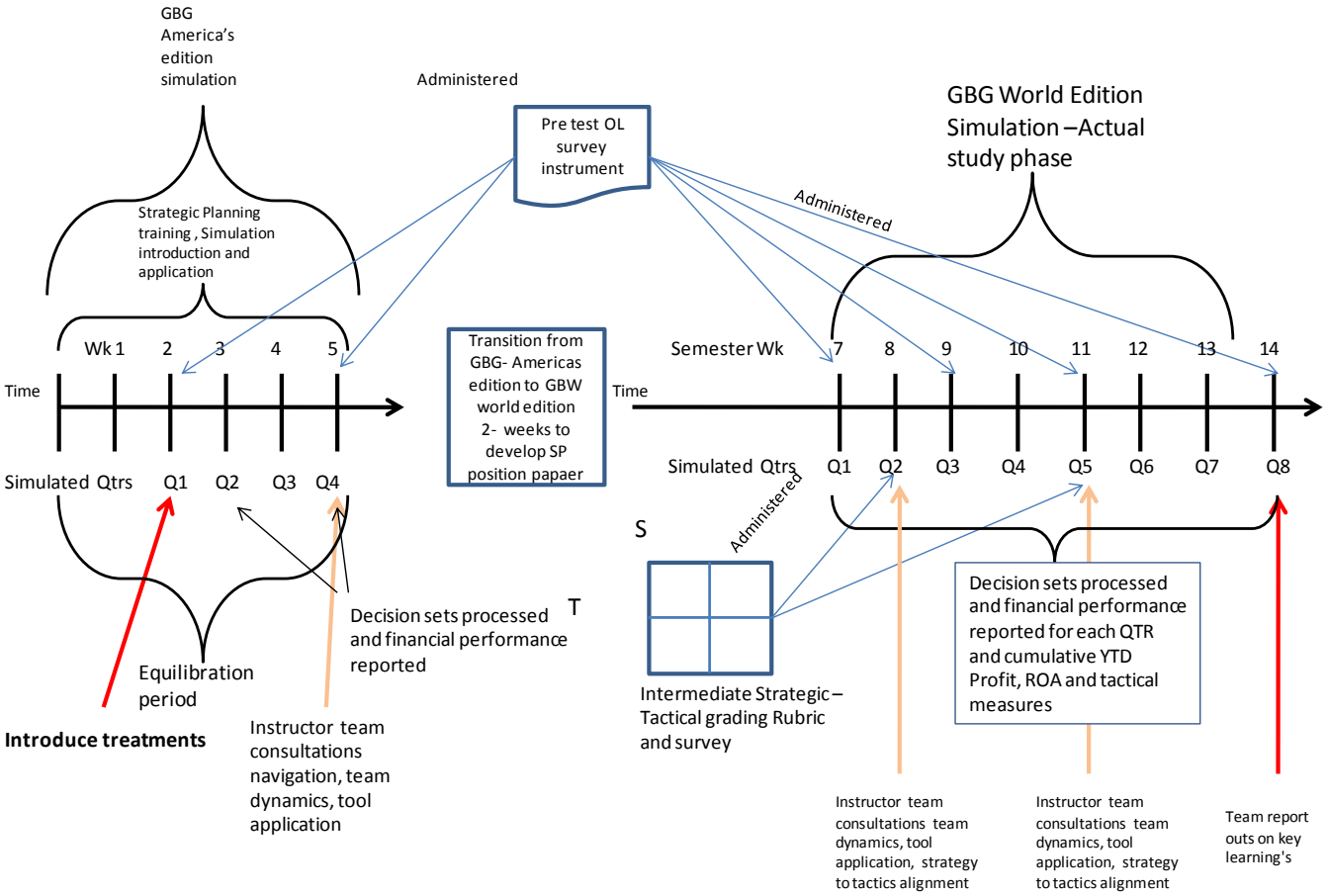

Figure 13. Research Design and Timeline.

Chapter 3 summarized the study's methods, population, control for confounding variables, instrumentation, data collection, and the statistical methods used to analyze the data to test the hypotheses. Chapter 4 includes the results of the statistical analyses, and chapter 5 consists of results, implications, and limitations of the present study

CHAPTER FOUR

RESULTS OF THE STUDY

Introduction

This study found that in simulated organizations, operationalized OL mechanisms appear to yield improvements in organizational learning and firm performance, which suggests that a fundamental order and structure process can be established to yield an operational framework from a dynamic and fluid system such as organizational learning. This chapter has four sections. The first section reviews the original research design and inconsistencies that occurred during implementation. The second section presents screening of the data prior to substantive analyses and validation of the questionnaires. Section three presents qualitative results with triangulation from multiple research collection nodes, with alternative implications explored. The last section provides a summary of results, with implications for answering each research question.

The empirical testing of relationships of an OL dynamic capability, its resultant learning mechanism, organizational learning, and firm performance were studied by applying a mixed-model approach to an experimental and control group of undergraduate students in their junior and senior years of study. The study was conducted in an industrial business environment simulated via an elaborate, long-term, computer-generated decision-making exercise. This university setting used base curriculum courses as part of a bachelor of science in business administration degree program. The classes cover strategic and tactical planning and their application to an international business setting and are part of a progression of required courses.\

Inconsistencies in Research Methodology

The original research design targeted a student sample size of 65, distributed among 20 firms enrolled across three classes. These management teams (firms) were designed to have 2-4 members each. Figure 10 illustrates the study group breakdown per the original research design.

Inconsistencies occurred from the original research design and are highlighted in Figure

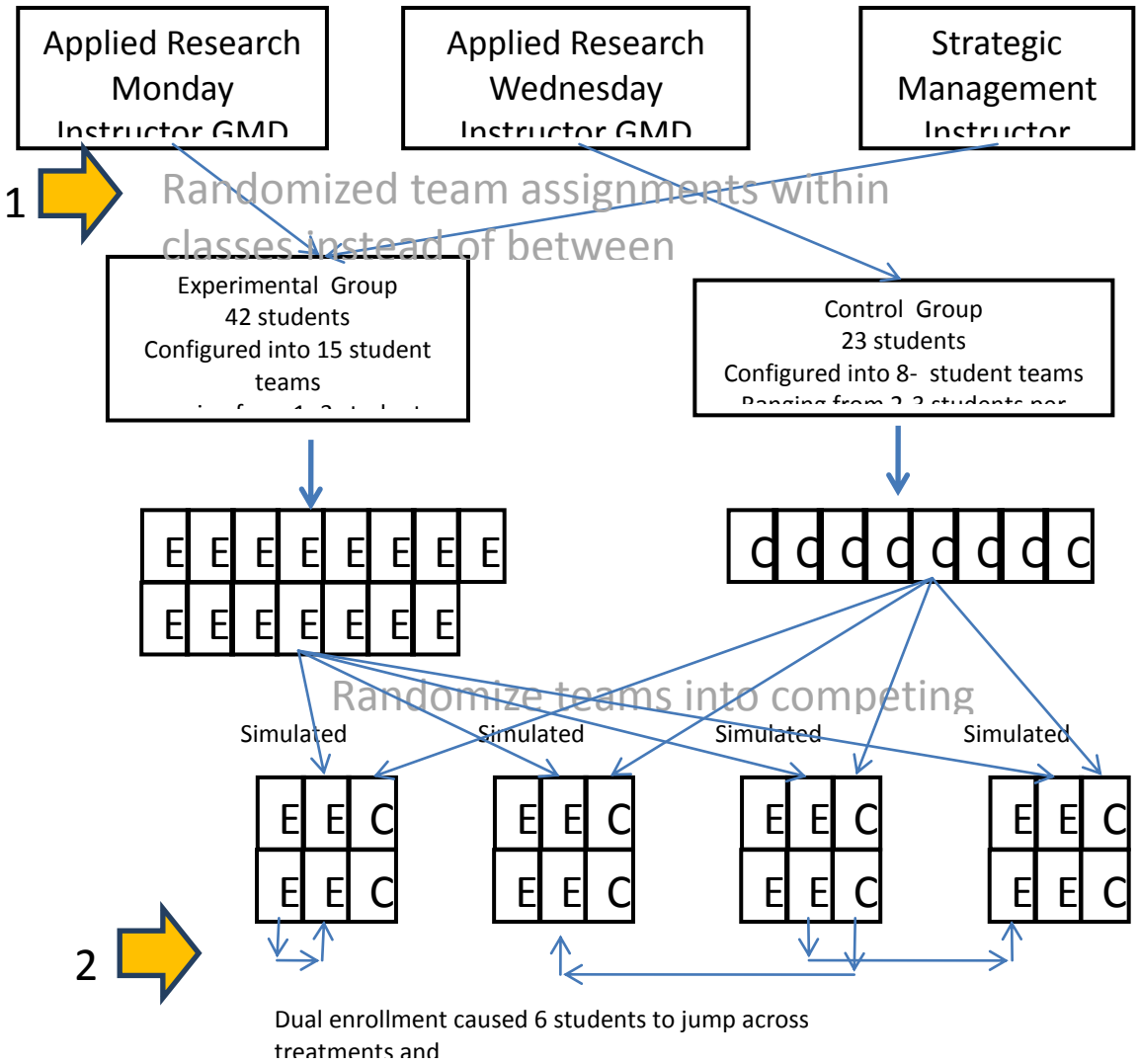

Figure 14. Actual Research Methodology.

The deviations from the original design are as follows, and reference points 1 and 2 in the illustration above:

1. The proposed study included randomization of students across classes. This design placed a heavy burden on students meeting in teams outside of class and could have caused negative attitudes. The design was altered to make one class the control and two classes experimental, which allowed the same ratio of control to experimental participants as in the original design. The students were randomized to create firms in their class versus across classes.
2. Within the study population, 10 students who had parallel enrollment. This dual enrollment allowed six students to transition, or jump across control and experimental groups. Four students participated on two firms in their assigned treatment group.

Dual enrollment occurred because the university allowed students to take classes simultaneously. The possible causes of dual enrollment are listed below:

1. Students withdrawing from or failing an earlier attempt at one of the research classes may have enrolled for both classes during the research semester.
2. Due to a student's graduation timeline and the need to expedite courses, the departmental chair may have granted approval for a student to take the classes in parallel.
3. Upon review of a student's transcript, an advisor may have granted permission to allow a student to take the classes in parallel. This would have included transferring students.

During the trial phase of the experiment, three out of 68 students were dual enrolled. These students remained in their treatment groups as assigned. There was a threefold increase in dual enrollment from the trial semester to the experimental semester.

The invisibility of dual-enrolled students was caused by a mistake in coding student names. Students were coded to eliminate bias in data analysis. The coding structure was based on

treatment, firm, industry, and class participant; it used a unique number for each student on the class roster. A separate license number was created for each student across the three class rosters, thus creating two simulation licenses for each of the dual enrolled students. The coding was as follows:

Example: EFTBS5
E – Experimental treatment
FT – Foxtrot industry
B- Team B in Foxtrot industry
S5 – Student number 5 in the study. Each name on each class roster received a unique number and simulation license number.

Once the coding was in place, visibility dual enrollees was lost. The potential impact on the study findings was as follows:

1. Competing firms shared the same member, thus exchanging trade secrets, methodologies, and ideas between firms. This could have equalized firm performance between teams, thus weakening any statistical differences between treatments and firms.
2. The dual-enrolled students had more time in the simulation and extended usage of the treatment methodology. These members could become highly trained experts on the simulation's use and treatment. These highly qualified members could influence firm performance, compared teams that did not have a highly trained member. These potentially trained members were dispersed among both control and experimental teams. Of the 15 experimental teams, 11 (73%) had a potentially highly trained member, and 5 of the 8 (62%) control teams had a possible highly trained individual. There were 7 teams remaining, 4 experimental and 3 control with no dual enrollment participants. One of the remaining experimental teams had only one student at the end of the experiment. The remaining teams had 2 to 3 members each, which was in the range of the original design.

The statistical hypotheses testing proposed in the original design would not provide confidence in determining significant effects due to the potential confounding variable of dual enrollment. Accordingly, the dual enrollment teams were removed from the sample. The hypotheses were analyzed using findings from the remaining three control and four experimental groups, which did not include any dual enrollment participants. Emphasis shifted from a quantitative to qualitative analysis due to the loss in sample size.

Emphasis on Qualitative Analysis

Due to a decrease in sample size, emphasis was placed on qualitative analysis. The organizational activity reports—which described strategies, analysis of performance data, functional organizational activities, treatment use, and tactical implementation—were foundational in the data analysis. These reports were submitted longitudinally across the research study, making them a powerful format for studying the process. An example of a team activity report is included in Appendix J. Other sources included research journal notes, team debriefings, attitudinal survey data (appendix A and B), simulation activity reports, and team member discussions. This in-depth review was critical in revealing how and why interrelationships occurred. It was also vital in determining causality of variables and how relationships played out over the course of the study.

These qualitative analyses were part of the original research design, but due to the inconsistencies of the research implementation, this area became important in determining interrelationships among variables. The qualitative analysis is presented in four sections: screening and validity of attitudinal instruments and data, data display, data reduction, and conclusions and triangulation of the data. Data reduction refers to the selecting, focusing,

simplifying, abstracting, and transformig of the data from research journal notes, activity reports, focus groups, and treatment utilizations. This data reduction is presented in a matrix format referencing findings in relation to specific constructs of the study.

Data display is an organized graphical presentation of variables and their spatial relationship. Both tables and graphs are used to indicate associations between attitudinal data, research constructs, and treatments. This comprehensive assembly of information allowed conclusions and relationships to be drawn. The emerging themes or conclusions from the data reduction and data display were tested for plausibility, logic, and validity. This systematic approach revealed complexities and dynamic interrelationships in the research context and extended the findings into potential new areas of research interest.

Screening of Data and Validation

The study's variables were assessed through multiple screening methods prior to substantive analyses. Distributions were inspected for range and completeness, normality, outliers, and multicollinearity. Data fell in expected ranges, with no out-of-range values, for all source variables, control factors, dependent variables, and factor scores. Missing values were minimal. For the questionnaires there were 5,190 valid data points out of 5,264 possible. The few (1.4%) missing responses appeared to be random, representing neither consistent clusters of variable categories nor respondent characteristics. Linearity was confirmed by examination of scatter plots. Normality was assessed for all variables. All variables were confirmed to be normal by using the Kolmogorov-Smirnov test for significance; scores ranged from.053 to .200. Variables were also screened for the presence of outliers. Univariate outliers were tested by examining standardized scores of all firms along each dependent variable (ROA & Profit).

For the purpose of validity and credibility, this study employed previously established means to measure each construct. Similar studies used these measurement items and discovered them to be both valid and generalized. The 65 responses and 20 firms provided an adequate number for statistical analysis. The small research population affects the study's power, or ability to detect significant relationships among the variables. To assess probable power, Cohen's (1977) work was applied. The Pearson coefficients range from .01 to .49. The average of the OL study variables is .285, which is slightly under Cohen's benchmark for a medium correlation effect size (r = .3). The achieved sample size of 63 corresponds to a power of 0.69. Cohen (1988) recommended a power of .8. In this exploratory research, qualitative analysis was triangulated with quantitative analysis to reinforce findings.

Reliability was demonstrated via Cronbach alpha coefficients for each questionnaire. The OL and Strategic Skills questionnaire demonstrated acceptable reliability by exhibiting coefficients greater than .70: .943 and .745, respectively. This finding aligns with previous research coefficients. All students passed the pretest of tool and terminology acquisition. The pretest starting position of the control and experimental groups exhibited no significant difference in the focal variables of OL and Strategic Skill (Table 3). The researcher and corresponding research groups were independently evaluated using standardized evaluation criteria to determine the level of effectiveness in the classroom and were administered by the researcher's university as a normal part of annual employee evaluations. During this research study groups were surveyed, ranking the instructor in all 21 ranking characteristics as very good to excellent. There was no statistical significance between the control and experimental scores, thus indicating a lack of bias in the study's administration.

Group demographics include the following variables: grade-point –average, age, gender, and proportions of business majors. This demographic information is presented in Table 2 and reveals no significant differences between the test groups.

Table 2

Demographic Comparison Between Groups

Demographic	Independent *t* test *t* statistic	Significance between control and experimental groups – independent samples *t* test
Male	-.382	
Female		.551
Age	.399	.734
Grade point average	-.286	.240
Majors:		
BADS		
BADA	.354	
MECT		.720
ACCS		
CISS		

Qualitative Findings

Qualitative analysis was conducted using multiple data collection sources. Data display used both graphical and tabular methodologies to present relationships between variables, treatments, and constructs. This arrangement of attitudinal data and firm performance enabled conclusions and relationships to be drawn between variables of the research. These data were drawn from the OL attitudinal survey as represented in Appendix A.

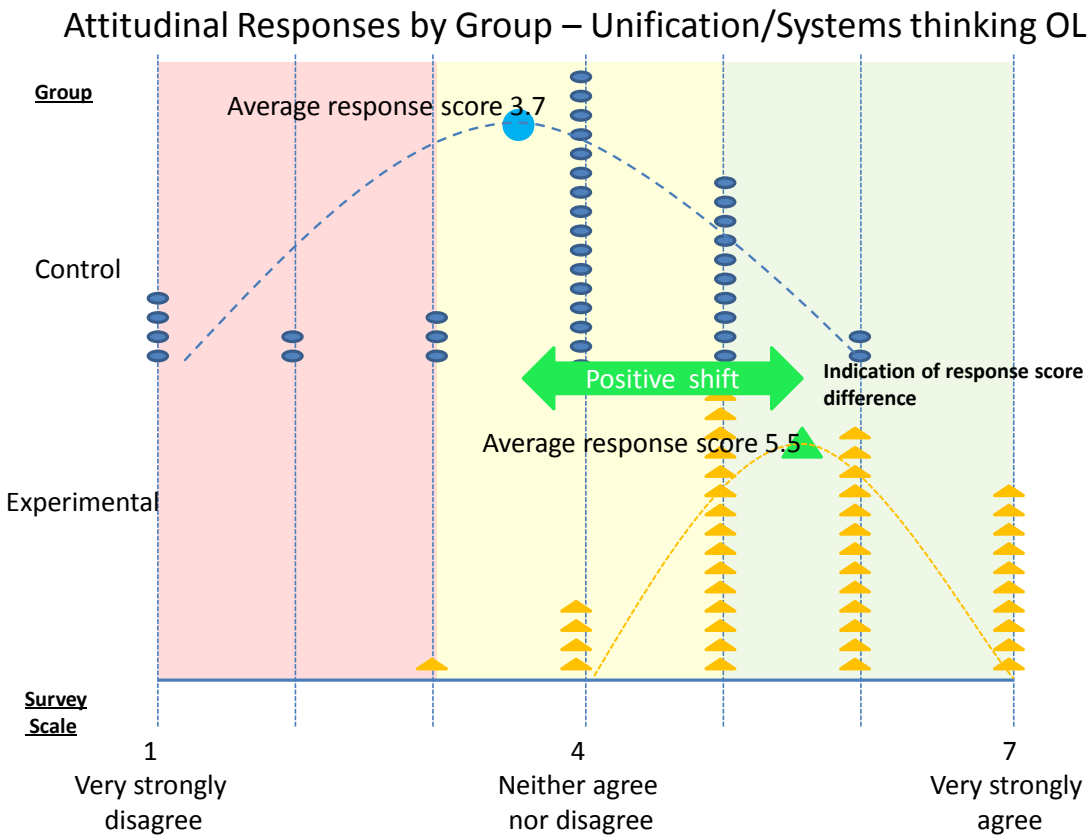

Figure 15. Graph of Unification Responses Between Groups.

Figure 15 reflects the response scores in the construct of unification. The corresponding symbols represent each ranking of question by the student. Each construct was represented by multiple questions. The control group scores exhibited a neutral response in regard to the use of unification concepts and principles. The experimental group reported a higher level of unification or systems thinking, ranging from "agreeing to very strongly agreeing." This ranking indicated that these principles were present at a higher level in the experimental treatment versus the control treatment.

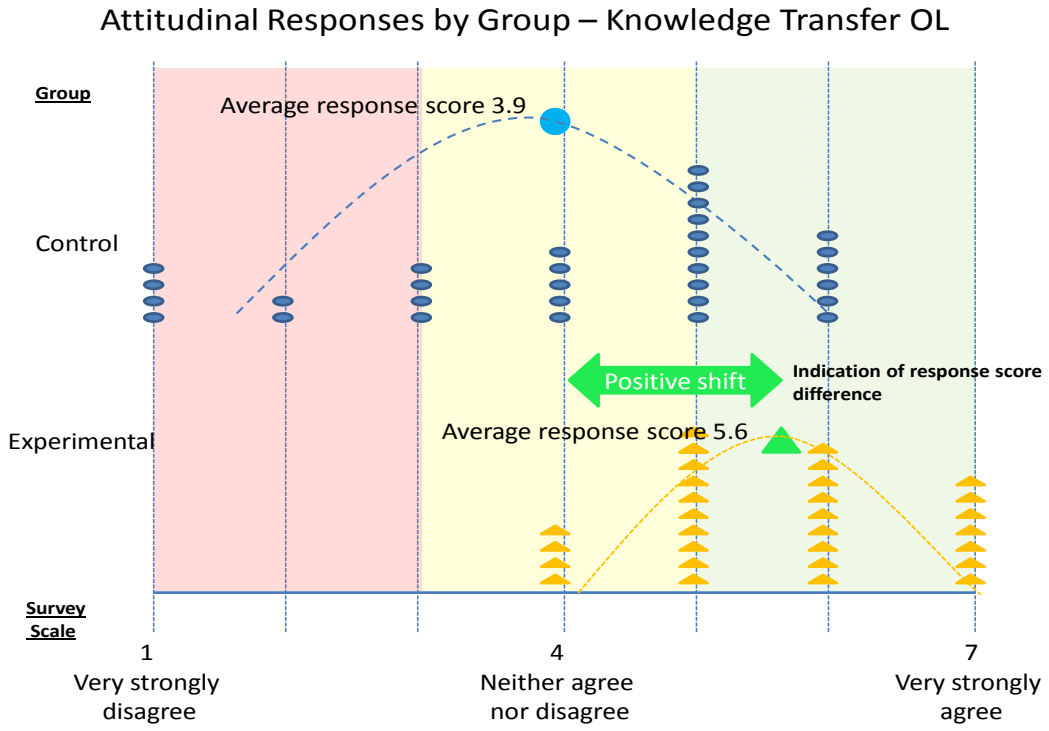

Figure 16. Graph of Knowledge Transfer Between Groups.

Represented in Figure 16, the experimental group rated the presence of knowledge transfer from "agreeing to very strongly agreeing." The control group ranged from "very strongly disagreeing to strongly agreeing," with a central tendency to be neutral.

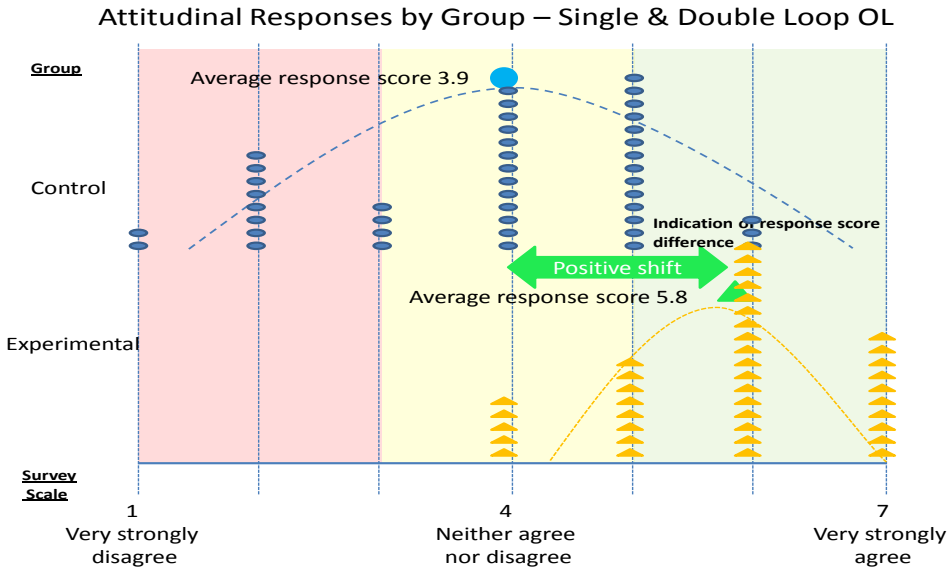

Figure 17. Graph of Single & Double Loop Learning Between Groups.

In Figure 17, the control group's central tendency was to rate single and double loop learning as neutral, with the experimental group being clustered in the "agreeing to very strongly agreeing" categories.

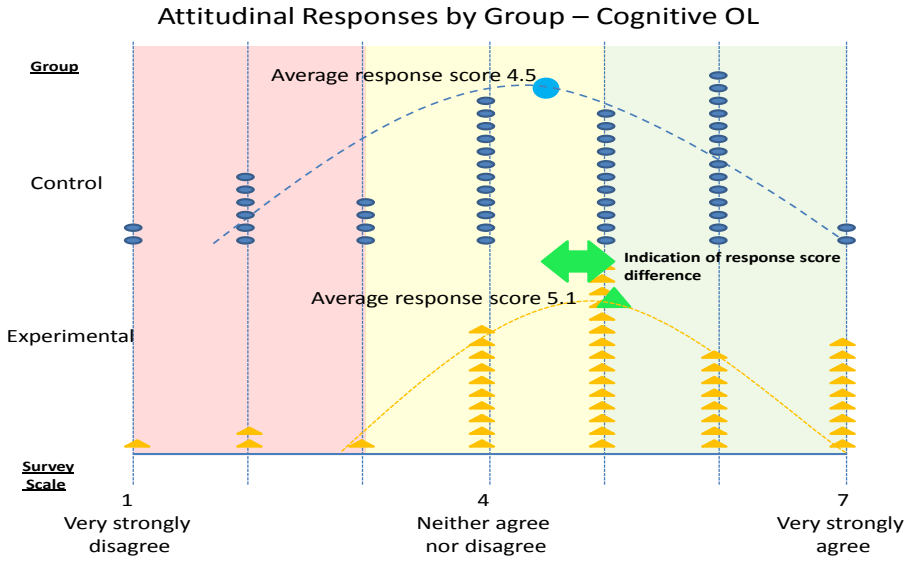

Figure 18. Graph of Cognitive Learning Responses Between Groups.

Figure 18 reflects little or no differences in the responses, although the mean is higher in the experimental group.

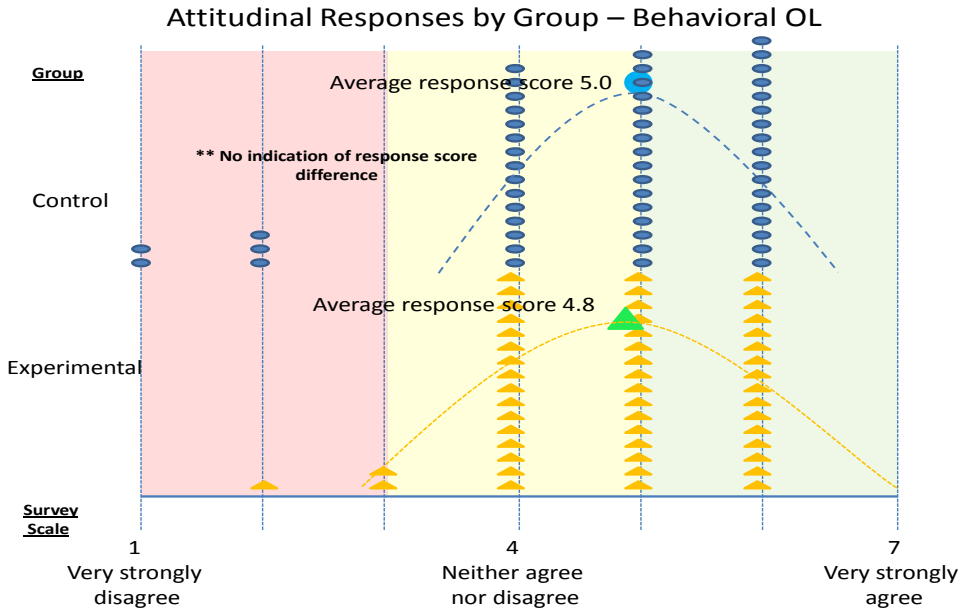

Figure 19. Graph of Behavioral Learning Responses Between Groups.

Figure 19 exhibits no difference in the range or central tendency of scores.

Table 3 presents the data reduction rubric and summarizes the qualitative findings in relation to research questions and theory constructs. Central to the analysis was the organizational activity reports, which described strategies, analysis of performance data, functional organizational activities, treatment use, and tactical implementation. Other sources used in the data reduction included research journal notes, team debriefings, simulation activity reports, and team member discussions.

Table 3

Qualitative Findings Rubric

Category of research, theoretical construct or hypothesis	Control group findings	Experimental group findings	Research journal notations
Unification/System	**Somewhat Exhibited** Teams failed to consistently exhibit interdependencies between internal capabilities such as production capacity, low cost, profits and external market attractiveness factors. Some groups failed to demonstrate major drivers of profit and ROA fully. Treatment failed to steer teams into a deeper analysis of internal capability	**Strongly Exhibited** Teams identified interdependencies and major causes of profit generation and cash flow. Strong analysis of operational, market and financial data longitudinally	**Experimental groups expressed a greater understanding of interrelationship primarily those involving internal capabilities**. Learning mechanism required deeper analysis of profit drivers longitudinally.
Behavioral	**Strongly Exhibited** The teams demonstrated an awareness of the markets and the treatment stimulated discussion and market analysis	**Strongly Exhibited** The teams demonstrated an awareness of the markets and the treatment stimulated discussion and market analysis	**The teams performed extremely well in understanding their markets prior to entry. The simulation information on external variables is rich** and used heavily by the teams. Experimental team demonstrated higher awareness longitudinally throughout the simulation on changes in the external environment
Knowledge Transfer	**Exhibited** The teams used KPI's, SWOTs, horizontal and vertical analysis to supplement the Ge/Mckinsey The weakness appears in the frequency of iterations of using these methods across the experiment. They relied on informal dialogue (Unwritten) for many of the their discussion across functional responsibilities	**Strongly Exhibited** The learning mechanism required significant effort on the teams to maintain, and understand. Much complaint was noted however the ability to use the tool as a focus point in communicating and tracking performance was stated as extremely valuable.	**In the early stages of the research testing the experimental team expressed a dislike for the complexity and effort required to understand and maintain the learning mechanism Value T.** This subsided after continued use, however many teams moved to a pencil format versus using software graphs.

(table continues)

Category of research, theoretical construct or hypothesis	**Control group findings**	**Experimental group findings**	Research journal notations
Cognitive	**Somewhat exhibited** The team's ability to leverage their internal and external strengths and build on key leanings of the simulation were widely distributed	**Somewhat exhibited** The team's ability to leverage their internal and external strengths and build on key leanings of the simulation were widely distributed	Key notation: Although results were widely distributed the teams that performed extremely well in leveraging knowledge and strengths gained during the simulation were the ones who **carefully forecasted KPI's and internal capabilities into a future state based** on potential decisions sets, almost like scenario playing.
Single & Double Loop (realignment or reconfiguration of Strategy)	**Exhibited** Teams exhibited a commitment to analyzing their progress versus specific goals and vision for their teams thus demonstrating organizational realignment of strategy	**Strongly exhibited** Teams were able to make quick realignments to take advantage of opportunities and were able to reconsider major strategic themes and move decisively into other tactical or strategic areas or improvements	Experimental teams found gaps quicker and moved more aggressively in capitalizing on opportunities or correcting inefficiencies in their organizations
Business & Markets	**Exhibited** see comments on behavior above	**Exhibited** see comments on behavior above	see comments on behavior above
Sub unit rivalry	**Exhibited** This construct evaluates communications across functional groups. The teams expressed good communications	**Exhibited** This construct evaluates communications across functional groups. The teams expressed good communications	Positive communications were expressed during the simulation. Initially in the pretest phase there existed some normalizing group dynamics. This stabilized after about 3 to 4 weeks.
Threats	**Exhibited** The teams were able to identify and react to threats in the external environment- primarily competitors moving into their markets	**Strongly Exhibited.** The experimental teams were able to identify threats and actually overcome them in many cases by developing counter strategies such as price points and promotional activities.	Both groups exhibited abilities to identify threats and react. The experimental group appeared to identify them earlier and mobilize actions quicker to overcome threats than the control group
Strategy consistency	**Strongly exhibited** Teams exhibited a strong commitment to what they believed was strong strategy and a perceived competitive advantage	**Exhibited** The teams were more willing to examine and flex strategies according to threats and opportunities, however they were committed to a generic overall strategy	Both groups exhibited a commitment to an overall strategy, however the control group seemed more willing to stay the course and not modify aspects of the strategy

(table continues)

Category of research, theoretical construct or hypothesis	Control group findings	Experimental group findings	Research journal notations
Innovation	**Exhibited** The teams exhibited initially a willingness to discuss many different ideas and in fact had a larger variety of strategies in the trial phase and generally a lot of excitement	**Somewhat exhibited** Teams developed solid visions of strategy and objectives. They did not exude a great deal excitement about encouraging their team mates to take actions	Almost two personalities observed at times between groups. The control groups in the initial stages exhibited a greater willingness to discuss alternative ideas and try them out in the trial phase.
Team Dynamics	**Exhibited Strongly** The control teams demonstrated good cohesiveness, communications, commitment even when performance was faltering	**Exhibited** The teams exhibited good dynamics after the initial trial phase. Unified about difficulty of learning mechanism and complained for almost half of the research period.	**Point of interest: positive team dynamics may have a limited impact on OL and performance however severe negative team dynamics can destroy OL and performance (lack of engagement/participation or loss of a key member)**
Creation of optimal strategy	**Exhibited somewhat** Most of the teams were able to identify the correct generic strategy, however two teams initially identified a differentiation strategy keying on brand and quality. One team quickly reversed course the other stayed the course	**Strongly exhibited**. Universally the teams selected the correct low cost strategy. The scale of the strategy varied greatly however. One team entered almost every market while others stayed at home.	**The life cycle aspects of the learning mechanism was a key variable according to the experimental group in determining generic strategy**
Speed of correct tactical or strategic development or modification	**Exhibited somewhat** The teams exhibited shorter time rates to develop strategy, however it took longer to implement and modify them. They lacked much of the tactical data later in the simulation to make fast adjustments.	**Exhibited somewhat** It took the experimental teams initially longer to develop their strategies, however their tactical implementation and modifications became quicker than control group in the last 4 qtrs of the simulation	**Note: It appears that the frequency and time between iterations effects OL rates**

Hypothesis 1 assessed the degree to which organizational learning was affected by the unique treatments of the independent variables. The experimental group appeared to exhibit higher levels of understanding and use in system thinking, knowledge transfer, and single- and double-loop learning versus the control group. The analysis of survey data, team activity reports, and focus group interviews, as indicated in Table 3, revealed that experimental firms were able

to identify interdependencies, major drivers of profit generation, and cash flow more than control firms were. The experimental teams stated and demonstrated that the Value T graphically portrayed relationships among market factors, internal capabilities, and financial performance. This ability to see trend data and correlations longitudinally assisted the firms in understanding the effect of tactical and strategic decisions. Experimental teams exhibited and verbalized an ability to see movement of competitors into the marketplace and understand and react to their price points and promotions more than the control group using the GE/McKinsey matrix.

The Value T used by the experimental group required systematic updating at prescribed frequencies throughout the simulation. Although the GE/ McKinsey required updating each simulated year, it did not require the level of tactical or operational data, as required by the Value T. This increased level of analysis, combined with graphical updates of the Value T, promoted more opportunities for knowledge transfer among the experimental firm members. The experimental teams stated that using the Value T as a focal point for tracking key performance indicators, capabilities and decision sets was extremely beneficial. In contrast, the control groups relied more frequently on informal dialogue and less on their treatment as a central decision tool. This ability to track, forecast, and compare actual performance data to objectives and targets systematically at prescribed frequencies enabled the experimental teams to demonstrate single- and double-loop learning more frequently and with better results than the control group. In addition, experimental teams were able to make quick realignments to take advantage of opportunities, and were able to reconsider major strategic themes and move decisively into other tactical or strategic areas to improve organizational performance.

Table 4

End of Simulation OL Attitudinal Survey Results

	Categories totaled by firms and averaged per treatment group		
	Control mean	Experimental mean	Percent difference from control to experimental
Unification	17.67	26.83	+52%
Behavioral	35.11	32.58	-6%
Knowledge transfer	15.33	22.25	+45%
Cognitive	22.78	29.50	+29%
Single & double loop	23.33	28.88	+24%
Average Group Total OL score	22.8	28.0	+23%

Table 4 shows the percentage difference between mean scores. The positive shift in attitudinal OL scores ranged from a low of 24% to a high of 52% between the control and experimental mean. The experimental groups exhibited a central tendency to rank each of the six OL constructs from "agreeing to very strongly agreeing." The control group exhibited a greater distribution across the ranking categories with a tendency to be clustered in the category of "neither agreeing nor disagreeing." This more consistent and higher ranking of the OL constructs indicated a support for the hypothesis. There appeared to be a positive relationship between the

OL learning mechanism and organizational learning, suggesting that operationalized OL-based business unit strategic planning methodologies improved organizational learning more than traditional business unit strategic planning methods.

Hypothesis 2 explored the relationship of the unique treatments and their effects on simulated firm performance. Figure 20 illustrates the individual team and treatment group mean performances in the simulation. The experimental group appeared to demonstrate a higher and more consistent performance than the control group.

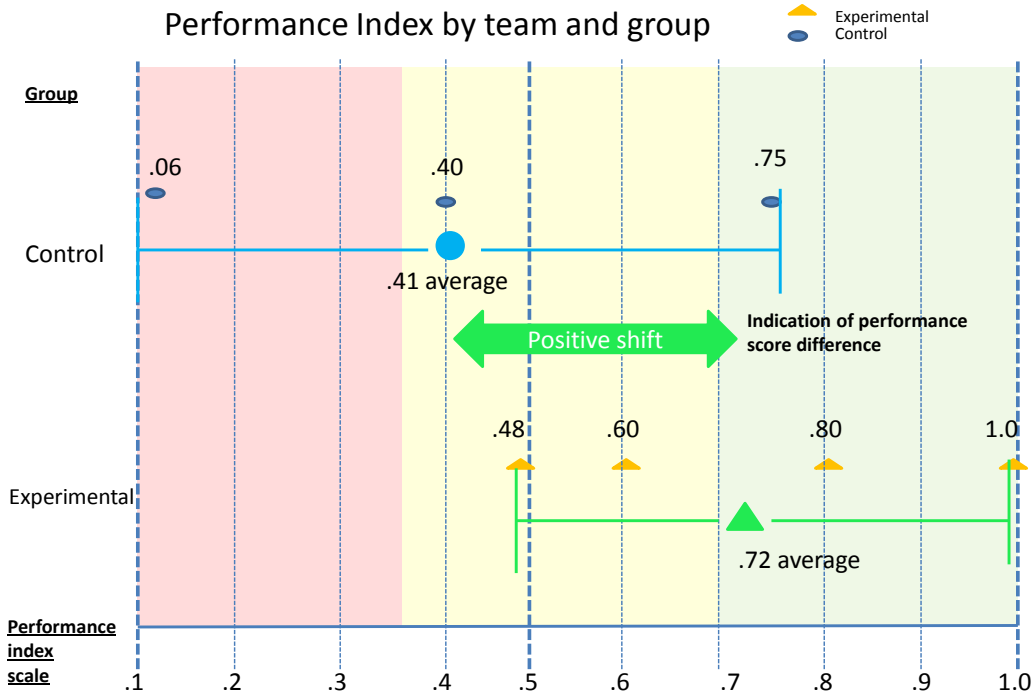

Figure 20. Performance Index by Group.

In Table 5, the treatment group means are compared for firm performance via the simulation firm performance index, and reflect the percent change in mean scores. It appears this higher performance was linked to the experimental group's ability to identify consistently the correct generic strategy based on the industry and product analysis. As evidenced in Table 3,

each experimental team correctly selected a low-cost generic strategy, whereas the control group chose both differentiation and low cost strategies. According to the experimental group, the life cycle aspects of the learning mechanism were a key variable in determining the correct generic strategy, thus driving positive firm performance.

The speed by which the proper decisions were made appears to be reflected in the performance index. It was noted that initial decision making in the early rounds of the simulation was performed quicker by the control group. The experimental groups took longer due to the analysis required by the Value T. This trend reversed during the simulation. After the initial rounds, the experimental groups reacted quicker to threats and opportunities, making more accurate and faster decisions than the control group. This speed in decision making enabled them to gain valuable market share and realize higher profits than their competitors, thus improving their performance index for most of the simulation. The higher performance index scores, in combination with higher levels of demonstrated OL by the experimental group, suggest that operationalized OL-based business unit strategic planning portfolio analysis improved firm performance more than traditional business unit strategic portfolio analysis methods.

Table 5

End of Simulation Firm Performance

Group	Qtr 8 end of simulation consolidated performance Index average	Percent difference from Control to Experimental in firm performance
Control	.406	+78%
Experimental	.722	

Hypothesis 3 explored the degree to which strategic skills are affected by the unique treatments of the independent variables. The analysis yielded mixed results between the treatment groups. The data were obtained using the strategic skills survey (Appendix B).

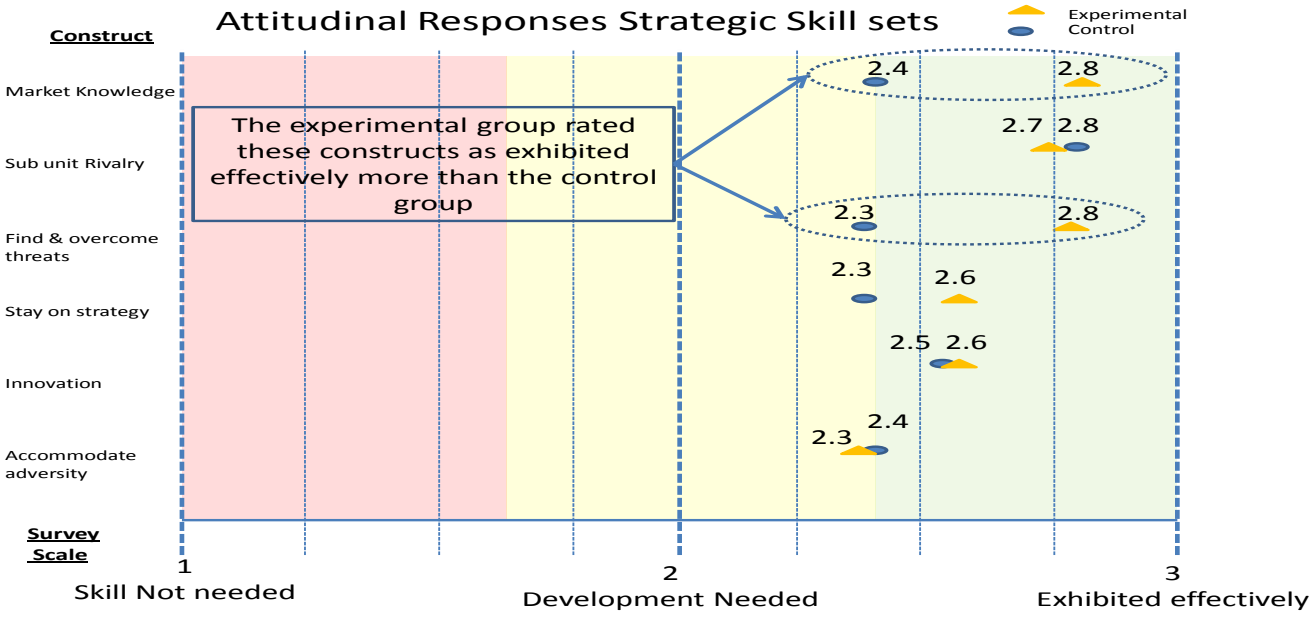

Figure 21. Strategic Skills Mean Rankings by Construct.

Table 6

Attitudinal Strategic Scores

Construct	Categories totaled by firms and averaged per treatment group Control	Experimental	Percent difference from Control to Experimental in firm performance
Business & Markets	19.33	22.20	+14.8%
Sub unit rivalry	22.67	21.67	-4.6%
Threats	17.00	22.00	+29.4%
Strategy consistency	19.00	20.67	+8.8%
Innovation	20.00	21.00	+5.0%
Adversity	19.33	18.33	-5.0%
Total Average strategic score	19.6	21.0	+7%

As illustrated in Figure 21, the experimental group scored the constructs of market knowledge and overcoming threats as "exhibited effectively", versus the control group rating of "needing development." The other four categories graphically exhibited no difference in ranking.

Subsequent control team interviews yielded a esprit de corps, excitement, and vision for their teams. This is in contrast to the experimental groups, who expressed only moderate excitement about their treatment and, in some cases, expressed initial frustration about detail and complexity. Post analysis between groups revealed a 29.4% increase in scores in the construct of finding and overcoming threats between the groups (Table 6). Control team discussions revealed a tendency not to deviate from initial strategies, whether or not competitors entered or left the markets, or changed product characteristics. They exhibited a determination to stay the course, and held a belief that their strategy was superior. The activity reports, interviews, and graphical analysis of data did not fully support the hypothesis that designed and operationalized OL-based business unit strategic planning portfolio analysis would improve strategic planning skills more than traditional business unit strategic planning methods.

Triangulation and Convergence of Findings

In the triangulation of the findings, three theoretical constructs emerge. The basis of knowledge transfer theory contends that both tacit and explicit knowledge can be converted and constitute a continuous learning loop. According to attitudinal data and activity reports, the experimental group exhibited a high level of movement between tacit and explicit states of knowledge. Further, the learning loops, or movement back and forth between the forms of knowledge, appeared to be a vital link in organizational learning. Although the experimental groups indicated an initial high degree of frustration in continually updating and sustaining the

learning mechanism, it provided the catalyst by which the movement between tacit and explicit knowledge occurred. Each iteration, or update, to the learning mechanism created a movement and opportunity to continually improve. Further, these numerous iterations, or loops, may help explain the variation in learning rates between the groups, which closely mirrored early theoretical research on learning curves. The learning mechanism required continual analysis and updates versus a more static approach in the control group.

The qualitative findings supported a positive relationship between OL theory and firm performance, as postulated in Hypothesis 2. The findings supported that unification theory could play a vital role in advancing OL and firm performance. An important difference between experimental and control groups was the interrelationships among internal, external, and firm performance variables. The experimental group demonstrated a higher ability to grasp the interrelationships between market attractiveness and internal capabilities such as production capacity, logistics, and unit cost to financial success, as demonstrated in the team activity reports and team interviews. The teams leveraged and grew their internal capabilities, and when paired with favorable external factors, they were successful at a higher rate than the control group. Again, this did not initially occur and only became evident as the use of the learning mechanism matured.

Single- and double-loop learning appeared to be a key component in advancing OL and improving firm performance. The ability to quickly realign or make adjustments to strategic and tactical plans versus specific performance goals is vital to continued firm success. Although both groups exhibited this characteristic, the experimental group demonstrated a higher velocity of realignment in tactical and operational decision sets. The experimental group also exhibited a

slightly higher degree of double-loop learning by questioning the underlying purpose of the original strategic and tactical goals and objectives. In several cases they were able to seize opportunities and overcome threats by shifting their original strategies and objectives.

Summary

Chapter 4 presented the results of the qualitative analyses. The results suggest that a fundamental order and structure (process) can be established to yield an operational framework from a dynamic system such as OL. The results support the hypothesis that operationalized OL-based business unit strategic planning methodologies could improve organizational learning and firm performance more than traditional business unit strategic planning methods. Results revealed no conclusive support for the hypothesis that OL-based business unit strategic planning portfolio analysis would improve strategic planning skills significantly more than traditional business unit strategic planning methods. In sum, the data implied partial support for two of the three hypotheses. Although the analysis was limited a small sample size, the triangulation of data sources corroborated the summative findings. Chapter 5 concludes the report with a discussion of results, implications, and limitations of the present study.

CHAPTER FIVE

CONCLUSIONS AND RECOMMENDATIONS

In chapter 4 qualitative findings were presented. These results were triangulated with summative findings and possible alternative implications were explored. The research suggests that a fundamental order and structure can be established to yield an operational framework from a dynamic system such as OL. The data indicate that the combination of knowledge transfer, systems, and spatial and codification theory can be aligned into an effective dynamic capability, thus yielding a learning mechanism that appears to positively impact firm performance and OL. Findings corroborate that operationalized OL-based business unit strategic planning methodologies improve organizational learning and firm performance more than traditional business unit strategic planning methods. The findings do not support the hypothesis that designed and operationalized OL-based business unit strategic planning portfolio analysis will improve strategic planning skills significantly more than traditional business unit strategic planning. The present chapter concludes the report by discussing conclusions and implications of the study. This chapter includes four sections. The first reviews the study and discusses findings as responses to the research questions; the second uses the study's results to derive implications for management; the third addresses limitations of the present study; and the final section suggests implications for future research.

Summary of the Study

Chapter 1 summarized the general problem investigated: the nature of relationships among organizational learning, codification, organizational strategy, and organizational performance. The research questions had clear links to current interests in management research.

The findings of this study enrich the body of knowledge of organizational learning by demonstrating the linkage between an OL dynamic capability, firm performance, and competitive advantage.

Chapter 2 reviewed relevant literature and showed that systematic codified OL dynamic capabilities could effectively synthesize and analyze knowledge, which are vital elements in organizational learning. The OL dynamic capability process integrates components of learning, behavioral, cognitive, systems thinking, and action. Because it incorporates codification, a deliberate operational framework, and key OL constructs as central elements, this model is well positioned to fill the deficiencies and satisfy the needs identified in the literature review. There is a gap in both conventional and alternative theories of organizational learning in the context of operational framework mechanisms. Based on research, there has been little empirical testing of specific operational OL codification frameworks (Hall, 2006).

Chapter 3 summarized the hypotheses, instrument, and methods of data gathering and analysis. The study examined the relationships among organizational learning, OL operationalized dynamic capabilities, and subsequent learning mechanisms, as well as their relationship with firm performance in the context of a simulated industrial environment, allowing for control of contextual factors not addressed by prior field research. This study thus provided a

conceptually focused, empirically extensive, rigorous test of the effectiveness of a systematic OL codification model (OL dynamic capability) on value creation.

Research Questions

This study began with a compound research question: Can a fundamental order and structure be established to yield an operational framework from a dynamic system such as OL, and how does this affect organizational learning and subsequent learning rates? Further, what is the relationship between OL and firm performance? This study has succeeded in identifying a dynamic OL learning capability and its relationships. Additionally, it has demonstrated the effectiveness of a codified dynamic capability that successfully produced a learning mechanism, which partially supports a positive relationship to firm performance and enhanced organizational learning. Specifically, this study corroborates Levy (1994) and Eijnatten (2004), who theorized that order and structure can be applied to a chaotic system if a known baseline is established. This study suggests that a complex dynamic system can be managed through a systematic, iterative process (dynamic capability) to achieve a specific targeted goal of designing a learning mechanism that positively affects OL and firm performance. In addition this study offers its findings to support Winter's (2002) claim that codification is an integral part of the entire knowledge evolution and transformation process and facilitates the generation of new routines and dynamic capabilities.

The OL dynamic capability was developed by a small team of researchers, combining specific constructs of OL, knowledge transfer, unification, spatial and codification theory. This combination of theoretical, articulated, and visual approaches revealed OL deficiencies, gaps, and disconnects in logic, relationships, or patterns. Specifically, the findings suggest that the

visual, pictorial, and recursive flow of dynamic capability highlights systematic patterns, interrelationships, and underlying structures, which influence desired outcomes or a desired future state. The OL dynamic capability may be used by organizations in developing new learning tools, routines, or methodologies from existing methods or approaches.

By using the postulated OL dynamic capability, the research team developed a new learning mechanism titled Value T. This newly designed learning mechanism is an improved strategic portfolio management tool, embedded with specific OL attributes that enable management teams to create, improve, and sustain economic value in a simulated business environment.

Chaos theory postulates that order and structure can be applied to a fluid and dynamic process or system, and predictability can be achieved if a known baseline in time is established. From a structured model or pattern, a window of predictability can emerge from a chaotic process or system. The OL dynamic capability began by accessing a known baseline against a desired future state. This desired future state exhibited certain key OL concepts and characteristics at a heightened state. This baseline or gap analysis was observed to be pivotal in the operational and OL enhancement process. Further, the OL dynamic capability showed that management tools can evolve from a lower state of OL attributes to a higher state. The ability of the dynamic capability to infuse unification, transfer, and spatial theory with continual improvement loops into the learning mechanism appeared to correlate positively with increased organizational learning, accelerated learning rates, and firm performance. The OL dynamic capability demonstrated that a structure or pattern of deterministic steps in a systematic format can yield a goal of greater performance known a priori. Therefore, a complex dynamic process or

system can be managed through a systematic, iterative process to achieve a specific goal of improved performance.

A secondary research question explored the resultant learning mechanism produced by the dynamic capability. Specifically, what are its effects on organizational learning and firm performance? How does the mechanism enhance or accelerate learning? The findings indicated a positive relationship between the learning mechanism and increases in organizational learning and performance. The positive effect of increased learning and firm performance appeared to be driven by higher levels of systems thinking, action learning, spatial relationships, and knowledge transfer iterations. The learning mechanism advances multiple learning loops or movements back and forth between tacit and explicit forms of knowledge, more than the traditional strategic management tool. This suggests that there is a vital link in advancing organizational learning and accelerating learning rates, thus supporting the general theory of knowledge transfer as postulated by Nonaka (1994).

In addition, the learning mechanism appeared to enable greater understanding of interrelationships (systems thinking) among internal, external, and firm performance variables via graphical spatial techniques. The experimental group demonstrated a higher ability to grasp the interrelationships between external opportunities, threats, and internal capabilities, thus allowing the organizations to leverage, drive, and sustain financial success. The graphical plotting of the internal capability in relationship to cash flow and profits appeared to be a key component in advancing system thinking in the teams. The ability to spatially and visually represent variable relationships enhanced understanding. This finding suggests that spatial and visual queues are vital for systems and knowledge transfer to occur efficiently and effectively,

not only in the OL dynamic capability but also in the learning mechanism. The OL dynamic capability demonstrated the capability to embed and transfer unique spatial attributes into the learning mechanism, thus enhancing the management team's ability to synthesize and analysis information.

Higher-order systems thinking was exhibited by two experimental teams when they articulated the importance of internal capability life cycle stages and their subsequent relationship to external market life cycle stages in international, domestic, and product segmentations. When these interrelationships were understood and aligned properly longitudinally, they successfully drove and sustained value creation in these firms. This relates positively to the more general theory of unification and dynamic complexity (Senge1996). The spatial and visual aspects of the dynamic capability and learning mechanism appear to be a vital link in accelerating learning rates and enhancing single- and double-loop learning. Thus, the application of these concepts and principles enhanced learning not only in the developmental team using the OL dynamic capability, but subsequently to the simulated teams via the learning mechanism. In summary, the OL dynamic capability appeared to be successful in embedding, transferring, or strengthening OL attributes in a new portfolio analysis tool, which improved performance more than non-OL-based traditional strategic management methods.

Limitations in the study were discovered in evaluating the relationship of the learning mechanism (Value T), strategic skills, and firm performance. The findings suggest that there were only specific strategic skills sets that were positively affected. These focused primarily on understanding external market factors and overcoming threats and leveraging opportunities. There were no apparent data supporting a relationship between strategy skill level and

performance. This is surprising and counter to the postulated hypothesis. This may be attributable to the importance of the tactical level of strategic planning, successful implementation, and realignment of strategy that are highly valued in the simulation and are not measured by the strategic skills instrument. Further, the lack of significant findings in strategic skills may be attributed to several factors: (a) The survey instrument is not conducive to detecting the level of granulation needed in this simulated environment, (b) the two treatments are basically the same in advancing strategic skills, and (c) the sample size does not provide for adequate analysis. Qualitative findings show that the experimental group was able to identify the optimal strategy due to the life cycle characteristic in the learning mechanism more consistently than the control group. Significant deviations between the two groups began to occur at the tactical level regarding speed and success of strategy implementation. This suggests that although strategic skill development is crucial, it must be linked to tactical and operational capabilities, and to successful and timely implementation with proper monitoring and control in order to positively impact firm performance.

The research findings also suggest that team dynamics is a critical variable to OL and performance. When examining the outlier teams, the loss or disengagement of key team members at critical milestones in the experiment was detrimental to the learning rates and subsequent performance. The loss of key members during the early phases of strategy development and implementation crippled the teams, and they never fully recovered during the course of the study. Both groups experienced the normal dynamics associated with the initial forming of teams, but there were no significant problems after the test phase of the study began. This reinforces the importance of having a pretrial phase so team members can become

comfortable with each other and their relative capabilities. Further, the control teams exhibited and expressed greater cohesiveness, excitement, and mutual encouragement than did the experimental teams. This is somewhat counter to contemporary research about team dynamics and performance. The data may imply that there is a point of limited return on positive team dynamics. The findings suggest that participation and engagement by team members is more important to organizational learning than teams' feelings of empowerment, cohesiveness, excitement, vision, and encouragement. The higher performing teams in some cases had spirited disagreements and occasional hurt feelings, but the performance of the team seemed to keep the groups unified and moving forward. Therefore, it may be concluded that achieving positive engagement of the members and avoiding negative team dynamics is more important than investing significant effort in developing or reinforcing a variety of noncritical team dynamics. It may also be deduced that enthusiastic debate is important in making superior team decisions.

In conclusion, this research suggests that simulations can be valuable exploratory platforms in examining the organizational learning process, testing management systems, and determining leadership ascendancy and group decision-making dynamics.

Emerging and Alternative Explanations

An alternative reason for improvements in OL and performance may be the learning mechanism driving and sustaining other mental activities. Instead of advancing specific OL constructs, the mechanism could be causing a prolonged and focused mental concentration on the required intellectual task. This prolonged focused activity may stimulate creativity and intellectual thought and, when coupled with mental iterations, may explain the difference between the two groups. In essence, the learning mechanism is causing the teams to spend more

time devoted to the subject matter. This, coupled with the frequency and time intervals of revisiting the mental task in itself, may be the principle cause of the accelerated learning and performance. This alternative finding is supported by experimental teams describing significant time being devoted to initially understanding and then using the learning mechanism in the early stages of the simulation. The time devoted to sustaining and interpreting the treatment significantly decreased in the later phase of the test as the teams developed proficiency in its use.

Implications for Management

The study offers useful lessons for practicing managers. As noted in chapter 1, a new type of global enterprise will thrive in the new millennium. These corporations will build new competitive advantages by discovering, accessing, mobilizing, and leveraging knowledge (Rutterford, Upton, & Kodwani, 2006). It appears the cognitive exercise inherent in following a prescribed flow of events characteristic of the OL dynamic capability enables managers to synthesize and analyze information more effectively. Thus, the OL dynamic capability creates a platform for learning and a pattern of collective activity through which the organization can systematically generate and modify its operating routines, tools, processes, or systems in pursuit of improved effectiveness. The application of the OL dynamic capability may help managers in creating and evolving current methods into enhanced methodologies that create systems thinking, behavioral, and action learning with accelerated learning rates. This research suggests that enhancing traditional strategic planning methods with specific OL constructs will relate positively to increases in learning and firm performance. More importantly, this study adds to the management body of knowledge by examining the capabilities firms use to "learn to learn," which has been identified as a need for future research (Vorhies & Morgan ,2005, p. 91). The

conceptualization and operationalization of learning capabilities can help managers understand how learning can be integrated into strategy development, execution, and evaluation.

By identifying the critical types of learning constructs that influence performance capabilities, unification, and transference, this study has aided managers by determining which learning capabilities appear to have a stronger effect on performance and in which types of environments. The OL dynamic capability can be extended to other mangerial environments, specifically those in information systems, research and development, and human resources (i.e., operating routines, training and performance evaluation) .

OL has been described as a complex and dynamical arrangement of connections among elements forming a unified whole that is both unpredictable (chaotic) and patterned (orderly) (Eijnatten, 2004). Discovering a structure or pattern of deterministic variables and their relationships to learning and value creation is highly valued. Lucier and Torsilieri (1997) found that a majority of investments in organizational learning by organizations failed to yield adequate returns. Although exploratory in nature, this study suggests that investing in the operationalization of OL at the strategic development, implementation, and tactical level may lead to improvements in learning and firm performance. Managers may achieve higher returns on investment in orgnainzational learning if they focus resources on the operationalization of OL versus other less tangible OL intitaitives, while still maintaining a unified approach to advancing OL. Furthermore, emerging global enterprises may create and sustain competitive advantages that use managment systems, tools, and routines that have been enhanced with specific OL constructs via codified models. This competitive advantage may extend into the evloution of research and development models and even product design.

Implications for Future Theory Development

Productive directions for future research, including both theory and empirical aspects, can be derived from this study's findings as well as its limitations. Regarding theory, this study offers several paths for future work. First, order and structure may be applied to a chaotic system, and predictability can potentially occur if a known baseline is established. This suggests that a complex dynamic system can be managed through a systematic, iterative process (dynamic capability) to achieve a specific targeted goal. According to Levy (1994), chaotic systems trace repetitive patterns, which often provide useful information. This was supported in this research by establishing that a chaotic process can be codified in to a systematic pattern of interdependent knowledge management constructs yielding a learning mechanism that appeared to improve effectiveness. According to Levy, knowing a generalized predicted outcome is similar to describing many meteorological phenomenon, such as hurricanes. Although we do not know where or when hurricanes will strike, we do know what conditions lead to their occurrence, when and where they are most frequent, and their likely paths. In the case of the OL dynamic capability, the recursive and interdependent steps were able to predicate the development of a learning mechanism that improved organizational learning and subsequent improved performance. An intriguing aspect of the patterns traced by chaotic systems is that they are independent of scale; in other words, similar patterns are traced by a system whatever horizon is used to view it. "These images of patterns in patterns are termed fractals when they are generated by chaotic systems. One interpretation postulates that in the natural world, fractals can be found in many phenomena" (Levy, 1994, p. 172). This implication for management research is not clear; however, it may be that the operationalization of OL into dynamic capabilities is scalable.

Can OL enhanced dynamic capabilities be used to predicate other fluid or static systems and applied successfully in other areas of management, such as information systems, human resources, improvement models, or strategies? Research is needed to establish whether this theoretical concept is applicable on a wider scale.

The OL dynamic capability process used the integration of both articulation and visual dynamics. According to research, our minds create and analyze information more effectively using analogy, symbol, and metaphor. Bennet and Brown (2006) stated that visual recordings help illuminate a group's perspective and enable relational thinking to emerge organically from conversation. This visual and pictorial capability highlights systematic patterns and underlying structures influencing desired outcomes. The combination of articulated and visual approaches allows disconnects in logic to appear more readily and can be explored in depth by team members. The spatial modeling of complex relationships illustrates advanced systems thinking and indicates a valuable area for further research. What types of spatial models, variables, and scales are best suited for enhancing and accelerating learning?

As a third, more general, direction for future theory building called for by this study is research addressing the link between this study's focal variables and team dynamics, both positive and negative, and their relative impact on performance results. Are there limited returns on positive team dynamics in the realm of organizational learning? What are the specific or necessary team dynamics and their respective levels needed to advance organizational learning? Although recent research indicates a positive relationship between team dynamics and organizational learning, it is still not clear how specific HR practices and variables affect the specific organizational capabilities that contribute to improved firm performance (Wright et al.,

2001). Many organizations holistically invest valuable resources into advancing team dynamics. Managers may yield greater return on investments by focusing HR efforts on more specific dimensions to advance organizational learning.

Implications for Future Empirical Research

In addition to these suggestions for future theory, the present study offers several directions for future empirical work. Some immediate extensions of the present study include investigating the potential mediating effects of organizational learning on strategic management skill sets and performance. Understating this relationship may shed light on the complexities and dynamics of organizations failing to convert the appropriate strategy into performance gains or competitive advantage.

Another important call for future empirical work is to replicate the present study's results with a larger sample. Researchers replicating the study should exercise caution in striving to extend the sample size across different classroom settings. A key learning of the research design is to limit the sample population in a specific classroom setting, using the same instructor to ensure that dual enrollment does not occur. The researcher should also validate that only one license is issued per individual student name. Another approach would be to replicate the work across academic settings with different researchers administering the treatments. Even with the large number of studies that have focused on organizational learning and strategy, further scale refinement is also necessary. This research suggests that learning processes are an important component of organizational success. Thus, further refinement and development of a thorough and complete learning scale, with specific regard to strategic skills both at the strategic and tactical level, would be beneficial to the field.

Lastly, the application of the OL dynamic capability to a field research environment would address validity and generalization questions concerning the external environment. The findings from actual field research could aid an understanding of further causation and interrelationships and could identify potential covariation. These are vital in transferring the findings to managerial applications and understanding the scalability of operationalized OL capabilities.

Summary

The researcher undertook this study to explore the integration of organizational learning concepts into the strategic planning process. There is a gap in understanding how to actually implement organizational learning concepts. Using a complex and dynamic simulated business environment, it was partially demonstrated that organizational learning concepts can be effectively incorporated into strategic planning and address this gap in knowledge. Within this simulated environment, incorporating organizational learning concepts into the strategic planning process appeared to improve organizational performance, advance strategic skills, and increase organizational learning. Further, the research suggested that management teams in the simulation using strategic management tools enhanced with organizational learning concepts demonstrated greater firm performance than teams using traditional strategic management tools. The operational model used in the simulation may begin to fill a void, allowing leaders to create and sustain competitive advantage for their organizations.

Executives and managers should be encouraged to extend these findings by applying this model not only to strategic planning but beyond the simulated environment and to other functions in the value chain. By extending this study's findings and systematically integrating

organizational learning into procedures, protocols, processes, products, and systems, organizational learning can become part of regular day-to-day operations and activities. This weaving of organizational learning into the DNA of a company may generate new innovation, performance, and economic wealth. As a result, the probability of succeeding in the complex and dynamic global business environment may be enhanced.

Further, this study contributes to the growing literature on organizational learning, strategic management, and the empirical relationship to firm performance. Specifically, it contributes to existing theory and empirical work in operationalizing OL and addressing Senge's (2006) call for answering dynamic complexity in strategic planning. The new dynamic capability developed by the researcher appeared to improve organizational learning, both in the development team and the student management teams, and improved simulated firm performance. The results contradict previous empirical research (Lucier & Torsilieri,1997) and demonstrate that it may be possible for firms that invest in specific and focused organizational learning methodologies to realize a significant return on investment. Lastly, the results of this study begin to address the void in the literature, providing "empirical insights into how firms can best develop and enhance [learning-to-learn] capabilities" (Vornies & Morgan, 2005, p.83).

The results from this study will help managers more effectively use organizational learning in their firms. The organizational learning capabilities demonstrated in this study can help create and sustain competitive advantage in the new millennium by discovering, accessing, mobilizing, and leveraging knowledge.

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APPENDICES

Appendix A: Survey Instruments

Organizational Learning Survey

¬ **Your responses will be kept strictly confidential. In the final report your responses will be combined with others to maintain anonymity.**

Firm Name_____

Quarter ending_____ **Date**_____ **Reference Code**_____

Please describe your organization along the following factors. Please respond using this scale.

	Very Strongly Disagree			*Neither Agree Nor Disagree*			*Very Strongly Agree*	*Not Applicable Don't Know*
1. This organization has a very clear understanding about how our strategy is affected by external changes.	1	2	3	4	5	6	7	N/A
2. This organization stays very aware of what's going on around us in order to understand what's happening to us and how we are doing.	1	2	3	4	5	6	7	N/A
3. This organization regularly scans the environment to observe issues that could affect us	1	2	3	4	5	6	7	N/A
5. This organization regularly re-evaluates what we do, why we do it, and how well we're doing it	1	2	3	4	5	6	7	N/A
6. This organization regularly interprets activity in our industry to assess what it means for our strategy	1	2	3	4	5	6	7	N/A
This organization regularly finds and fills gaps between what we already know, and what we need to know to carry out our strategies.	1	2	3	4	5	6	7	N/A
This organization believes there is a high degree of uncertainty about how our strategy is affected by external changes	1	2	3	4	5	6	7	N/A
People in this organization regularly talk about what's going on in the industry and what it might mean for US.	1	2	3	4	5	6	7	N/A
In this organization, people hold many different opinions about our purpose, our strategy, and how we're doing.	1	2	3	4	5	6	7	N/A
This organization regularly considers what's going on in the world to evaluate whether new opportunities or threats have emerged.	1	2	3	4	5	6	7	N/A
8. In this organization, decisions about which actions to take are made primarily by improvising.	1	2	3	4	5	6	7	N/A
This organization evaluates the selection of new initiatives and their fit closely with past successes and existing capabilities	1	2	3	4	5	6	7	N/A

For the following items, define "knowledge" as the scope of all your firm's needs to know to accomplish its -work. If your answer would vary for specific types or areas of knowledge, please choose the response that best characterizes your organization overall, in terms of the range of all that your organization must know to accomplish its work.

	Very Strongly Disagree			*Neither Agree Nor Disagree*			*Very Strongly Agree*	*Not Applicable Don't Know*
This organization continually updates its knowledge	1	2	3	4	5	6	7	N/A
This organization's knowledge base consists primarily of material that is extensively documented	1	2	3	4	5	6	7	N/A
This organization continually pays attention to the outcomes of our actions so we can tell whether our knowledge base needs to be modified	1	2	3	4	5	6	7	N/A
This organization makes use of activities and practices that develop our knowledge and enable the knowledge to grow over time	1	2	3	4	5	6	7	N/A
This organization's learning focuses primarily on exploiting our existing expertise to achieve economies of scale,	1	2	3	4	5	6	7	N/A
This organization intends to learn and to use our knowledge to improve our competitive position	1	2	3	4	5	6	7	N/A
This organization regularly learns things that result in expansion of our capabilities	1	2	3	4	5	6	7	N/A
This organization's knowledge base consists primarily of unwritten routines, processes, and "know-how"	1	2	3	4	5	6	7	N/A
This organization's knowledge base has a very extensive range, diversity, and depth	1	2	3	4	5	6	7	N/A
This organization's learning focuses primarily on exploring new areas of knowledge so that we can develop new capabilities for the future	1	2	3	4	5	6	7	N/A

	Very Strongly Disagree			*Neither Agree Nor Disagree*			*Very Strongly Agree*	*Not Applicable Don't Know*
Our organization was able to identify the primary cause's) of firm performance	1	2	3	4	5	6	7	N/A
The company identified interdependencies between causes of firm performance	1	2	3	4	5	6	7	N/A
Our company identified interrelationships between factors. (Interrelationships between factors might include profit versus market growth or life cycles.)	1	2	3	4	5	6	7	N/A
We were able to display intermediate factors of firm performance. Intermediate factors link major causes of ROA and profits to strategy and actions	1	2	3	4	5	6	7	N/A
The management team identified key categories or functions of firm performance? (Example: resources, capabilities, competitors, distribution, etc)	1	2	3	4	5	6	7	N/A

Researcher asked the following questions during focus group interaction sessions.

1. How well did the portfolio analysis facilitate productive problem solving activity?
2. In your opinion, was using the portfolio analysis tool easy or difficult?
3. What is your perception of the overall readability of the portfolio analysis tool when complete?
4. How much did the portfolio analysis stimulate discussion between participants?
5. To what degree did the portfolio analysis tool promote productive dialogue among participants?
6. Did the portfolio analysis tool actively develop participation?
7. General comments

		▪ Your responses will be kept strictly confidential. In the final report your responses will be combined with others to maintain anonymity.

STRATEGIC LEADERSHIP QUESTIONNAIRE

As you review the items listed below, reflect on various meetings or discussions that have involved strategic issues. Then circle a response based on the following scale:

1 ⇨ this behavior is generally **NOT NEEDED** in such situations
2 ⇨ this behavior is **EXHIBITED EFFECTIVELY**, no improvement needed
3 ⇨ further **DEVELOPMENT NEEDED**

This is a self evaluation by the student and their perception of how his or her team is performing in the simulation.

Know the Business and the Markets?

	Skill Not Needed	Exhibited Effectively	Develop Needed
Actively consider what product and service features internal and external consumers or users require?	1	2	3
Identify and interpret social, economic, and political trends that could affect the business?	1	2	3
Articulate a conceptual understanding of the business unit's past actions?	1	2	3
Ask thought-provoking questions that relate to the business unit's future actions?	1	2	3
Generate many alternatives to key issues; for example, by answering "what if..." questions?	1	2	3

Manage Sub-unit Rivalry?

Establish and communicate business unit goals/objectives?	1	2	3
Foster interdepartmental communications?	1	2	3
Manage interdepartmental relationships effectively?	1	2	3

Find &Overcome Threats?

Quickly spot problems and address their broader implications	1	2	3
Redefine issues to make them more understandable?	1	2	3
Identify constraints to remove or avoid them?	1	2	3

Stay on Strategy?

	Skill Not Needed	Exhibited Effectively	Develop Needed
Capitalize on the business unit's strengths?	1	2	3
Seek to strengthen the business unit's competitive advantage: address the question, "why should they want it from us"?	1	2	3
Focus on specific internal and/or external target customers?	1	2	3

Act as an Entrepreneurial Force?

Create a vision of what the business unit could be?	1	2	3
Champion innovative ideas, even when faced with skepticism, risk, and/or resistance?	1	2	3
Influence and excite others to take desired actions?	1	2	3

Accommodate Adversity Well?

Respond flexibly to problems, opportunities, and threats?	1	2	3
Exhibit comfort and tolerance when dealing with ambiguous tasks?	1	2	3
Deal with setbacks by being resilient?	1	2	3

Thank you for taking time to provide this feedback.

Appendix B: OL Assessment Matrix

	OL Assessment Matrix	Grading				
	X = 0 ▲ = 1 O =2 ✓ = 3	Not Exhibited	Partially exhibtied	Exhibited	Strongly exhibited	Comments
	Behavioral	X	▲	O	✓	
1	The approach regularly re-evaluates what we do, why we do it, and how well we're doing it (temporal characteristics)					
2	The approach evaluates our theories and how they are affected by external changes in the market					
3	The approach highlights the relationship between our industry or competive, changes and their impact on the organization.					
4	This approach is able to highlight the relationship between multi variables that influence value creation, purpose, vision and status of the organization					
5	This approach regularly considers what's going on in the world to evaluate whether new opportunities or threats have emerged.					
6	This approach highlights decisions and actions that are related to new organizational innovation and change.					
7	The approach assesses gaps between disired states and present states identifiying potetnial improvement opportunites.					
8	This approach evaluates the competitive position of the organization					
9	:This approach evaluates the selection of new initiatives and their fit closely with past successes (historical) and existing capabilities.					
	Cognitive					
1	This approach continually updates its knowledge at prescribed frequencies					
2	This approach regularly finds and fills gaps between what we already know, and what we need to know to carry out our strategies					
3	This approach consist of material that is extensively documented and researched					
4	The approach involves the practice of correcting misalignments between expectations and reality to generate more effective organizational behavior in real time					
5	The approach continually evaluates the outcomes of actions and their relationship to strategy so that our knowledge base needs can be modified					
6	The approach makes use of activities or potential activites and practices that develop our knowledge and enable the knowledge to grow over time					
7	The approach focuses primarily on exploiting our existing expertise (core competencies) to achieve economies of scale, efficiency, and specialization					
8	The approach focuses on the creation of knowledge within a firm, and the implementation of such creativity					
9	The approach promotes understanding and growth and how to add to its knowledge in order to improve the competitive position					
10	This approach emphasizes actions and decisions that can result in expansion of internal capabilities					
11	This approach incorporates a knowledge base having extensive range, diversity, and depth					
12	The approach questions the underlying basic assumptions and reflect about whether the theory under which they have been operating is still consistent with current evidence, observations, and experience.					
13	This approach of learning focuses primarily on exploring new areas of knowledge so that we can develop new capabilities for the future					
	Systems					
1	This approach strives to identify the primary cause(s) of value creation and or firm performance.					
2	The approach identifies the interdependencies between the causes of value creation and or firm performance. Interdependent causal factors interact with each other to create the effect.					
3	The approach identifies interrelationships between factors? (Interrelationships between factors might include causes, effects, and intermediate factors.)					
4	The approach is able to display intermediate factors? Intermediate factors link the root causes with the effect.					
5	The approach identifies categories of causes that drive value creation or firm performance. (Example: resources, capabilities, competitors, distribution, value chain					
6	The approach strives to test the logic and integrity of the strategy and decision made by the organization.					
7	The approach places the relative strengths, weakness, or absence of variables and objectives into an interrelationship or spatial diagram.					
8	The approach is designed to visually identify critical patterns, casual relationships, feedback loops, and integrate systems' thinking as a framework for seeing interrelationships and patterns of change versus static snapshots.					
	Knowledge transfer					
1	The approach utilizing small tests, prototypes, case scenarios, or simulations.					
2	The approach can be readily stored and transmitted to others					
3	The apprach presents competing explicit possibilities					
4	The approach; has undergone continual improvement readjusting or modifying based on trial results with regular improvement cycles					
5	The approach becomes widely disseminated, discussed, redesigned, and modified utilizing members of the organization outside of the immediate designers or users					
6	The appraoch first dis-embodies and then re-embodies tacit knowledge.					
7	The approach provides a approach for testing the logic and integrity of the tool itself. (This would be a way to verify that the construction of the tool is correct or valid.)					
8	The approach facilitates productive problem solving activity.					
9	The approach is simple and easy to understand.					
10	The tool stimulates discussion and dialogue between participants.					
	Vizualization					
1	the approach transforms concepts, ideas, interrelationships into an operational framework based on visual or written ques easily communicated to others					
2	The approach uses clear spatial and visual elements for synthesis and analysis of mulit variables.					

Appendix C: Strategic Planning Treatment for Control and Experimental Groups

The following comparison matrix of historical award winners distilled from their award applications. This model was developed to ensure students and the research study are using the most contemporary models relevant to real-world organizations, thus striving to make research findings more generalized to the external environment. By analyzing the individual firm strategic processes a summative model can be determined and illustrated in Figure 1.

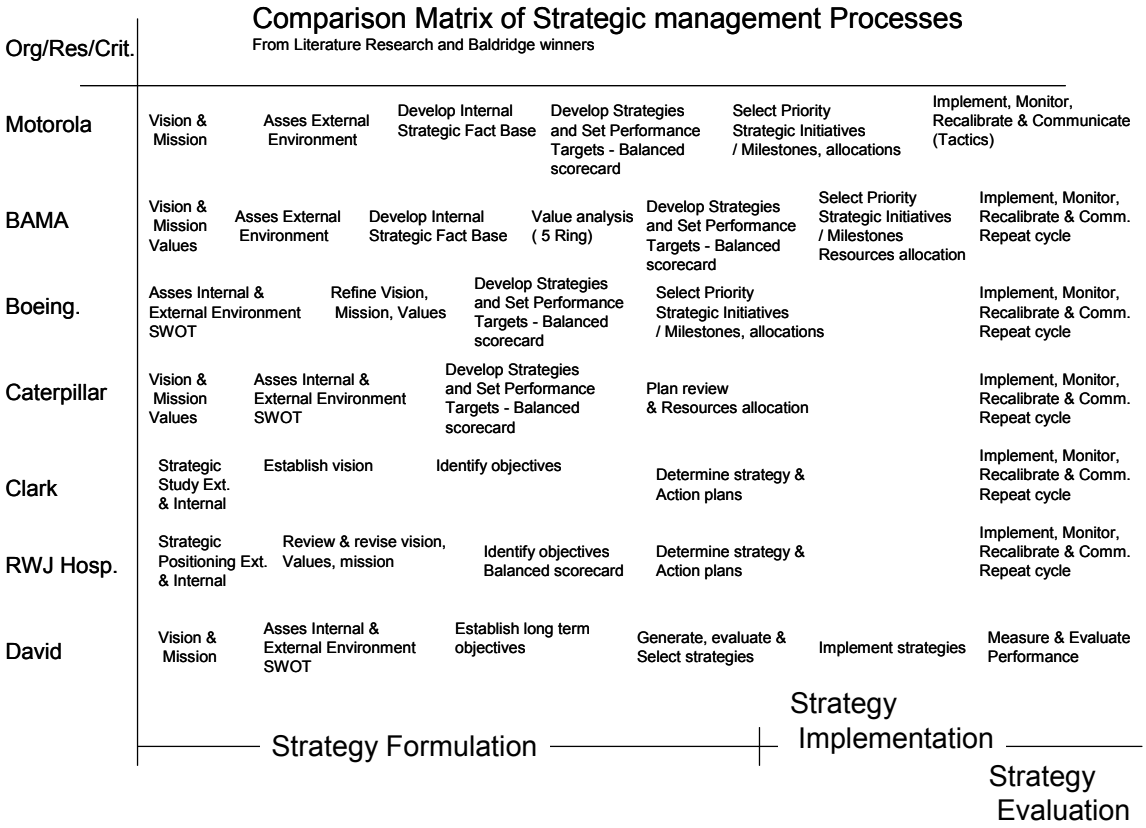


Figure 1: Comparison Matrix (Baldridge, 2006)

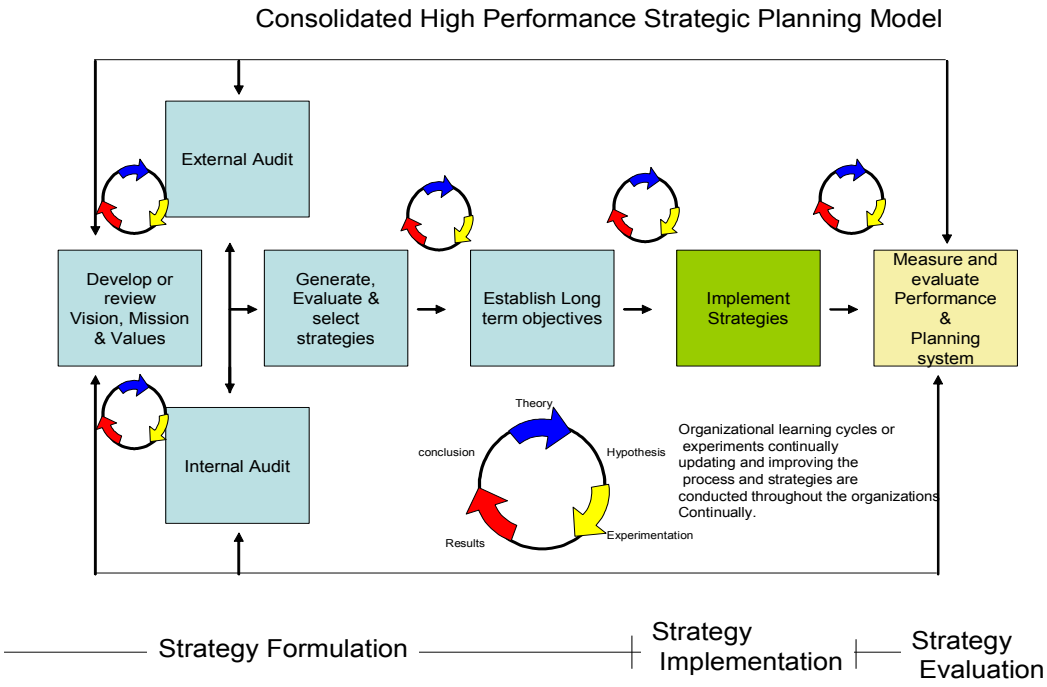


Figure 2: Consolidate High Performance SPP

The SPP treatment model is broken down into three stages: strategy formulation, strategy implementation, and strategy evaluation. In the strategy formulation stage, the activities of developing a vision and mission/values are a critical driver for the strategic planning process. This step attempts to set the direction of the company and align the corresponding levels of the organization. The vision and mission are usually reviewed and revised according to input from external opportunities and threats and internal strengths and weaknesses. From this analysis long-term objectives are derived, which represent the results expected by pursuing certain strategies. Objectives should be quantitative, measurable, realistic, understandable, challenging, hierarchical, obtainable, and congruent among organizational units. Identified objectives drive the strategy generation, evaluation, and selection step. Strategy analysis and choice seeks to

determine alternative courses of action that could best enable the firm to achieve its mission and objectives.

The strategy implementation stage may include establishing annual objectives, devising policies, allocating resources, altering or reviewing structure, evaluating human resource needs, adapting processes and culture shifts. It is essential that lower hierarchical levels of the organization are involved as much as possible in the strategy formulation stage so that they can execute and take ownership of implementation activities. The third stage of strategy review, evaluation and control is essential due to the fact that strategies may become obsolete as environments change. Strategy evaluation includes the following three basic activities: (1) Examining the underlying bases of a firm's strategy, (2) comparing expected results with actual results and (3) taking corrective actions to ensure performance conforms to plans (David 2005).

The treatment differential for control and experimental is in the context to business unit strategic product management and is as follows:

A. OL designed planning process (Portfolio Analysis) "Value T"

B. Contemporary planning process (Portfolio Analysis) BCG and GE/McKinsey

These treatments are introduced during a special training session held outside of normal class schedules to enable complete randomization of control and experimental teams across the differing classes. The control group was trained in the traditional BCG and GE/ McKinnsey portfolio methods (David, 2005). The experimental group was trained in the Value T methodology as described in Chapter 2 and appendix F.

Lesson Plan for Treatment Groups

Instructor: Guy DeLoach - use same instructor for both treatments.

Setting: Special 4 hour instruction class for Portfolio analysis Note: Both Value T and GE Mckinsey matrix instruction uses this lesson plan format except value T procedure is outlined in appendix C & F. There was two separate 4 hour sessions- one for each treatment group

Lesson Plan Title: Control group GE/Mckinsey portfolio training

Concept / Topic To Teach: GE/Mckinsey portfolio

General Goal(s): Teach concepts, application and expectations and deliverables for experimental phase using GE/Mckinsey matrix

The aim of the GE/McKinsey Matrix Portfolio Analysis is to:
• Analyze the current business portfolio and decide which businesses should receive more or less investment
• Develop growth strategies for adding new products and businesses to the portfolio

• Decide which businesses or products should no longer be retained or harvested

Specific Objectives:

A. Six-step approach for the implementation of the McKinsey Matrix

1. Specify drivers of each dimension. The corporation must carefully determine those factors that are important to its overall strategy.
2. Determine the weight of each driver. The corporation must assign relative importance weights to the drivers.
3. Score the SBU's on each driver.
4. Multiply weights and scores for each SBU.
5. View resulting graph and interpret it.
6. Perform a review/sensitivity analysis. Make use of adjusted other weights and scores (there may be no consensus

B. Application in case scenario- America edition
C. Ensure understanding of expectations and deliverables in simulation action plans

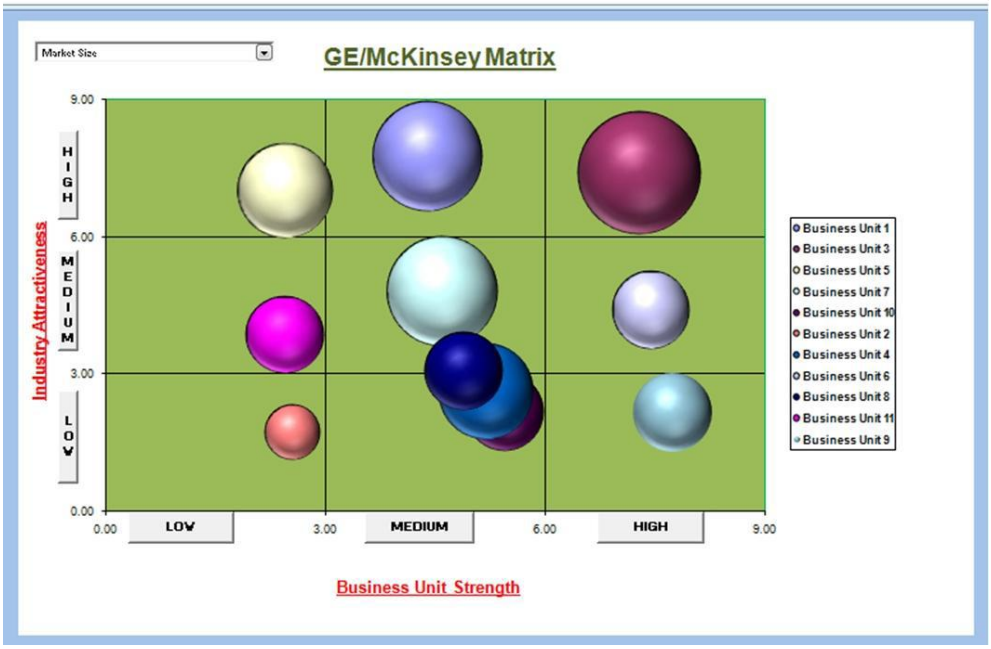
Required Materials: Power point slides and support materials accessible to students via Lee University instructor website, GBG simulation world edition and Americas edition.

Anticipatory Set (Lead-In): Use the GE case analysis example. Jack Welch redefined GE into a new learning organization and subsequent leading edge company

Step-By-Step Procedures:

1.1 INTRODUCTION

The GE/McKinsey Matrix is a nine-cell (3 by 3) matrix used to perform business portfolio analysis as a step in the strategic planning process.
The GE/McKinsey Matrix identifies the optimum business portfolio as one that fits perfectly to the company's strengths and helps to exploit the most attractive industry sectors or markets.
Thus, the objective of the analysis is to position each SBU on the chart depending on the SBU's Strength and the Attractiveness of the Industry Sector or Market on which it is focused. Each axis is divided into Low, Medium and High, giving the nine-cell matrix as depicted below.
SBUs are portrayed as a circle plotted on the GE/McKinsey Matrix, where the size of the circle represents a factor such as Market Size.
The GE/McKinsey Matrix differs from other tools, like the Boston Consulting Group Matrix, in that multiple factors are used to define Industry Attractiveness and Business Unit Strength.



Each factor can be given a different weighting in calculating the overall attractiveness of a particular industry.
Typically:
Industry Attractiveness = *Attractiveness Factor 1 Value by Factor 1 weighting + Attractiveness Factor 2 Value by Factor 2 weighting, etc*.
Business Unit Strength = *Strength Factor 1 Value by Factor 1 weighting + Strength Factor 2 Value by Factor 2 weighting, etc*.
This template allows the user to define up to 10 SBUs to be plotted. Up to 10 different factors can be used to define Industry Attractiveness; typical factors would be Market Size, Market Growth Rate, Industry Profitability, Competitive Rivalry, etc.
Up to 10 factors can also be used to define SBU Strength. Typical factors are Market Share, Distribution Channel Access, Financial Resources, R&D Capability, etc
The factors and their relative weightings are selected. The rating values for each factor are entered for each SBU and Industry.
The SBU Strength and Industry Sector Attractiveness are calculated and the GE/McKinsey Matrix is automatically produced.
The format used to produce the Matrix is a MS-Excel Bubble Chart. Industry Attractiveness and Business Strength are plotted on the X and Y axes. The size of the Bubble allows a further factor to be depicted on the chart. The default factor used is Market Size. However, a Dropdown list is available allowing the user to dynamically select any of the Industry Attractiveness factors as an alternative.

1.2 User Instructions

The MS-Excel model has a simple Push Button Menu system at the top of the Workbook in cell B2. (see figure 1) The following general guidelines should be followed. Cells in Green are intended for User Input. Cells in Black are calculated and should not be altered by the user. On first use it is recommended that the Menu Options be used in the sequence in which they are numbered, 1, 2, 3, etc. On subsequent use the options can be selected as required to make amendments to the data originally entered.

Figure 1

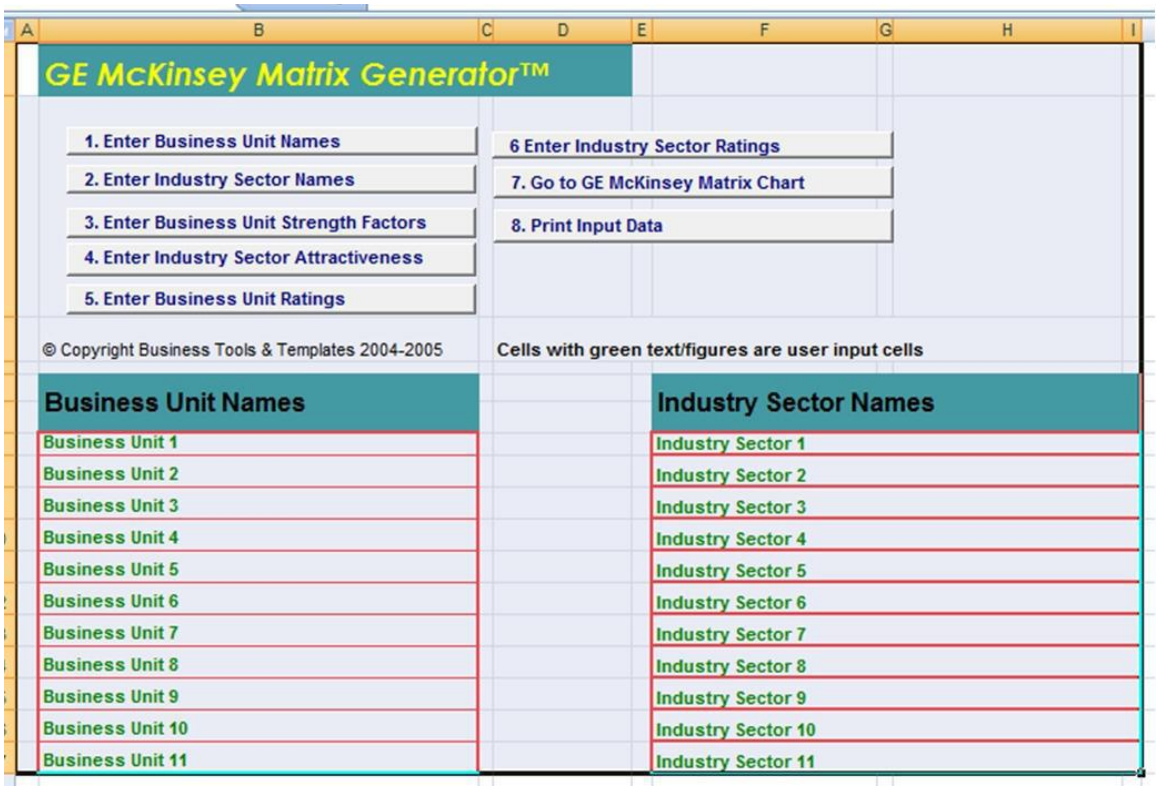
Step by Step

1. Enter the Business Unit Names.

Up to 10 Business Units may be entered (see figure 1)

2. Enter the Industry Sector Names.

Each Industry sector should correspond to a Business Unit. Thus, Industry Sector 1 should correspond to Business Unit 1, etc. (see figure 1)



3. Enter Business Unit Strength Factors.

Business Unit Strength Factors	Factor Weighting	Business Unit 1 Rating 1 -9	Business Unit 2 Rating 1 -9
Market Share	20%	5	4
Profitability Relative to Competitors	20%	4	2
Management Team	15%	3	3
Labour Costs	10%	4	1
Distribution Channel Access	10%	5	2
Financial Resources	5%	6	2
R & D Capability	5%	7	4
Production Technology	5%	5	1
Customer Focus	5%	4	2
Industry Specialisation	5%	3	3

Figure 2
For each Factor enter a corresponding weighting as a percentage. The sum of the weightings assigned to the different factors MUST add up to 100% (see figure 2)

4. Enter Business Unit Ratings.

Enter Ratings for each Business Unit it terms of the Strength Factors on a scale of 1 to 9 where:

1 Extremely Weak
5 Industry Average
9 Extremely Strong representing industry best practice
(see figure 2)

5. Enter Industry Attractiveness Factors.

Industry Attractiveness Factors	Factor Weighting	Industry Sector 1 Rating 1 -9	Industry Sector 2 Rating 1 -9	Industry Sector 3 Rating 1 -9	Industry Sector 4 Rating 1 -9	In
Market Size	20%	4	1	5	3	
Market Growth Rate	20%	8	1	9	2	
Sector Profitability	15%	9	1	9	2	
Competitive Environment	10%	9	2	9	2	
Global Opportunities	10%	9	3	9	1	
Regulatory Regime	5%	8	1	9	7	
Opportunity to Differentiate	5%	9	1	5	1	
Demand Patterns	5%	9	1	5	3	
Entry Barriers	5%	9	5	5	4	
Distribution Structure	5%	9	5	5	5	

Figure 3

For each Factor enter a corresponding weighting as a percentage. The sum of the weightings assigned to the different factors MUST add up to 100%

6. Enter Industry Attractiveness Ratings.

Enter Ratings for each Industry Sector it terms of the Attractiveness Factors on a scale of 1 to 9 where:
1 Extremely Unattractive
5 Industry Average
9 Extremely Attractive
(see figure 3)

Chart Generation

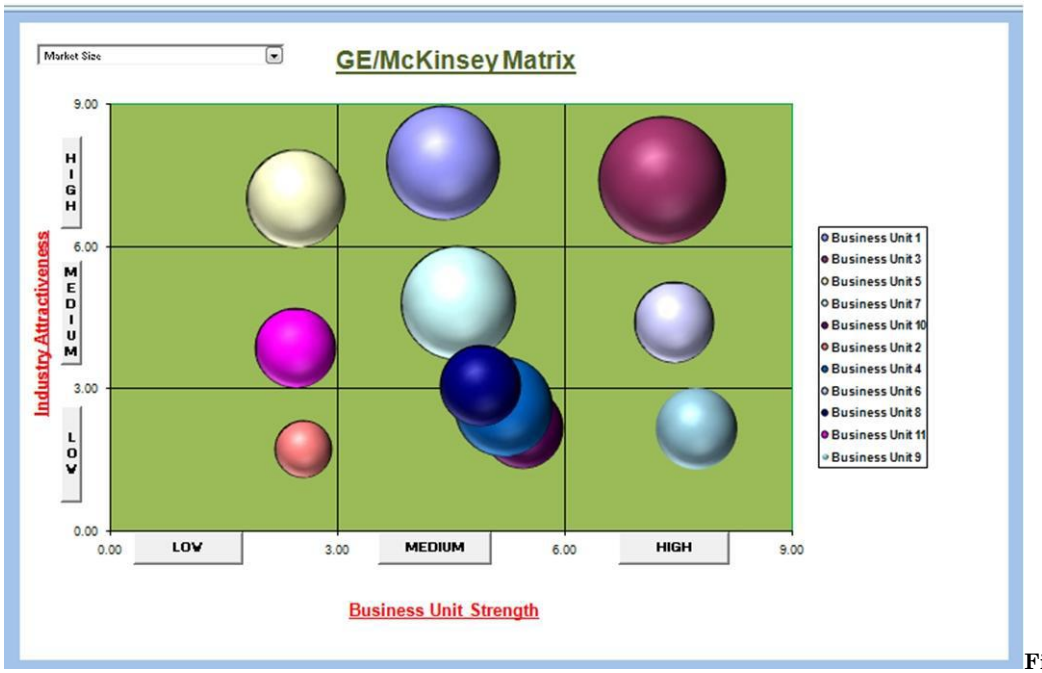


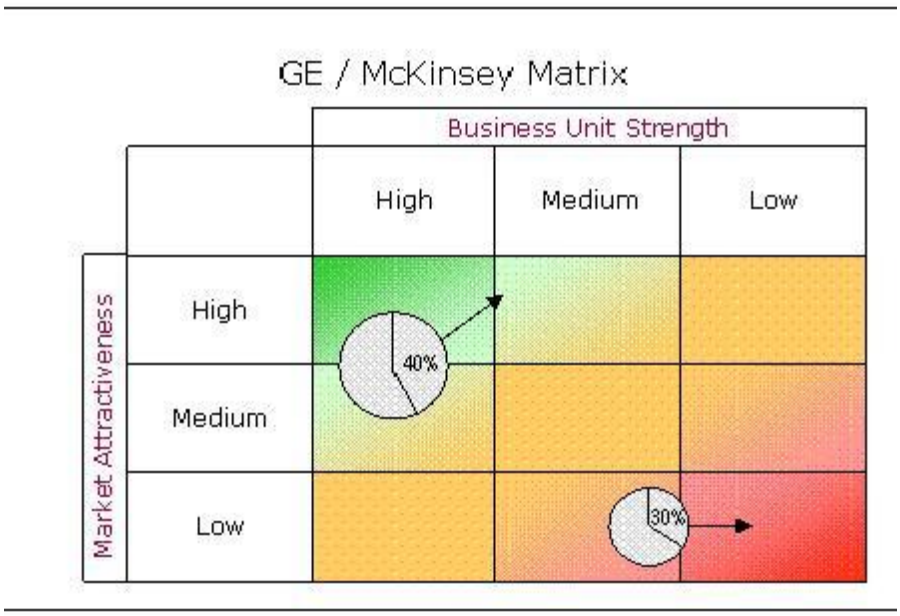
Figure 4

When the data is entered, the Business Unit Strength and corresponding Industry Attractiveness values are calculated and the GE/McKinsey Matrix chart is automatically created.

The GE/McKinsey Matrix Chart (see figure 4) has a dropdown list on the top left-hand corner of the chart to select the Industry Attractiveness Factor to be depicted by the relative size of the bubbles displayed in the chart.

Each business unit can be portrayed as a circle plotted on the matrix, with the information conveyed as follows:

- Market size is represented by the size of the circle.
- Market share is shown by using the circle as a pie chart.
- The expected future position of the circle is portrayed by means of an arrow.



The green zone indicates go ahead. It includes the strong SBU's in which the company should invest and grow. They go for Expansion Strategies

The yellow zone indicates wait and see. It includes SBS's that are medium in overall attractiveness. They should maintain their level of investments. They go for Stability Strategies

The red zone indicates stop. It includes SBU's that are low in overall attractiveness. They go for Retrenchment Strategies (Divestment and Liquidation).

The shading of the above circle indicates a 40% market share for the strategic business unit. The arrow in the upward left direction indicates that the business unit is projected to gain strength relative to competitors, and that the business unit is in an industry that is projected to become more attractive. The tip of the arrow indicates the future position of the center point of the circle.

Plan for Independent Practice: Students will apply portfolio analysis to case study in the Americas edition. Use portfolio analysis by major market and product segmentation. Groups report out findings. Instructor and class mate's critique findings.

Closure (Reflect Anticipatory Set): Instructor reinforces key learning's of portfolio analysis concepts. Instruct students for usage during simulation experimental phase.

Assessment Based on Objectives: Administer quiz on portfolio analysis key concepts, its application and expected deliverables for experimental phase.

Appendix D: Business Simulation Comparison Matrix

Descriptor	CAP	BPG	GBW	MICRO
Number of products	One product for five market segments. Can expand to eight models.	One but can introduce new models for nine possible market segments in each of four market areas.	Two but tailored by quality levels for the country markets served.	One but can vary quality and develop features by markets.
Product type(s)	Electronic sensor	Generic—A consumer durable	25" and 27" television sets	Generic—A consumer durable
Home country	United States	United States	Can be the United States, Mexico, Germany, Spain, Japan or Thailand.	United States or any euro zone country.
Active subsidiaries	None	Three markets in the United States with an additional generic off-shore market.	One in the Home Country plus the addition of five more.	Two in the United States plus an additional generic euro zone market.
Factories	One	Two	Six	Three
Factory operations	Two shifts	Two shifts plus overtime	Two shifts plus overtime	Number of work crews plus overtime
Factory maintenance	No	Yes—By factory based on plant size	Yes—By factory and by three types of equipment in each factory	Yes
Factory options	No	Build new, expand plant size and production lines, layoff and deactivate individual lines, close and sell plant.	Build new, expand, contract, decommission, liquidate or transfer all to other operating units. Can also sell off capacity and subcontract as strategic alliances.	Build new, expand, lease, subcontract, decommission or liquidate.
Quality Control	Ten options regarding quality initiatives	Quality is a product design and market segment variable.	Two simultaneous types of programs.	No Quality Control program but a "Quality Investment" decision improves the product's quality.
Research and Development	Product performance, size and mean time between a product's failure.	Product and process with process resulting in cost savings.	Product development resulting in patentable features with slight process benefits.	Product and process to add features and increase production efficiency.
Factory workers	Assigned by the simulation.	Line worker efficiency increased via training expenditures.	Experienced and inexperienced with different salaries and training needs scheduled by shift and product.	Hired one period in advance.
Factory foreman	No	No	Yes—By coverage required in each country.	No
Robotics	No	No	Two types plus attending technicians.	No
Raw materials	Automatically ordered by the simulation.	Automatically supplied by the simulation.	Six—Advance ordering of two major groups with three quality levels each.	One ordered one period in advance.
Capacity options	Increase or decrease factory size and the factory's labor to robotics ratio.	New lines where space is available, more space can be purchased.	18 possibilities-- Assembly line capacity and two types of robots within each factory.	Add capacity to an existing plant or build new plants.
Funds transfers	No	Yes	Yes	Yes
Sales promotion	By medium.	Budgeted by market areas.	Budgeted by country markets and products.	Budgeted by markets.
Fluctuating exchange rates	No	Yes	Yes	Yes
Sales offices	Automatically hired by the simulation.	Yes—Options to start-up and shut-down one per market.	Yes—Options to start-up and shut-down multiple sales offices in each country	No
Sales force	Part of sales budget by model.	Market assignments, quits, hiring, firing, base salaries and commission rates	Country assignments, quits, hiring, firing, training budget, base salaries and commission rates	Market assignments, quits, hiring, firing, base salaries and commission rates.
Employee training	Factory workers	Factory workers	Factory workers, sales representatives and robotic technicians	Yes
Distribution Centers	No but part of sales budget by model.	Yes	Yes	Yes
Wholesalers	No	No	Two types	Yes
Bonds	Yes—With no mandatory repayments with bond calls.	Yes—With bond calls.	Yes—With mandatory quarterly payments with bond calls.	Yes—With mandatory quarterly payments with bond calls.
Stocks	Yes-- With dividends and Treasury Stock purchases.	Yes-- With dividends and Treasury Stock purchases.	Yes-- With dividends and Treasury Stock purchases.	Yes-- With dividends and Treasury Stock purchases.
Short-term loans	1-year loan	90-day loan	90-day loan	90-day loan
Short-term investments	No	Deposit certificates	Yes	Deposit certificates
Minimum decisions	50	41	24	
Maximum decisions	75	87	326	103
Research Reports	No	Five covering competitor's advertising, sales force size, sales force compensation and two levels of consumer preference surveys.	Twelve covering actual unit sales, one-quarter sales forecasts, advertising budgets, quality levels and sales force compensations by products and countries.	Eleven covering a one and four-quarter sales forecast, number of sales persons and their commissions, plant capacity, three forms of advertising and actual sales and sales prices.
Companies per industry	2-6	3-8	3-9	2-20
Computer-generated events	None	10 Vignettes	12 Critical Incidents	None
Strategic alliances	No	No	Yes—Patent licenses, capacity sales/purchases and subcontracting	No
Computer role	Online server	Installed locally via internet delivery	Online server	Online server
Decision support materials	*Pro forma* Income Statements and *Pro forma* Cash Flow Report and auxiliary spreadsheets.	Eight auxiliary spreadsheet programs available online covering capital budget, pro forma financials, production plan and	Built-in *Pro forma* Income Statements and *Pro forma* Cash Flow Report and auxiliary spreadsheets for production scheduling, raw	Built-in *Pro forma* Income Statements and *Pro forma* Balance Sheet and Cash Flow Reports and auxiliary spreadsheets for

Appendix E: OL Dynamic Capability Process and Development of Value T

The OL development team was comprised of three professor's in the field of business management with experience in corporate and academia environments with specialization in strategic management and administration. Prior to the OL assessment, the traditional portfolio tools were fully defined with key elements, purpose, and objectives. These elements were illustrated and recorded so understanding of the approaches was fully understood by all team members. Utilizing the OL assessment matrix**,** the BCG and GE/McKinsey matrix were graded independently by each team member. The assessment process revealed gaps or opportunities for strengthening certain key organizational learning constructs in the approaches. The following OL assessment criteria were rated as low or absent by the team:

Behavioral learning

1. Temporal qualities – a) The ability to update knowledge at prescribed frequencies and regularly re-evaluate what the organization does, why it is done, and how well it is being done. b) Continual evaluation of outcomes, related actions and their relationship to strategy so that the organizational knowledge base can be modified. c) The approach exhibits patterns, rhythms, or symmetry among variables over time. The traditional approaches may be enhanced to better enable accuracy of forecast, their methodologies and relationship of variables in a dynamic time flow.

2. Value creation- The approaches cannot adequately highlight the relationship between multiple key variables both external and internal that influence value creation, purpose, vision, and status of the organization. Cognitive learning

1. The approaches provide focus on leveraging and expanding core competencies to

achieve economies of scale, efficiency, and specialization.

Systems and Action learning

1. The approach strives to identify the primary causes of value creation and performance.
2. The approach indentifies the interdependencies between causes of value creation. These interdependent casual factors interact with each other to create effect.
3. The approach is to display intermediate factors. Intermediate factors link the root causes with the effect.
4. The approach identifies categories of causes that drive value creation or performance. (resources, capabilities, competitors, distribution, value chain)

The three member panel summarized the opportunities for incorporating OL elements as follows: 1) the traditional portfolio analysis methods of analyzing multiple variables in a dynamic time flow may be enhanced. It is vital that firms do not focus their attention on isolated snapshots in time, this limitation restricts or hampers action or cycles of learning; 2) existing approaches may not fully exhibit the characteristics or importance of economic value creation in the value chain functions. The inability to determine economic value creation hinders the behavioral learning process by not providing proper or relevant comparative data; 3) industry and product life cycles can be enhanced to clearly identify, evaluate and understand casual chains with potential strategy options. 4) Interpretation and application of generic strategies is sometimes complex and difficult, hampering cognitive learning; 5) the evaluation of key learning's over life cycles in markets, industry, and products may be improved to highlight alternative strategies, actions and associated performance. This feedback loop is vital to

understand the relationship and causal chains of strategy, action and performance, thus driving sustainable competitive advantage.

A modified interrelationship diagram was used to identify existing and potentially new elements incorporating the OL constructs (Figure 2). Interrelationships of elements were established with causal loops implying negative and positive effects. Several new elements were developed via the process to address the gaps in OL constructs and include the following: Value chain analysis and value creation metrics (EVA, Residual Income, Cash) were developed to address the enhancement of value creation (behavioral learning); stages of product life cycles and relationships to generic strategy are introduced to promote cognitive learning capabilities; and product life cycle characteristics are introduced to bridge the relationship of variables over time. These elements were placed into a spatial format via a brainstorming session striving to represent graphical interdependencies of multiple key variables and strategy, which reinforces systems, and action learning. Forecasting into the future and monitoring performance to predictions strengthens the understanding of casual effects and their underlying strategy a vital component of double-loop learning. The combined analysis of market attractiveness and value chain core and distinct competencies, life cycle stage, market share, revenue contribution and economic profits should permit for a greater understanding of casual dynamics enhancing organizational learning. Figure 17 illustrates these relationships.

After several iterations the graphical representation was created. The subsequent technique, "Value T" strives to address the OL deficiencies and highlight causal relationships between the factors, thus providing greater cognitive and behavioral learning opportunities. The value T consists of two opposing graphs configured in a T matrix format and is illustrated in

Figure 13. The opposing graphs are market attractiveness and value chain analysis in the vertical axis (scales 1 low – 5 high), with a time element in the horizontal axis. This time element allows one to understand more fully the dynamics associated in the business environment. The aspect of temporal characteristics is critical in cognitive and behavioral learning more specifically the analysis of business forces and developing subsequent strategies. Competition among organizations is played out over time. As circumstances, capabilities, and strategies change, static analysis techniques do not reveal the dynamics of the competitive environment (Dess, 2006).

The Value T reinforces cognitive learning by allowing firms to access the competitive environment over time, through business cycles and project future market and competitive advantage positions by plotting competitor positions against current organizational state. A key component of successful strategic planning and action learning is the ability to project or forecast into the future. The temporal qualities of the value T permits a firm to compare projections against actual competitor performance, correcting misalignments, and hopefully strengthening the projection methods which is a form of single-loop learning. High market attractiveness and economic value creation in the value chain should drive increased wealth for shareholders (Figure 9).

The Value T highlights specific interdependencies between market attractiveness and value chain by adding the variable of accounting profits and other economic value creation indicators. The value creation indicator (increasing shareholder wealth) is proposed to be either residual income or economic value added (EVA). Shareholder wealth may or may not be added in the presence or absence of high levels of market attractiveness and competitive advantage.

With the move in recent years to ensure shareholder wealth in investments, it is critical to understand fully the drivers of economic profits and their associated cost of capital. Understanding the critical drivers of wealth creation is a basis of single and double-loop learning. Products, markets and SBUs must return a positive economic profit. Accounting profits may yield positive results, but if positive economic profits are not being generated, there is an evaporation of value in the organization.

Appendix F: How to Use Value T Detail

The resultant learning mechanism, "Value T" is a graphical representation comprised of multiple linking theories and variables. The following figures describe how each variable is graphically represented and builds to a completed Value T matrix.

Industry attractiveness is captured using an index in a vertical axis. The corresponding color palette (red low – moderate- green high) illustrates visually a potentially improving or worsening market attractiveness position.

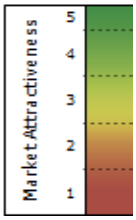


Figure 1: *Market Attractiveness*

This index is comprised of market attractiveness variables. This information is derived from an external factor evaluation format illustrated in Table 1.

Value T

Industry Attractiveness Factors	Factor Weighting 0.0 -1.0% must add to 1.0		Industry sector 1 Rating 1 -5		Industry sector 2 Rating 1 -5		Industry sector 3 Rating 1 -5	
Market growth rate	25.0%		4	1	2	0.5	2	0.5
Market size	20.0%		4	0.8	3	0.6	2.5	0.5
sector profitability	20.0%		5	1	2	0.4	4	0.8
global opportunities	10.0%		5	0.5	3	0.3	4	0.4
regulatory regime	5.0%		3	0.15	3	0.2	4	0.2
opportunity to diferentiate	5.0%		4	0.2	3	0.2	3	0.2
demand patterns	5.0%		3	0.15	4	0.2	3	0.2
entry barriers	5.0%		3	0.15	2	0.1	1	0.1
distribution structure	5.0%		2	0.1	3	0.2	1	0.1
Total	1.00		**4.05**		**2.55**		**2.8**	

Value Chain analysis	Factor Weighting 0.0 -1.0% must add to 1.0		SBU or Product 1 Rating 1 -5		SBU or Product 2 Rating 1 -5		SBU or Product 3 Rating 1 -5	
Market share	20.0%		4	0.8	2	0.4	4	0.8
Profitability relative to compettiors	15.0%		4	0.6	3	0.5	3	0.5
Management team	10.0%		5	0.5	2	0.2	4	0.4
Labor cost	15.0%		5	0.75	3	0.5	4	0.6
Distribution Channels access	10.0%		3	0.3	3	0.3	4	0.4
Financial resources	10.0%		4	0.4	3	0.3	3	0.3
R & D capability	5.0%		3	0.15	4	0.2	3	0.2
Production Technology	10.0%		3	0.3	2	0.2	3	0.3
Customer Loyalty	5.0%		2	0.1	3	0.2	1	0.1
Total	1.00		**3.9**		**2.65**		**3.45**	

Table 1: *EFE and IFE evaluation*

Depending on the segmentation used in the external factor evaluation (EFE) process, the weighted scores are graphed accordingly. If the segmentation is a series of products, an EFE is constructed for a variety of products in that market. The resulted weighted scores allow the proper plotting of the products on the market attractiveness axis.

Value chain analysis is considered to be aligned with the internal strengths and weakness of the firm and is identified via the value chain analysis (VCA) process. Competitive advantage life cycles of core and distinct competencies should be identified similarly to the market attractiveness life cycles. The weighted scores for each factor are plotted on the VCA vertical axis (Figure 2)**.** The scores are derived via an internal factor evaluation approach as illustrated inTable 1. The corresponding color palette (red low – moderate- green high) illustrates visually a

potentially improving or worsening value chain position.

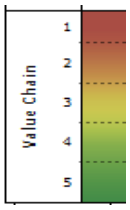


Figure 2: *Value Chain evaluation*

The vertical components of market attractiveness and VCA are arranged with a time variable positioned horizontally between the two categories that references longitudinal events at prescribed frequencies that are relevant to product life cycles or market velocity (Figure 3).

Figure 3*: Time variable*

The Value T uses a circle graph format. In the upper graph of market attractiveness, the size of the balloon may represent the revenue contribution of each SBU, product, division, etc. Inside the balloon, a pie chart is constructed to present the relevant market share. (Figure 4)

Figure 4: Revenue and Market Share

Within the VCA axis the size of the circles may indicate the level of profit or cash flow contribution for that specific product or business segmentation. Inside the balloons residual income or EVA can be represented by a symbol (+,-) or percentile.

Figure 5: EVA and Profit

Product and industry life cycles are identified and aligned in the market attractiveness variable. This aspect strives to identify patterns, velocity and sustainability aspects in market attractiveness in relation to time (Figure 6).

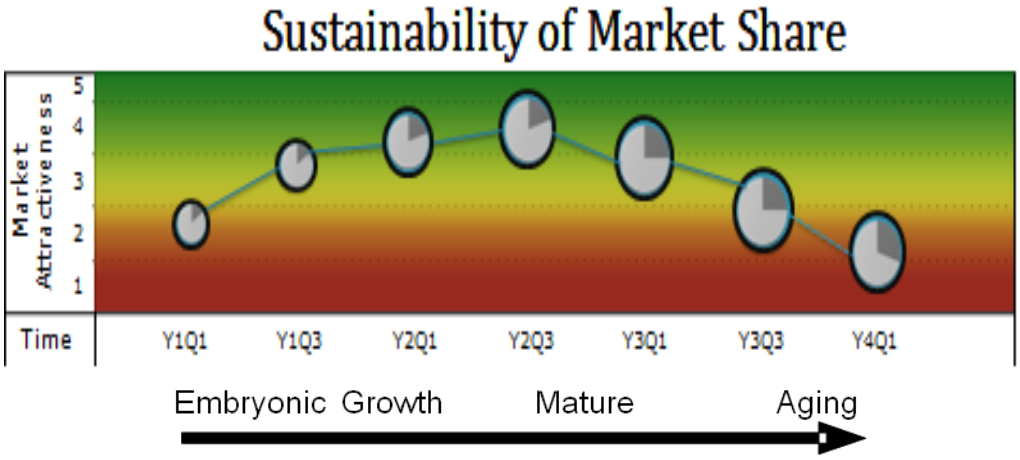


Figure 6: Sustainability of Market Share

Competitive advantage life cycles are identified similarly to the market attractiveness cycles. The weighted scores for each factor are plotted on the VCA axis. The zone marked in red represents low value adding potential**;** and as the plots move into the green area, it represents greater potential for value creation. This aspect strives to identify patterns, velocity and

sustainability aspects in core and distinct competency in the VCA in relation to time (Figure 7).

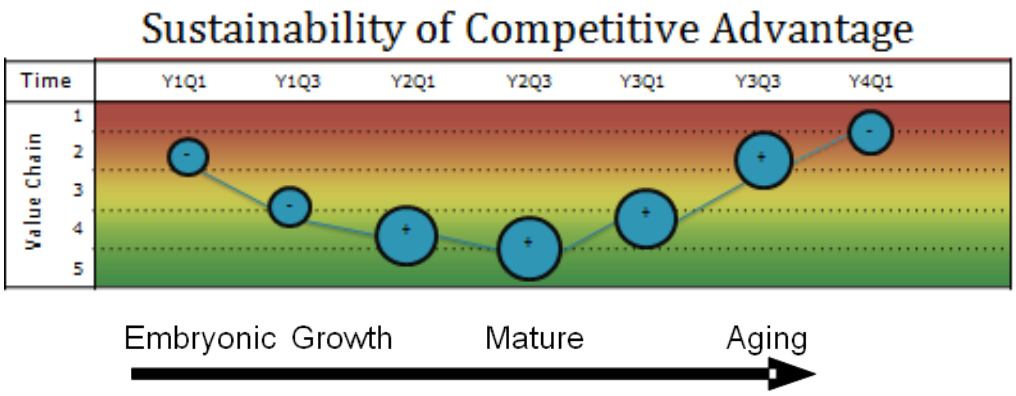


Figure 7: Sustainability of Competitive Advantage

Other colored circles or the use of additional symbols can represent competing internal products, products at other price points, targeted market segments or external competitor products. Further these positions are forecasted into a future state as illustrated in Figure 8

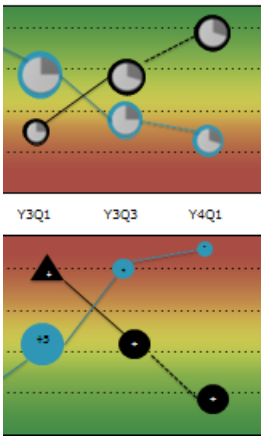


*Figure 8: C*ompetitor position

Utilizing key OL theoretical concepts the value T is designed to enable managers to efficiently and effectively synthesize and analyze multiple variables and their relationships.

These relationships may exhibit themselves in patterns or casual linkages. The distance between market attractiveness and VCA is computed to analyze these relationships. Figure 9

Distance	2.5	5.8	4.1

Figure 9: *Relationship of VCA to Market Attractiveness*

The Value T contains an indicator of cash flow (size of balloon) in the form of accounting profits. Although not a direct cash flow correlation, profits are generally accepted as an indication of cash generation. The accounting profit indicator may be changed to actual cash flow contribution for greater ease in understanding cash generation and cash needs across products or SBUs. Understanding the causal relationship among competitive advantage, life cycles, and economic profits of the firm are critical for organizational learning and vital to sustain growth and increase shareholder wealth.

The Value T graphical capabilities, represents in a spatial context, multiple indicators that influence value creation. The ability to identify and more fully understand these relationships and enhance the cognitive learning process is vital to learning and organizational success. Product and industry life cycles are an important part of organizational cognitive knowledge because emphasis on various generic strategies, value chain configuration globally, value creating activities, and overall objectives vary over the course of business life cycles. Firms depend on investments in research and development activities in the introductory stage of the life cycle. R&D is the source of new products and features that hopefully will drive product differentiation and first to market. During the maturity phase, the function changes and managers must place

greater emphasis on production efficiencies and process engineering to lower costs. This action helps to protect the firm's market position and to extend the product life cycle (Dess, 2006). The Value T evaluates the cycles of products, markets, and SBUs and encourages the development of cognitive knowledge through causal understanding in the drivers of sustaining market share and competitive advantage. The organization needs to identify patterns, variation and shifts in these critical factors and strive to understand their drivers. Systems thinking strives to understand the patterns and rhythms' throughout business life cycles.

Tool Dynamics and Usage

The Value T is constructed using a balloon graph format. In the upper graph of market attractiveness, the size of the balloon may represent the revenue contribution of each SBU, product, division, etc. Inside the balloon, a pie chart is constructed to present the relevant market share. Market attractiveness variables can be considered similarly to opportunities and threats that may exist in the firm's external environment. This information is derived from an external factor evaluation format illustrated in Table 1.

Depending on the segmentation used in the external factor evaluation (EFE) process, the weighted scores are graphed as exhibited in Figure 13. If the segmentation is a series of products, an EFE is constructed for competing products in that market segment. The resulted weighted scores allow the proper plotting of the products on the market attractiveness axis. Plots in the zones primarily colored red indicate less attractive market potential, and as plots move into the areas shaded green represent greater market attractiveness. The factors are charted at prescribed frequencies. These prescribed frequencies are based on the life cycle or velocity of the markets. Upon completion of the EFE analysis, one should estimate the life cycle of the market segment,

SBU, product, or pertinent segment using the life cycle descriptors. The life cycle categories should include embryonic, growth, mature, and aging. Further definition may be applied indicating the beginning or exiting of a particular life cycle stage. Over time, these stages should evolve with resolution and accuracy of the actual life stage becoming more clearly defined. Proper life cycle identification is critical for cognitive learning to occur and can be crucial in determining potential applicable generic strategies.

Value chain analysis is considered to be aligned with the internal strengths and weakness, and specific core and distinct competencies of the firm and is identified via the VCA process. Competency life cycles should be identified similarly to the market attractiveness cycles. The weighted scores for each factor are plotted on the VCA axis. The zone marked in red represents low value adding potential, and as the plots move into the green area it represents greater potential for value creation. The size of the balloons indicates the level of profit or cash flow contribution for that specific product or business segmentation. Inside the balloons residual income or EVA can be represented by a symbol (+,-) or number. A number for EVA and a percentage for residual income are encouraged to understand increases over time in the creation of wealth sustainability throughout the life cycle. The balloons are projected into a future state to assist in the strategic planning process.

Correspondingly, forecasting and actual results are compared to evaluate the projection methodologies for accuracy. Competitor positions also can be graphed in the value chain axis as a reference (behavioral learning) and to reinforce the specific type(s) of competitive advantage that the firm may or may not have over competitors. Competitor positions may be represented using differing symbols such as triangles or diamonds. The competitor positions and subsequent

firm position can be configured and reinforced using information from benchmarking or competitor profiles.

Diagnostics of the Value T

As presented earlier, life cycles present potential distinct generic strategies that may apply. By forecasting the attractiveness positions and consideration of specific life stages, the firm can develop appropriate strategies to drive and sustain value creation. The Value T graph is a simplified analytical tool for determining potential generic strategies, or eliminating non-value adding business segments, or simplifies and focuses on value adding aspects of the business. As the distance between the vertical plots of both graphs decreases, a potentially worsening investment, value evaporation, or indication of a weakened state may be evident. As the distance between the balloons increases the potential for value creation and return on investment may increase as seen in Figure 10. The distance is calculated so that the multivariable relationship can be tracked over time which is vital to establishing appropriate strategies and understanding casual linkages vital in systems thinking.

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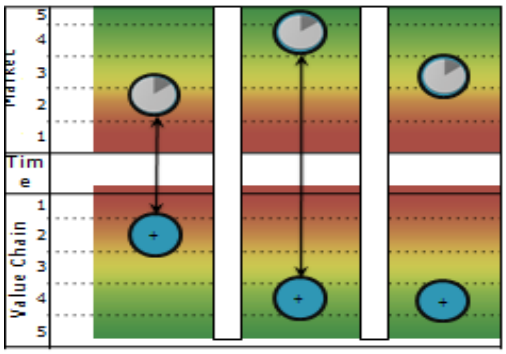


Distance	A=2.5	A=5.8	A=4.1

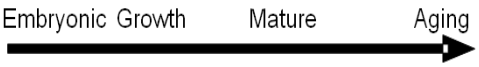


Figure 10: Correlations between Market and Value Chain

The residual income should be evaluated through differing stages of the life cycle. These internal measure of value creation should be correlated with life cycle segments, competitor positioning, market share, profit contribution, revenue streams, and core competencies in the value chain. If negative residual income is continually associated with key variables and the product segment is entering or forecasted to enter mature or later growth stages, an alternative strategy may be needed to generate shareholder wealth or a defensive strategy may need to be applied (retrenchment, divesture, or liquidation). The colorization of the graphs, corresponding location (life stage) relative separation and size of the balloons can indicate potential strategies for consideration. Plots are actual and predictive. Numbers reveal the relative strengths or weakness of the relationships, not mathematical precision. Total scores below 2.5 indicate an organization that may have an internally weak competitive position, economic value and market attractiveness in their perspective life cycles, whereas a firm scoring over 2.5 may be considered possessing a stronger competitive position, generating economic value and in an attractive market in certain business life cycles.

Three generic strategy profiles emerge from the correlation between the factor placement in the VCA, market axis and the related color. They are as follows: 1) investment for growth (see Figure 11) or the projected potential for growth, which is primarily colored green on both axes. Within this color band these variables are targets for investment, have strong to medium business strengths, are in attractive markets, and should yield economic profits for the firm. These factors

should receive financial and managerial support to maintain their strong position and to continue contributing to long-term profitability. In other words, managers should evaluate the potential for market leadership segmentation, identify weaknesses and build on strengths;

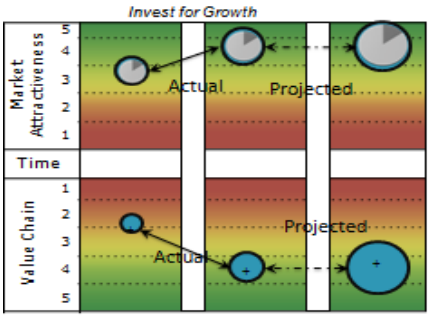


Figure 11: Investment for Growth (DeLoach, 2010)Factors that are losing their market attractiveness and competitive advantage may be considered for selective harvesting of cash-flow or differentiation modifications. For businesses with attractive markets but weakening value chain or competitive advantage (green and yellow axis position respectively) investments must be made to improve business strengths, only businesses that can improve their strengths should be retained. Managers should evaluate opportunities for specialization, seek niches, and consider acquisitions. Businesses that have good competitive advantage in an industry that is losing its market attractiveness (yellow and green axis position respectively) may be candidates for harvesting cash flow, but caution needs to be exercised not to run down the firm prematurely. Managers might consider maintaining position elsewhere, invest strongly in a growth area (developing countries) and identify growth segments. Selective investment and earnings retention is characterized by variations in the market and competitive conditions. They are primarily a mix of green and red plots. Management should be more cautious and place a greater emphasis on selective investing and earning retention (see Figure 12). Businesses with average

business strengths and average market attractiveness (yellow and yellow) may be able to improve their positions by creative segmentation to create profitable segments and by selective investment to support the segmentation strategy. These businesses need to create superior returns by concentrating on building segment barriers to differentiate themselves (specialize, invest, selectively and identify segments):

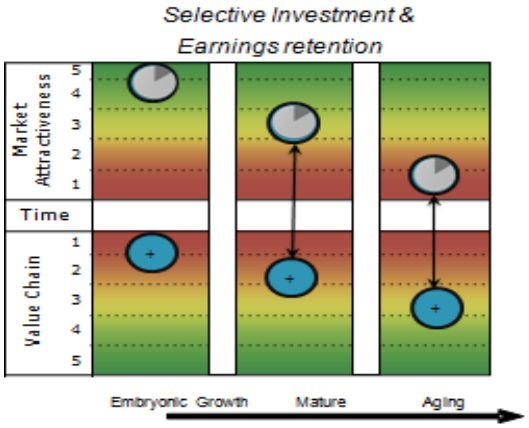


Figure 12: Selective Investment & Earnings Retention (DeLoach, 2010).

3) Harvesting and divesture (see Figure 13) are the least attractive and are primarily colored red. Management should follow a policy of harvesting and divesting unless the relative strengths can be improved (controlled exit or divestment, specialization).

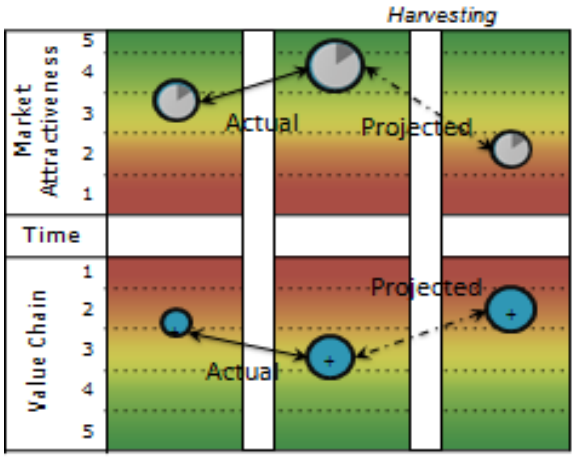


Figure 13: Harvesting & Divesture (DeLoach, 2009).

Life cycles of market attractiveness may deviate from life cycles in competitive advantage created by the value chain (see Figure 14). The market may continue to be attractive, but because of competitors emulating aspects of a company's core and distinct competencies, the competitive advantage cycle may be short lived, and adjustments or improvements may be needed to sustain a competitive advantage.

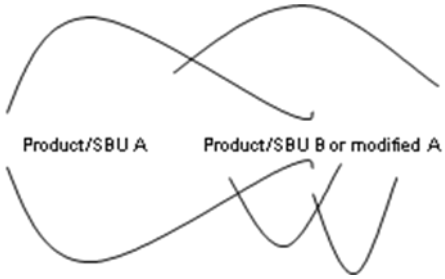


Figure 14: Deviating Life Cycles between Market Attractiveness and Value Chain Analysis (DeLoach, 2010)

Appendix: G: Letter to Participants

Dear Prospective Participant:

My name is Guy DeLoach, and I am a doctoral student at Baker College of Flint, Michigan. I am conducting a study to understand the relationship of organizational learning and strategic-functional planning. Your participation in this study will make a unique contribution to the study because you are using a business simulation as a normal part of your class. Your contribution to this study will be held in the strictest of confidence according to the Institutional Review Board, Human Research guidelines of Baker College and guidelines of Lee University department of business. Your name will not be used in the study or in any follow-up articles or publications.

The research model I am using is both qualitative and quantitative through which I am seeking comprehensive descriptions about organizational learning. I hope to gather information about what you experienced as you went through your class and simulation; what your thoughts and learning experience may have been.

You will be asked answer a brief survey before and during your simulation experience. You can access the survey at your leisure via the internet at the university website in complete privacy. The questions only pertain to you and your management teams learning experience. Your grade in no way is affected by your survey answers and analysis of scores is conducted in a coded format, which means that your name is not known in the analysis.

I hope that you will be willing to participate. If you have any questions about your participation, you may call my office phone at 423-614-8169. If you agree to participate, I will need you to sign the Consent form that accompanies this.

I am excited about your participation and a great learning experience!

Sincerely,

Attached (Release form)

Appendix H: Informed Consent Form

Project Title: ORGANIZATIONAL LEARNING CAPABILITIES WITHIN THE STRATEGIC PRODUCT MANAGEMENT PROCESS

Investigator: Guy DeLoach

You are being asked to participate in a research project conducted through Lee University's department of business in conjunction with Baker College. The College and university require that you give your signed agreement to participate in this project.

The investigator will explain to you in detail the purpose of the project, the procedures to be used, the expected duration or frequency of your participation, and the potential benefits and possible risks of participation. You may ask him/her any questions you have to help you understand the project. A basic explanation of the project is written below. Please read this explanation and discuss with the researcher any questions you may have.

If you decide to participate in the project, please sign on the last page of this form. You will be given a copy of this form to keep.

Refusal to participate in this study will have no effect on any future services you may be entitled to from the College or university. Anyone who agrees to participate in this study is free to withdraw from the study at any time with no penalty.

1. Nature and Purpose of the Project:

The research project you are being asked to participate in is one where the researcher is seeking comprehensive descriptions about organizational learning and strategic-functional planning. Information will be gathered from you about what you experienced as you went through your class and the business simulation, your thoughts, and learning activities may have been. The purpose of the research will be to describe the experiences individuals have encountered in learning and applying new concepts and methodologies in regard to strategic and functional planning.

2. Explanation of Procedures:

You are one of approximately 75 students, depending on fall 2010 enrollment. You will be asked to answer survey questions periodically throughout the class semester via the university website. The survey will require approximately 10 minutes filling out. The questions only pertain to you and your management teams learning experience. Your grade in no way is affected by your survey answers and analysis of scores is conducted in a coded format, which means that your name is not known in the analysis.

3. Identification Of Any Experimental Medical Treatments Or Procedures:

There will be no experimental or medical treatments or procedures applied during the research.

4. Discomfort and Risks:

There is no anticipated discomfort or risk associated with participating in this research.

5. Benefits:

Students enhance their understanding and application of organizational learning concepts, which is valued by business in the real-world. In addition, students are able to learn new and cutting edge strategic and functional methodologies that will enhance their understanding of strategic and tactical business planning.

6. Confidentiality:

Names, file numbers, or any other type of identifying information will NOT be used in the research or in any follow-up articles or publications. Any hard copy data will be kept in a locked file cabinet in the university's department of business; the researcher and department chair will be the only individuals who have access to the file and electronic data.

7. Explanation of compensation, if any:

There will be no compensation for participation in the study

8. Name of person to contact in case of research-related injury:

You may contact Dr. John Vinton, (810) 766-2133), DBA Chairperson and Dr. Dewayne Thompson (423) 614-8160, Department Chair.

You may also contact the researcher if you have any questions related to the study. His telephone number is 423-614-8169.

9. Name of person to contact in case of questions about your rights as a research participant: If you have any questions about your rights as a subject/participant in this research, or if you feel you have been placed at risk, you can contact the Chair of the Human Subjects' Institutional Review Board through Mike Tyler, Associate Vice President of Institutional Effectiveness, at 810-766-4329.

I have read this form and I understand it. I understand that if at any time I become uncomfortable with this project I am free to stop my participation. I understand also that it is not possible to identify all potential risks in an experimental procedure, and I believe that reasonable safeguards have been taken to minimize both the known and potential but unknown risks.

_____ _____

Signature *Date*

_____ _____

Signature *Date*

Appendix I: Letter of Approval to Conduct Research

LEE UNIVERSITY

Department of Business

July 20, 2010

To Whom it May Concern,

I am writing in regard to Guy DeLoach, Baker College DBA student. I am his direct supervisor and Department of Business Chair at Lee University. We have discussed his dissertation proposal and he has supplied me with a copy of the following: Research questions, survey instruments, protocol, simulation process, letter to participants and release/informed consent form. I have also worked with Mr. DeLoach and the research design in a pre-study during the spring 2010 semester. I have reviewed all of the information and grant him permission to conduct the study during the fall 2010 semester. He has agreed not to use names or identifying information in his study to provide confidentiality/anonymity for our students.

I grant Guy DeLoach permission to approach the IRB with his application for his research/dissertation. Please feel free to contact me if you have any questions.

Sincerely,

Dr. Dewayne Thompson

Department of Business Chair Lee University

T 423-614-8160 F 423-614-8173
Cleveland, Tennessee 37320-3450
www.leeuniversity.edu

Appendix J:
Example of Team Activity Report

Executive Activity Report for Team Awesome 11/29/10

Team Awesome initial company Strategy copied from report dated 10/20/10

- As a company we have decided to attack the foreign market in two of three regions. By the end of the 4th quarter we will have a heavily automated US plant due to labor cost and a much larger plant in Mexico with a base capacity of 500. These are the following markets that we will key on

Ship to /From

a. Japan/US
b. Japan/Mexico
c. Mexico/Mexico
d. US/US
e. US/Mexico

In order to be successful in these markets we will implement a low cost first to market strategy. The low cost will emphasize low unit cost via automation of the US plant, raw material mix and a manual low labor cost plant in Mexico. Logistic cost will be minimized by feeding markets from the least expensive manufacturing locations preferably by surface. However we may initially ship air to seize first to market opportunity until we can get product in the pipeline. The TV sets are in a mature phase of product development. The US market is mature but large and replacement sets maintains the market. Mexico has a potential growth market within the 25" product. Japan is mature, however we feel that we can be first to market and serve this market by quickly expanding our manufacturing base maintaining at least 20 percent excess capacity in the early quarters to capitalize on potential market growth. By quarter 4 we should have our cost and capacity plan well in place.

The Value T has identified potential weaknesses in capacity and unit cost. The Value T is fed by Key performance indicators of each segment. We are developing internal KPI's to monitor the value chain and its performance closely. We will develop a strategic mix in raw materials to achieve the low unit cost versus quality index. KPI's for Market attractiveness will be closely monitored for threats and opportunities in the marketplace. Hopefully being first to markets with production capacity will allow us to price our products aggressively.

Strategy summary Qtr 7

We are currently in first position within our industry. We feel that we have achieved our strategy of being the low cost provider by establishing low unit cost and minimizing logistical expenses which show a decreasing trend. We have achieved major world and region market share. Our Value T indicates several cycle shifts in both our value chain and market attractiveness. In Japan we experienced 100% market share and first to market. A competitor entered the market in Qtr six and we had to quickly adjust our product selling price we lost almost 40% of the market. Our internal value chain grew in strength financially and capacity (see KPI's) the dip at the end was due to lost market share in Japan. We should have anticipated a competitor moving into the market and begun to lower our sales prices. Total expenses and COGS improved every quarter until the 7th where we are making corrections for the last Qtr and anticipate finishing in a positive trend and first in profits and ROA. Our cash position over the last three quarters has almost tripled. We feel we have successfully implemented the strategy however we are continually making corrections due to our KPI's reflecting on the Value T and competitor moves. Monitoring our KPI's and plotting them on the Value T takes a lot of time and was initially difficult, however it has forced us to know our business and we feel this is the reason we are successful.

Financial KPIs

The KPIs for the financials would be **EPS, Net Income % Increase, Gross Margin**, and **Current Ratio**.

EPS
Over the past 7 quarters we have seen significant improvements in all of our KPI's and ratios. Our earnings per share has gone from -.10 to a peak of $1.02 per share. It dropped significantly this past quarter to .48 due to the fact that our competitor LOACH entered the Japan market unannounced and undercut our price significantly. This is the first sign of competition we have seen in Japan and was unexpected. However, we are planning on buying back more stock this quarter and we are aiming to gain back more market share in Japan by lowering our prices to LOACH's level.

Net Income
Our net income has also seen a nice increase. Percentage wise we have increased our net income from -3% to a max of 17% (of total revenue). We saw a drop to 12% this quarter (along with an increase in total expenses and COGS). This is due to what was previously stated which was the entrance of LOACH into Japan which is where we make more of our profit.

Gross Margin
Thirdly, we have seen our gross margin improve. Our gross margin started at 24.7% and we have managed to increase that to a peak of 58.8%. It dropped due to previously stated matters to 53.9%.

Current Ratio
Lastly, our current ratio has been doing fairly well. We saw a sharp incline this past quarter due to increase in inventory. However, we are planning to buy back some stock and only produce what is necessary this quarter, so inventory should go down.

Points of Interest:
(see horizontal analysis balance sheet) This past quarter we saw **cash** except total liabilities. This is fantastic and we are hoping to continue this trend by paying off bonds and taking care of any other debt we may have.

(see ratio pages) As you can see from most of the ratio graphs, they have all been trending in the correct direction until this past quarter. Another good indicator of how we are doing is our cash ratio. It has been going straight up. It may plateau soon, but we need to make sure it doesn't go back down. We are hoping to recover from this latest hit in Japan and continue our fantastic growth.

Production

Overtime

The goal when it comes to overtime is to have as little as possible which for most quarters will be zero. We fixed our subassemblies problem from four quarters ago in the U.S. plant and reached our goal of no overtime for this past quarter. We've had to shift some things around for this coming quarter and will only be producing 25" in the U.S. plant. We also will not be producing at maximum capacity to avoid having a large inventory. The reason we're not producing any 27" is because we don't need to produce more to meet the demand, especially not that more companies have entered the market. Also, because we're not producing at maximum capacity, we had to let some of our workers go and we'll now mainly be using automatons for the second shift. Considering all of these factors, we don't foresee any overtime occurring in this quarter.

Our goal with the Mexico plant is the same as U.S. which is no overtime. We were able to meet this goal for the past couple quarters. We did so by hiring more workers to cover for vacation. We've also switched all production to shift one and are now just making 25". This is how it was set up last quarter and we managed to keep overtime at zero so we'll be keeping everything the same for this quarter to ensure no overtime.

Quality Index

Our quality index in our U.S. plant has now exceeded our goal of 8.0 for 25". We're happy with that quality and will buy subassemblies in the same mix for this quarter. Our 27" was lower than what we wanted but because we're no longer producing 27", we don't have to worry about it.

In Mexico, our quality is actually a little too high for our 25". While we would like it to stay over 8.0, it'd be nice to keep it below at least 8.6. We'll be taking this into account when we purchase subassemblies.

Unit cost

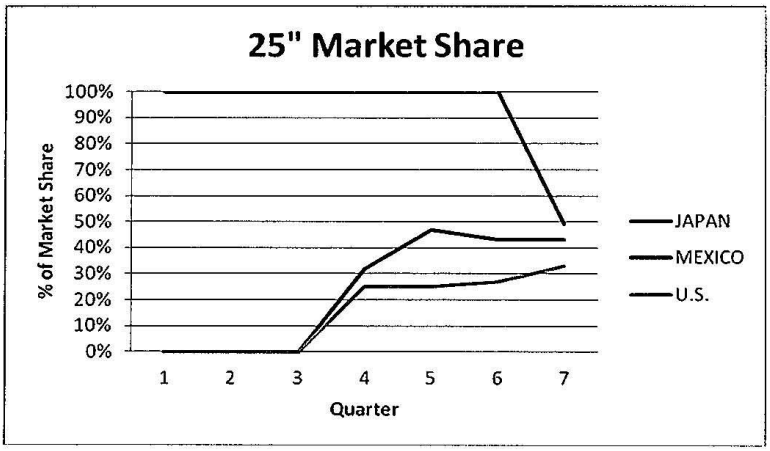
Our unit costs have stayed pretty consistent over the past two quarters for both our 25" and 27" in the U.S. We don't' plan on seeing much of a change this quarter. Our quality is above where we want it, however, we're not going to be producing as much so both of those factors will kind of balance each other out when it comes to changes based on subassemblies. As mentioned earlier, we won't be producing any 27" this quarter so our focus will be on 25".

Our unit cost in Mexico has increased slightly but we don't expect to see a much higher increase in that area. Even though we are only going to be running shift one this quarter, we are still buying the same number of subassemblies to replenish our stock in case we need shift two running again.

Marketing KPI's

The KPI's for marketing will be **market share, lost sales,** and **shipping expenses.** We have taken out sales per sales representatives because of a lack of information regarding tracking performance.

The 7th quarter we had a competitor enter the Japanese market. Because of this we saw a dramatic drop in our market share in both our 25" and 27" T.V.'s. We went from having 100% market share with both products to just under 50% for each. Our goal for the 4th quarter in year 2 is to gain 60% market share with both products in Japan. We hope to gain an additional 3% market share with both products in the U.S. and to gain an additional 7% in the Mexico market. . In order to attain this goal we must cut prices to sell our leftover inventory and to gain market share. We must also increase commission rates to 5% for both products in each market to ensure a complete sales effort on the part of our sales staff. We will also be increasing our sales promotions by 10% to capture new customers.



Mexico

External Analysis

QRTR1					
Attractiveness Factors	Factor Weighting	25°		27°	
(M)Total Market Share	0.2	1	0.2	1	0.2
(M)Annual Market Growth Rate	0.15	3	0.45	3	0.45
(C)Number of Competitors	0.16	5	0.8	5	0.8
(S)discretionary income	0.13	2	0.26	2	0.26
(S)Tax	0.13	2	0.26	2	0.26
(C)Distribution efficiency	0.08	2	0.16	2	0.16
(T)speed of technological change	0.05	2	0.1	2	0.1
(E) Interest Rates	0.1	2	0.2	2	0.2
	1.00		2.43		2.43

Internal Analysis

Attractiveness Factors	Factor Weighting	TV'S			
(F)Cash Ratio	0.2	2	0.4		
(F)Credit Rating	0.1	3	0.3		
(O)Distribution Strength	0.1	2	0.2		
(O)Cost Position	0.15	2	0.3		
(MRKT)Market Share Growth	0.15	1	0.15		
(MGMT)Process Management	0.1	2	0.2		
(R&D)manufacturing technology	0.05	1.5	0.075		
(MRKT)Price Position	0.15	2	0.3		
	1.00		3.93		

QRTR2					
Attractiveness Factors	Factor Weighting	25°		27°	
(M)Total Market Share	0.2	1	0.2	1	0.2
(M)Annual Market Growth Rate	0.15	3	0.45	3	0.45
(C)Number of Competitors	0.16	5	0.8	5	0.8
(S)discretionary income	0.13	2	0.26	2	0.26
(S)Tax	0.13	2	0.26	2	0.26
(C)Distribution efficiency	0.08	2	0.16	2	0.16
(T)speed of technological change	0.05	2	0.1	2	0.1
(E) Interest Rates	0.1	2	0.2	2	0.2
	1.00		2.43		2.43

Attractiveness Factors	Factor Weighting	TV'S			
(F)Cash Ratio	0.2	3	0.6		
(F)Credit Rating	0.1	2	0.2		
(O)Distribution Strength	0.1	3	0.3		
(O)Cost Position	0.15	3	0.45		
(MRKT)Market Share Growth	0.15	5	0.75		
(MGMT)Process Management	0.1	2.5	0.25		
(R&D)manufacturing technology	0.05	2	0.1		
(MRKT)Price Position	0.15	5	0.75		
	1.00		3.40		

QRTR3					
Attractiveness Factors	Factor Weighting	25°		27°	
(M)Total Market Share	0.2	1	0.2	1	0.2
(M)Annual Market Growth Rate	0.15	3	0.45	3	0.45
(C)Number of Competitors	0.16	5	0.8	5	0.8
(S)discretionary income	0.13	2	0.26	2	0.26
(S)Tax	0.13	2	0.26	2	0.26
(C)Distribution efficiency	0.08	2	0.16	2	0.16
(T)speed of technological change	0.05	2	0.1	2	0.1
(E) Interest Rates	0.1	2	0.2	2	0.2
	1.00		2.43		2.43

Attractiveness Factors	Factor Weighting	TV'S			
(F)Cash Ratio	0.2	2	0.4		
(F)Credit Rating	0.1	4	0.4		
(O)Distribution Strength	0.1	3	0.3		
(O)Cost Position	0.15	3	0.45		
(MRKT)Market Share Growth	0.15	5	0.75		
(MGMT)Process Management	0.1	3	0.3		
(R&D)manufacturing technology	0.05	2	0.1		
(MRKT)Price Position	0.15	5	0.75		
	1.00		3.45		

QRTR4					
Attractiveness Factors	Factor Weighting	25°		27°	
(M)Total Market Share	0.2	3	0.6	3	0.6
(M)Annual Market Growth Rate	0.15	2	0.3	2	0.3
(C)Number of Competitors	0.16	4	0.64	4	0.64
(S)discretionary income	0.13	2	0.26	2	0.26
(S)Tax	0.13	2	0.26	2	0.26
(C)Distribution efficiency	0.08	2	0.16	2	0.16
(T)speed of technological change	0.05	2	0.1	2	0.1
(E) Interest Rates	0.1	2	0.2	2	0.2
	1.00		2.52		2.52

Attractiveness Factors	Factor Weighting	TV'S			
(F)Cash Ratio	0.2	3.5	0.3		
(F)Credit Rating	0.1	4	0.4		
(D)Distribution Strength	0.1	3.5	0.35		
(O)Cost Position	0.15	3	0.45		
(MRKT)Market Share Growth	0.15	3	0.45		
(MGMT)Process Management	0.1	3.5	0.35		
(R&D)manufacturing technology	0.05	2	0.1		
(MRKT)Price Position	0.15	3	0.45		
	1.00		2.85		

QRTR1 - YR2					
Attractiveness Factors	Factor Weighting	25°		27°	
(M)Total Market Share	0.2	3.75	0.75	3.75	0.75
(M)Annual Market Growth Rate	0.15	2	0.3	2	0.3
(C)Number of Competitors	0.16	4	0.64	4	0.64
(S)discretionary income	0.13	2	0.26	2	0.26
(S)Tax	0.13	2	0.26	2	0.26
(C)Distribution efficiency	0.08	2	0.16	2	0.16
(T)speed of technological change	0.05	2	0.1	2	0.1
(E) Interest Rates	0.1	2	0.2	2	0.2
	1.00		2.67		2.67

Attractiveness Factors	Factor Weighting	TV'S			
(F)Cash Ratio	0.2	2	0.4		
(F)Credit Rating	0.1	3	0.3		
(O)Distribution Strength	0.1	3.5	0.35		
(O)Cost Position	0.15	3	0.45		
(MRKT)Market Share Growth	0.15	3	0.45		
(MGMT)Process Management	0.1	3.5	0.35		
(R&D)manufacturing technology	0.05	1.5	0.075		
(MRKT)Price Position	0.15	3	0.45		
	1.00		2.83		

QRTR2 - YR 2					
Attractiveness Factors	Factor Weighting	25°		27°	
(M)Total Market Share	0.2	3.5	0.7	3.5	0.7
(M)Annual Market Growth Rate	0.15	2	0.3	2	0.3
(C)Number of Competitors	0.16	4	0.64	4	0.64
(S)discretionary income	0.13	2	0.26	2	0.26
(S)Tax	0.13	2	0.26	2	0.26
(C)Distribution efficiency	0.08	2	0.16	2	0.16
(T)speed of technological change	0.05	2	0.1	2	0.1
(E) Interest Rates	0.1	2	0.2	2	0.2
	1.00		2.62		2.62

Attractiveness Factors	Factor Weighting	TV'S			
(F)Cash Ratio	0.2	3.5	0.7		
(F)Credit Rating	0.1	2	0.2		
(O)Distribution Strength	0.1	3.5	0.35		
(O)Cost Position	0.15	3	0.45		
(MRKT)Market Share Growth	0.15	4	0.6		
(MGMT)Process Management	0.1	2.5	0.25		
(R&D)manufacturing technology	0.05	2	0.1		
(MRKT)Price Position	0.15	5	0.75		
	1.00		3.40		

QRTR3 - YR2					
Attractiveness Factors	Factor Weighting	25°		27°	
(M)Total Market Share	0.2	3.6	0.72	3.6	0.72
(M)Annual Market Growth Rate	0.15	2	0.3	2	0.3
(C)Number of Competitors	0.16	4	0.64	4	0.64
(S)discretionary income	0.13	2	0.26	2	0.26
(S)Tax	0.13	2	0.26	2	0.26
(C)Distribution efficiency	0.08	2	0.16	2	0.16
(T)speed of technological change	0.05	2	0.1	2	0.1
(E) Interest Rates	0.1	2	0.2	2	0.2
	1.00		2.64		2.64

Attractiveness Factors	Factor Weighting	TV'S			
(F)Cash Ratio	0.2	4	0.8		
(F)Credit Rating	0.1	2	0.2		
(O)Distribution Strength	0.1	4	0.4		
(O)Cost Position	0.15	3	0.45		
(MRKT)Market Share Growth	0.15	4	0.6		
(MGMT)Process Management	0.1	3	0.3		
(R&D)manufacturing technology	0.05	3	0.15		
(MRKT)Price Position	0.15	4	0.6		
	1.00		3.50		

QRTR4 - YR 2					
Attractiveness Factors	Factor Weighting	25°		27°	
(M)Total Market Share	0.2	5	1	5	1
(M)Annual Market Growth Rate	0.15	2	0.3	2	0.3
(C)Number of Competitors	0.16	4	0.64	4	0.64
(S)discretionary income	0.13	2	0.26	2	0.26
(S)Tax	0.13	2	0.26	2	0.26
(C)Distribution efficiency	0.08	2	0.16	2	0.16
(T)speed of technological change	0.05	2	0.1	2	0.1
(E) Interest Rates	0.1	2	0.2	2	0.2
	1.00		2.92		2.92

Attractiveness Factors	Factor Weighting	TV'S			
(F)Cash Ratio	0.2	3	0.6		
(F)Credit Rating	0.1	2	0.2		
(O)Distribution Strength	0.1	4.2	0.42		
(O)Cost Position	0.15	3	0.45		
(MRKT)Market Share Growth	0.15	3	0.45		
(MGMT)Process Management	0.1	5	0.5		
(R&D)manufacturing technology	0.05	3	0.15		
(MRKT)Price Position	0.15	4	0.6		
	1.00		3.37		

Japan

External Analysis

QRTR1

Attractiveness Factors	Factor Weighting	25"		27"	
(M)Total Market Share	0.2	5	1	5	1
(M)Annual Market Growth Rate	0.15	2	0.3	2	0.3
(C)Number of Competitors	0.16	5	0.8	5	0.8
(S)Propensity to spend	0.13	1	0.13	1	0.13
(S)Tax	0.13	1	0.13	1	0.13
(C)Distribution Intensity	0.08	2	0.16	3	0.24
(T)speed of technological change	0.05	2	0.1	2	0.1
(E) Interest Rates	0.1	2	0.2	2	0.2
	1.00		2.82		2.90

Internal Analysis

Attractiveness Factors	Factor Weighting	TV'S	
(F)Cash Ratio	0.2	2	0.4
(F)Credit Rating	0.1	3	0.3
(O)Distribution Strength	0.1	2	0.2
(O)Cost Position	0.15	2	0.3
(MRKT)Market Share Growth	0.15	1	0.15
(MGMT)Process Management	0.1	2	0.2
(R&D)manufacturing technology	0.05	1.5	0.075
(MRKT)Price Position	0.15	2	0.3
	1.00		1.93

QRTR2

Attractiveness Factors	Factor Weighting	25"		27"	
(M)Total Market Share	0.2	5	1	5	1
(M)Annual Market Growth Rate	0.15	2	0.3	2	0.3
(C)Number of Competitors	0.16	5	0.8	5	0.8
(S)Propensity to spend	0.13	2	0.26	2	0.26
(S)Tax	0.13	1	0.13	1	0.13
(C)Distribution Intensity	0.08	3	0.24	3	0.24
(T)speed of technological change	0.05	3	0.15	3	0.15
(E) Interest Rates	0.1	2	0.2	2	0.2
	1.00		3.08		3.08

Attractiveness Factors	Factor Weighting	TV'S	
(F)Cash Ratio	0.2	3	0.6
(F)Credit Rating	0.1	2	0.2
(O)Distribution Strength	0.1	3	0.3
(O)Cost Position	0.15	3	0.45
(MRKT)Market Share Growth	0.15	5	0.75
(MGMT)Process Management	0.1	2.5	0.25
(R&D)manufacturing technology	0.05	2	0.1
(MRKT)Price Position	0.15	5	0.75
	1.00		3.40

QRTR3

Attractiveness Factors	Factor Weighting	25"		27"	
(M)Total Market Share	0.2	5	1	5	1
(M)Annual Market Growth Rate	0.15	3	0.45	3	0.45
(C)Number of Competitors	0.16	5	0.8	5	0.8
(S)Propensity to spend	0.13	2	0.26	2	0.26
(S)Tax	0.13	1	0.13	1	0.13
(C)Distribution Intensity	0.08	3	0.24	3	0.24
(T)speed of technological change	0.05	3	0.15	3	0.15
(E) Interest Rates	0.1	2	0.2	2	0.2
	1.00		3.23		3.23

Attractiveness Factors	Factor Weighting	TV'S	
(F)Cash Ratio	0.2	2	0.4
(F)Credit Rating	0.1	4	0.4
(O)Distribution Strength	0.1	3	0.3
(O)Cost Position	0.15	3	0.45
(MRKT)Market Share Growth	0.15	5	0.75
(MGMT)Process Management	0.1	3	0.3
(R&D)manufacturing technology	0.05	2	0.1
(MRKT)Price Position	0.15	5	0.75
	1.00		3.45

QRTR4

Attractiveness Factors	Factor Weighting	25"		27"	
(M)Total Market Share	0.2	5	1	5	1
(M)Annual Market Growth Rate	0.15	2	0.3	2	0.3
(C)Number of Competitors	0.16	5	0.8	5	0.8
(S)Propensity to spend	0.13	2	0.26	2	0.26
(S)Tax	0.13	1	0.13	1	0.13
(C)Distribution Intensity	0.08	4	0.32	4	0.32
(T)speed of technological change	0.05	3	0.15	3	0.15
(E) Interest Rates	0.1	3	0.3	3	0.3
	1.00		3.26		3.26

Attractiveness Factors	Factor Weighting	TV'S	
(F)Cash Ratio	0.2	1.5	0.3
(F)Credit Rating	0.1	4	0.4
(O)Distribution Strength	0.1	3.5	0.35
(O)Cost Position	0.15	3	0.45
(MRKT)Market Share Growth	0.15	3	0.45
(MGMT)Process Management	0.1	3.5	0.35
(R&D)manufacturing technology	0.05	2	0.1
(MRKT)Price Position	0.15	3	0.45
	1.00		2.85

QRTR1 - YR 2

Attractiveness Factors	Factor Weighting	25"		27"	
(M)Total Market Share	0.2	5	1	5	1
(M)Annual Market Growth Rate	0.15	3	0.45	3	0.45
(C)Number of Competitors	0.16	5	0.8	5	0.8
(S)Propensity to spend	0.13	2	0.26	2	0.26
(S)Tax	0.13	2	0.26	2	0.26
(C)Distribution Intensity	0.08	4	0.32	4	0.32
(T)speed of technological change	0.05	3	0.15	3	0.15
(E) Interest Rates	0.1	3	0.3	3	0.3
	1.00		3.54		3.54

Attractiveness Factors	Factor Weighting	TV'S	
(F)Cash Ratio	0.2	2	0.4
(F)Credit Rating	0.1	3	0.3
(O)Distribution Strength	0.1	3.5	0.35
(O)Cost Position	0.15	3	0.45
(MRKT)Market Share Growth	0.15	3	0.45
(MGMT)Process Management	0.1	3.5	0.35
(R&D)manufacturing technology	0.05	1.5	0.075
(MRKT)Price Position	0.15	3	0.45
	1.00		2.83

QRTR2 - YR 2

Attractiveness Factors	Factor Weighting	25"		27"	
(M)Total Market Share	0.2	5	1	5	1
(M)Annual Market Growth Rate	0.15	3	0.45	3	0.45
(C)Number of Competitors	0.16	5	0.8	5	0.8
(S)Propensity to spend	0.13	2	0.26	2	0.26
(S)Tax	0.13	2	0.26	2	0.26
(C)Distribution Intensity	0.08	4	0.32	4	0.32
(T)speed of technological change	0.05	3	0.15	3	0.15
(E) Interest Rates	0.1	3	0.3	3	0.3
	1.00		3.54		3.54

Attractiveness Factors	Factor Weighting	TV'S	
(F)Cash Ratio	0.2	3.5	0.7
(F)Credit Rating	0.1	2	0.2
(O)Distribution Strength	0.1	3.5	0.35
(O)Cost Position	0.15	3	0.45
(MRKT)Market Share Growth	0.15	4	0.6
(MGMT)Process Management	0.1	2.5	0.25
(R&D)manufacturing technology	0.05	2	0.1
(MRKT)Price Position	0.15	5	0.75
	1.00		3.40

QRTR3 - YR 2

Attractiveness Factors	Factor Weighting	25"		27"	
(M)Total Market Share	0.2	5	1	5	1
(M)Annual Market Growth Rate	0.15	3	0.45	3	0.45
(C)Number of Competitors	0.16	5	0.8	5	0.8
(S)Propensity to spend	0.13	2	0.26	2	0.26
(S)Tax	0.13	2	0.26	2	0.26
(C)Distribution Intensity	0.08	4	0.32	4	0.32
(T)speed of technological change	0.05	3	0.15	3	0.15
(E) Interest Rates	0.1	3	0.3	3	0.3
	1.00		3.54		3.54

Attractiveness Factors	Factor Weighting	TV'S	
(F)Cash Ratio	0.2	4	0.8
(F)Credit Rating	0.1	2	0.2
(O)Distribution Strength	0.1	4	0.4
(O)Cost Position	0.15	3	0.45
(MRKT)Market Share Growth	0.15	4	0.6
(MGMT)Process Management	0.1	3	0.3
(R&D)manufacturing technology	0.05	3	0.15
(MRKT)Price Position	0.15	4	0.6
	1.00		3.50

QRTR4 - YR 2

Attractiveness Factors	Factor Weighting	25"		27"	
(M)Total Market Share	0.2	3.5	0.7	3.5	0.7
(M)Annual Market Growth Rate	0.15	2	0.3	2	0.3
(C)Number of Competitors	0.16	4	0.64	4	0.64
(S)Propensity to spend	0.13	2	0.26	2	0.26
(S)Tax	0.13	2	0.26	2	0.26
(C)Distribution Intensity	0.08	4	0.32	4	0.32
(T)speed of technological change	0.05	3	0.15	3	0.15
(E) Interest Rates	0.1	3	0.3	3	0.3
	1.00		2.93		2.93

Attractiveness Factors	Factor Weighting	TV'S	
(F)Cash Ratio	0.2	3	0.6
(F)Credit Rating	0.1	2	0.2
(O)Distribution Strength	0.1	4.2	0.42
(O)Cost Position	0.15	3	0.45
(MRKT)Market Share Growth	0.15	3	0.45
(MGMT)Process Management	0.1	5	0.5
(R&D)manufacturing technology	0.05	3	0.15
(MRKT)Price Position	0.15	4	0.6
	1.00		3.37

United States

External Analysis

QRTR1					
Attractiveness Factors	Factor Weighting	25°		27°	
(M)Total Market Share	0.2	1	0.2	1	0.2
(M)Annual Market Growth Rate	0.15	1	0.15	2	0.3
(C)Number of Competitors	0.16	1	0.16	1	0.16
(S)discretionary income	0.13	1	0.13	3	0.39
(S)Tax	0.13	2	0.26	2	0.26
(C)Distribution efficiency	0.08	2	0.16	2	0.16
(T)speed of technological change	0.05	3	0.15	3	0.15
(E) Interest Rates	0.1	2	0.2	2	0.2
	1.00		1.41		1.81

Internal Analysis

Attractiveness Factors	Factor Weighting	TV'S		
(F)Cash Ratio	0.2	2	0.4	
(F)Credit Rating	0.1	3	0.3	
(O)Distribution Strength	0.1	2	0.2	
(O)Cost Position	0.15	2	0.3	
(MRKT)Market Share Growth	0.15	1	0.15	
(MGMT)Process Management	0.1	2	0.2	
(R&D)manufacturing technology	0.05	1.5	0.075	
(MRKT)Price Position	0.15	2	0.3	
	1.00		1.93	

QRTR2					
Attractiveness Factors	Factor Weighting	25°		27°	
(M)Total Market Share	0.2	1	0.2	1	0.2
(M)Annual Market Growth Rate	0.15	1	0.15	1	0.15
(C)Number of Competitors	0.15	1	0.15	1	0.15
(S)Propensity to spend	0.15	4	0.6	4	0.6
(S)Tax	0.15	2	0.3	2	0.3
(C)Distribution Intensity	0.1	1	0.1	1	0.1
(T)speed of technological change	0.05	3	0.15	3	0.15
(E) Interest Rates	0.05	2	0.1	2	0.1
	1.00		1.75		1.75

Attractiveness Factors	Factor Weighting	TV'S		
(F)Cash Ratio	0.2	3	0.6	
(F)Credit Rating	0.1	2	0.2	
(O)Distribution Strength	0.1	3	0.3	
(O)Cost Position	0.15	3	0.45	
(MRKT)Market Share Growth	0.15	5	0.75	
(MGMT)Process Management	0.1	2.5	0.25	
(R&D)manufacturing technology	0.05	2	0.1	
(MRKT)Price Position	0.15	5	0.75	
	1.00		3.40	

QRTR3					
Attractiveness Factors	Factor Weighting	25°		27°	
(M)Total Market Share	0.2	1	0.2	1	0.2
(M)Annual Market Growth Rate	0.15	1	0.15	1	0.15
(C)Number of Competitors	0.15	1	0.15	1	0.15
(S)Propensity to spend	0.15	4	0.6	4	0.6
(S)Tax	0.15	2	0.3	2	0.3
(C)Distribution Intensity	0.1	1	0.1	1	0.1
(T)speed of technological change	0.05	3	0.15	3	0.15
(E) Interest Rates	0.05	2	0.1	2	0.1
	1.00		1.75		1.75

Attractiveness Factors	Factor Weighting	TV'S		
(F)Cash Ratio	0.2	2	0.4	
(F)Credit Rating	0.1	4	0.4	
(O)Distribution Strength	0.1	3	0.3	
(O)Cost Position	0.15	3	0.45	
(MRKT)Market Share Growth	0.15	5	0.75	
(MGMT)Process Management	0.1	3	0.3	
(R&D)manufacturing technology	0.05	2	0.1	
(MRKT)Price Position	0.15	5	0.75	
	1.00		3.45	

QRTR4					
Attractiveness Factors	Factor Weighting	25°		27°	
(M)Total Market Share	0.2	2	0.4	1	0.2
(M)Annual Market Growth Rate	0.15	3	0.45	1	0.15
(C)Number of Competitors	0.15	1	0.15	1	0.15
(S)Propensity to spend	0.15	4	0.6	4	0.6
(S)Tax	0.15	2	0.3	2	0.3
(C)Distribution Intensity	0.1	1	0.1	1	0.1
(T)speed of technological change	0.05	3	0.15	3	0.15
(E) Interest Rates	0.05	2	0.1	2	0.1
	1.00		2.25		1.75

Attractiveness Factors	Factor Weighting	TV'S		
(F)Cash Ratio	0.2	1.5	0.3	
(F)Credit Rating	0.1	4	0.4	
(O)Distribution Strength	0.1	3.5	0.35	
(O)Cost Position	0.15	3	0.45	
(MRKT)Market Share Growth	0.15	3	0.45	
(MGMT)Process Management	0.1	3.5	0.35	
(R&D)manufacturing technology	0.05	2	0.1	
(MRKT)Price Position	0.15	3	0.45	
	1.00		2.85	

QRTR1 - YR 2					
Attractiveness Factors	Factor Weighting	25°		27°	
(M)Total Market Share	0.2	2	0.4	1	0.2
(M)Annual Market Growth Rate	0.15	3	0.45	1	0.15
(C)Number of Competitors	0.15	1	0.15	1	0.15
(S)Propensity to spend	0.15	4	0.6	4	0.6
(S)Tax	0.15	2	0.3	2	0.3
(C)Distribution Intensity	0.1	1	0.1	1	0.1
(T)speed of technological change	0.05	3	0.15	3	0.15
(E) Interest Rates	0.05	2	0.3	2	0.1
	1.00		2.25		1.75

Attractiveness Factors	Factor Weighting	TV'S		
(F)Cash Ratio	0.2	2	0.4	
(F)Credit Rating	0.1	3	0.3	
(O)Distribution Strength	0.1	3.5	0.35	
(O)Cost Position	0.15	3	0.45	
(MRKT)Market Share Growth	0.15	3	0.45	
(MGMT)Process Management	0.1	3.5	0.35	
(R&D)manufacturing technology	0.05	1.5	0.075	
(MRKT)Price Position	0.15	3	0.45	
	1.00		2.83	

QRTR2 - YR2					
Attractiveness Factors	Factor Weighting	25°		27°	
(M)Total Market Share	0.2	2.75	0.55	1	0.2
(M)Annual Market Growth Rate	0.15	1.5	0.23	1	0.15
(C)Number of Competitors	0.15	1	0.15	1	0.15
(S)Propensity to spend	0.15	4	0.6	4	0.6
(S)Tax	0.15	2	0.3	2	0.3
(C)Distribution Intensity	0.1	1	0.1	1	0.1
(T)speed of technological change	0.05	3	0.15	3	0.15
(E) Interest Rates	0.05	2	0.1	2	0.1
	1.00		2.18		1.75

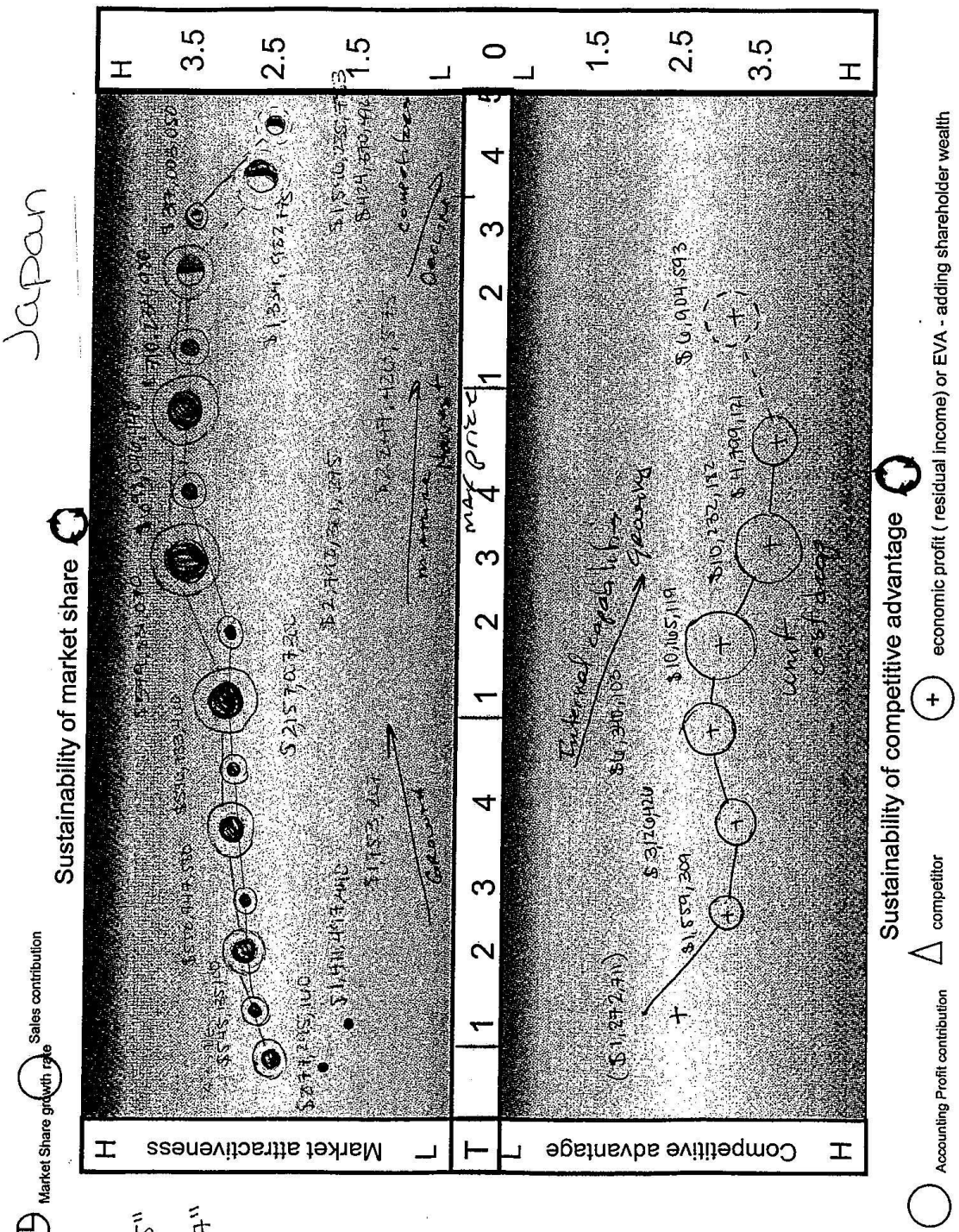
Attractiveness Factors	Factor Weighting	TV'S		
(F)Cash Ratio	0.2	3.5	0.7	
(F)Credit Rating	0.1	2	0.2	
(O)Distribution Strength	0.1	3.5	0.35	
(O)Cost Position	0.15	3	0.45	
(MRKT)Market Share Growth	0.15	4	0.6	
(MGMT)Process Management	0.1	2.5	0.25	
(R&D)manufacturing technology	0.05	2	0.1	
(MRKT)Price Position	0.15	5	0.75	
	1.00		3.40	

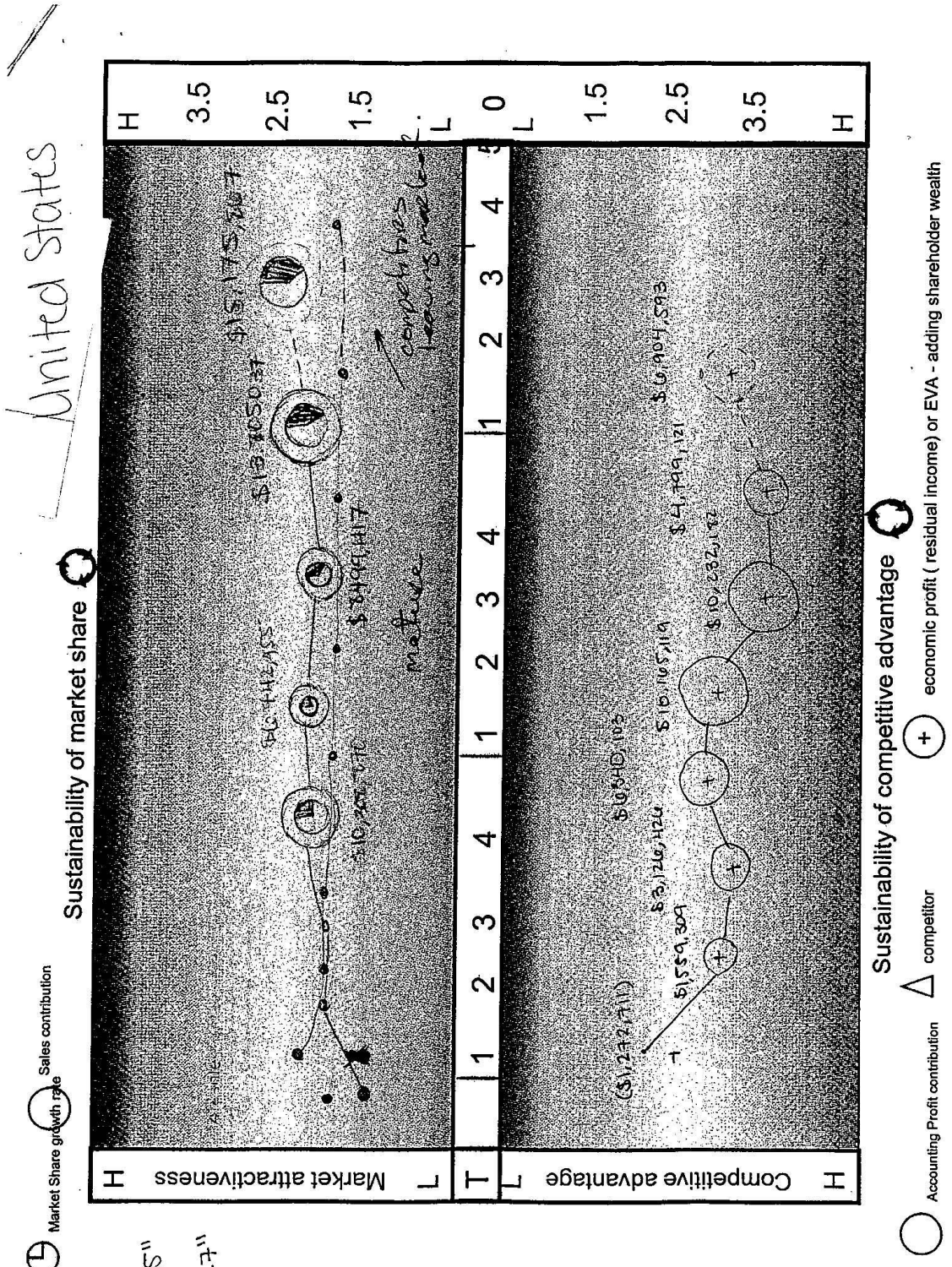
QRTR3 - YR 2					
Attractiveness Factors	Factor Weighting	25°		27°	
(M)Total Market Share	0.2	3.5	0.7	1	0.2
(M)Annual Market Growth Rate	0.15	2	0.3	1	0.15
(C)Number of Competitors	0.15	1	0.15	1	0.15
(S)Propensity to spend	0.15	4	0.6	4	0.6
(S)Tax	0.15	2	0.3	2	0.3
(C)Distribution Intensity	0.1	1	0.1	1	0.1
(T)speed of technological change	0.05	3	0.15	3	0.15
(E) Interest Rates	0.05	2	0.1	2	0.1
	1.00		2.40		1.75

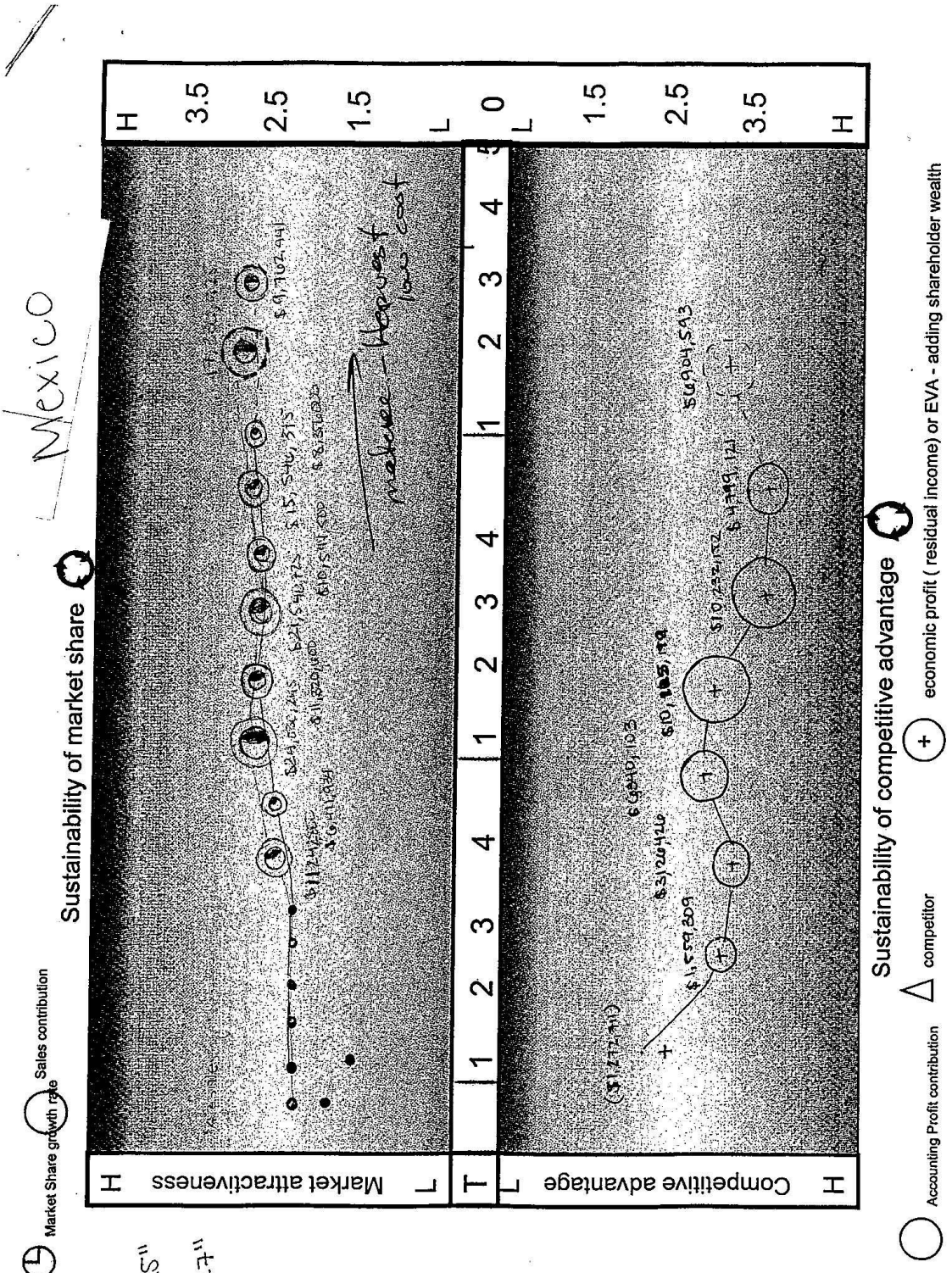
Attractiveness Factors	Factor Weighting	TV'S		
(F)Cash Ratio	0.2	4	0.8	
(F)Credit Rating	0.1	2	0.2	
(O)Distribution Strength	0.1	4	0.4	
(O)Cost Position	0.15	3	0.45	
(MRKT)Market Share Growth	0.15	4	0.6	
(MGMT)Process Management	0.1	3	0.3	
(R&D)manufacturing technology	0.05	3	0.15	
(MRKT)Price Position	0.15	4	0.6	
	1.00		3.50	

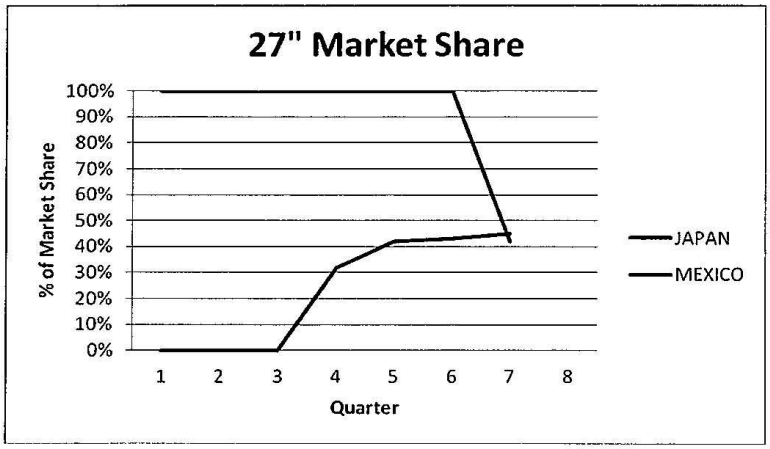
QRTR4 - YR2					
Attractiveness Factors	Factor Weighting	25°		27°	
(M)Total Market Share	0.2	4	0.8	1	0.2
(M)Annual Market Growth Rate	0.15	2	0.3	1	0.15
(C)Number of Competitors	0.15	1	0.15	1	0.15
(S)Propensity to spend	0.15	4	0.6	4	0.6
(S)Tax	0.15	2	0.3	2	0.3
(C)Distribution Intensity	0.1	1	0.1	1	0.1
(T)speed of technological change	0.05	3	0.15	3	0.15
(E) Interest Rates	0.05	2	0.1	2	0.1
	1.00		2.50		1.75

Attractiveness Factors	Factor Weighting	TV'S		
(F)Cash Ratio	0.2	3	0.6	
(F)Credit Rating	0.1	2	0.2	
(O)Distribution Strength	0.1	4.2	0.42	
(O)Cost Position	0.15	3	0.45	
(MRKT)Market Share Growth	0.15	3	0.45	
(MGMT)Process Management	0.1	5	0.5	
(R&D)manufacturing technology	0.05	3	0.15	
(MRKT)Price Position	0.15	4	0.6	
	1.00		3.37	

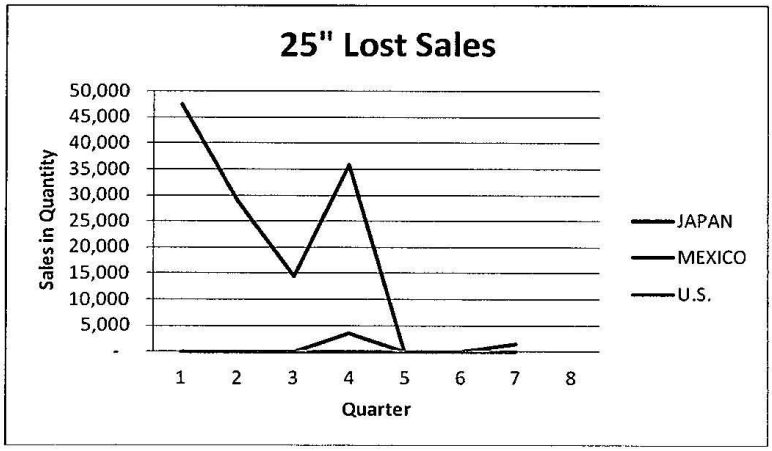


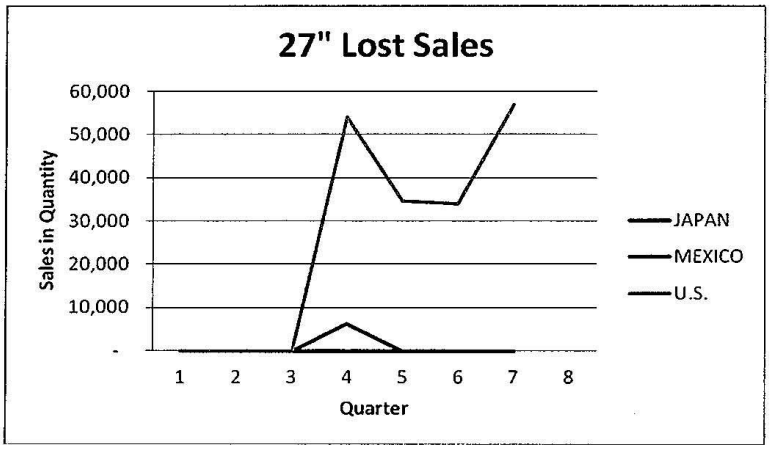




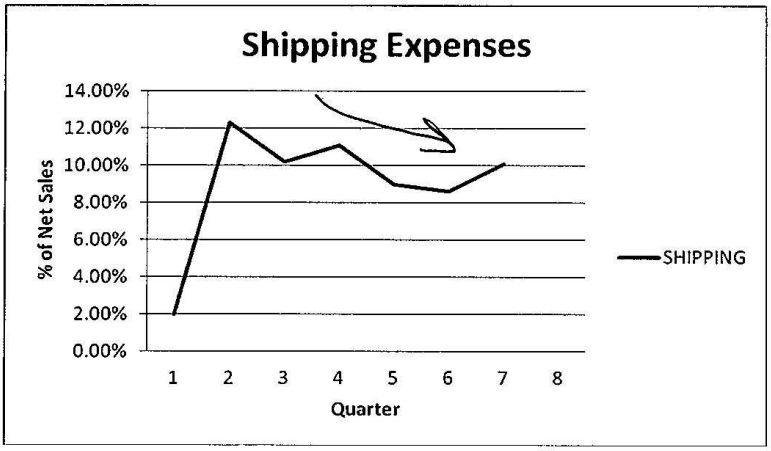


We have achieved our goal for lost sales. By the 7th quarter we have reached 0 lost sales in 25" T.V.'s in Japan and the U.S. For 27" T.V.'s we have reached 0 lost sales for Japan and Mexico. This is largely in part due to our increase in production and surplus in inventory. In Mexico and Japan we have a 10% invetory to offset seasonal variations and to decrease our lost sales. In Mexico we had 1,300 lost sales for our 25" T.V. which is well within our standards. In the U.S. we had over 55,000 lost sales with our 27" product. We do not offer this product in the U.S. which means we need to cut all promotion of the 27" product in order to decrease these lost sales. We do not want to promote a product that is not offered in a certain market.



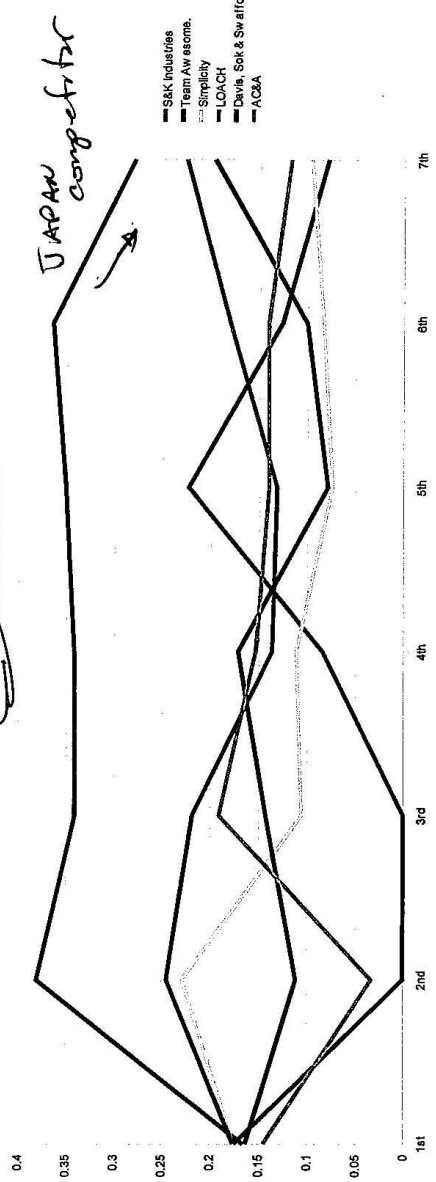


We have shifted our shipping routes in an effort to cut shipping expenses. In quarters 5 and 6 we saw our shipping expenses start to trend downwards. However, in the 7th quarter we had a competitor enter the Japanese market. This was an unexpected move that was very damaging to our net sales. This drop in sales also affected what percentage our shipping expenses were of our net sales. Our goal for the final quarter is to decrease shipping expenses to under 9.0% of our net sales. This would allow us to have a higher profit margin, which would in turn increase our quarterly profit.

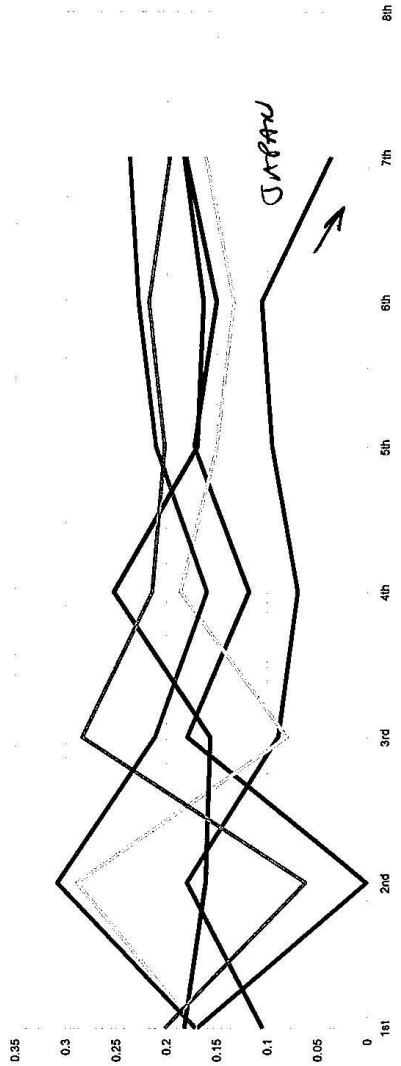


Charts

Basics World Market Share

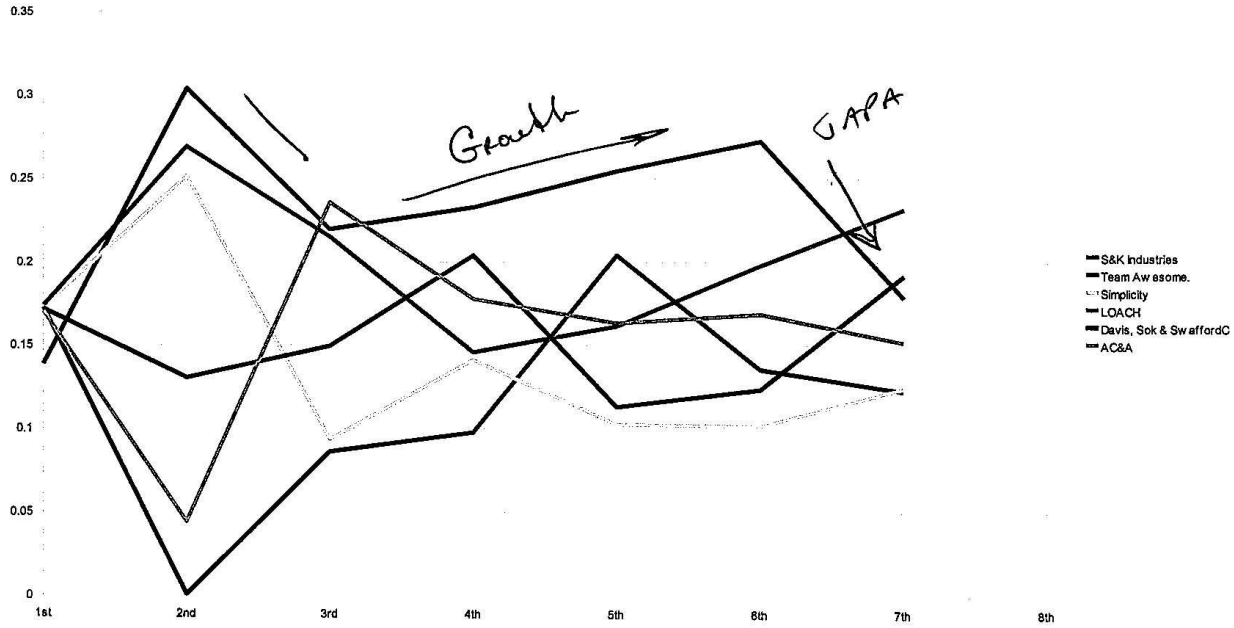


Deluxe World Market Share



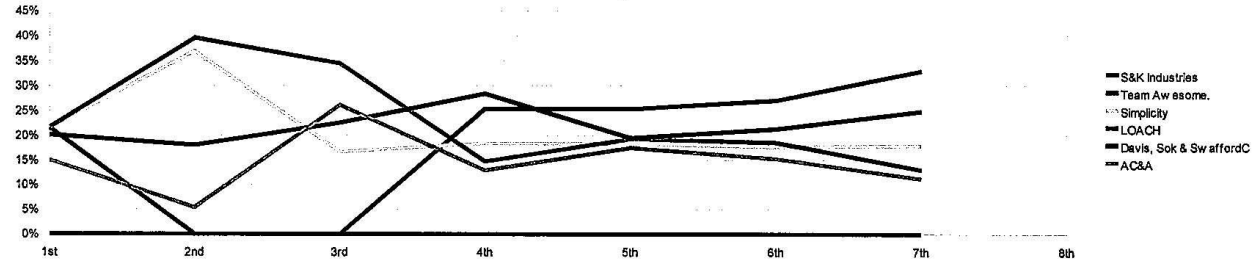
Charts

All Models Market Share

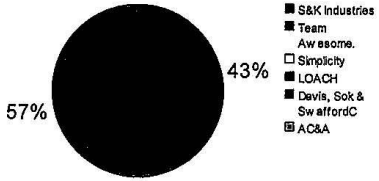


Charts

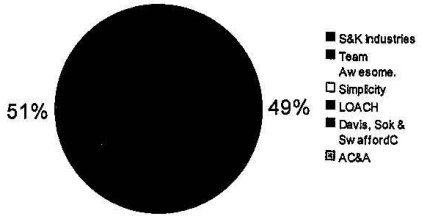
25 " Market Share By Quarter U.S. over time



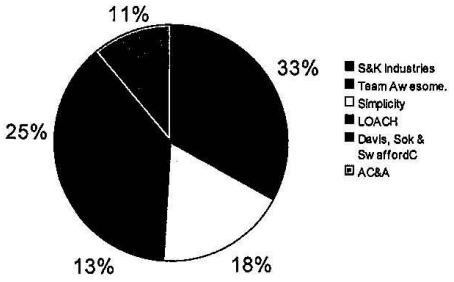
25" Market Share in 2nd Qrter 2nd Yr Mexico



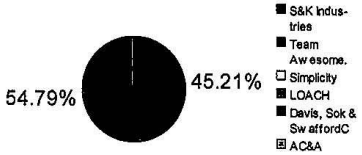
25" Market Share in Japan 3rd Qrter



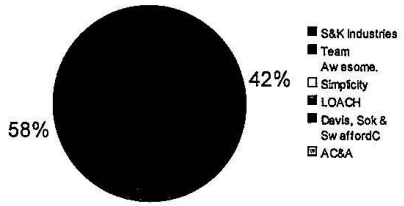
25" Market Share in 2nd Qrter 2nd YR U.S.



27" 3rd Qrter Year 2 Market Share Mexico

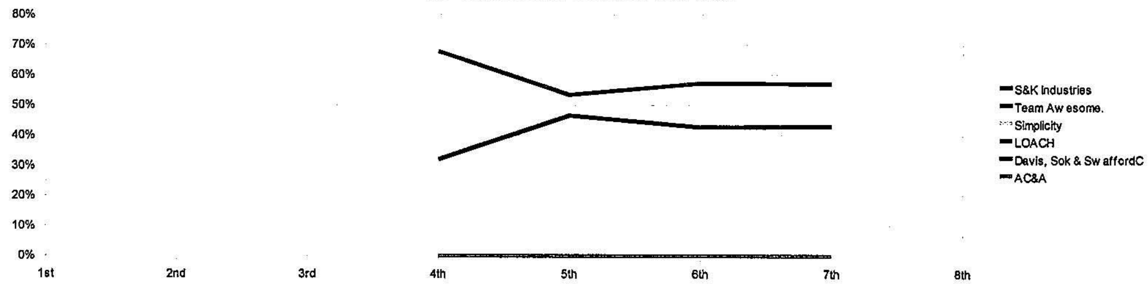


27" Market Share in Japan 3rd Qrter

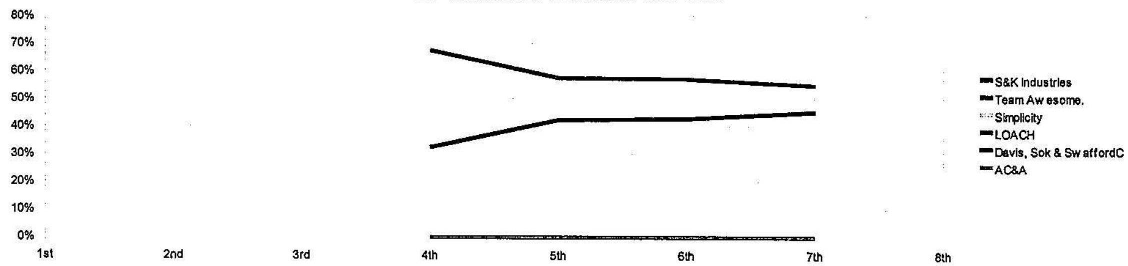


Charts

25" Market Share in Mexico Over Time

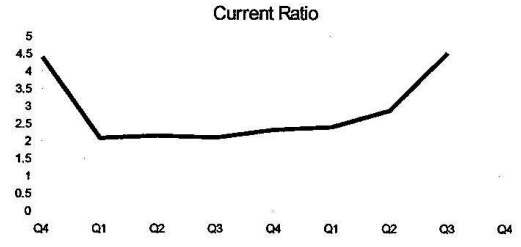


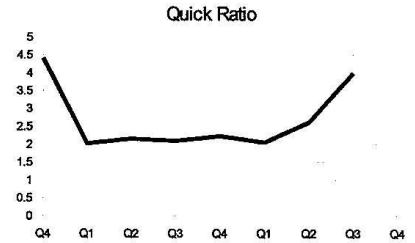
27 "Market Share in Mexico Over Time

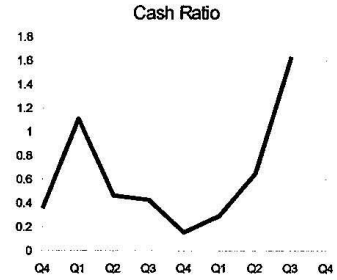


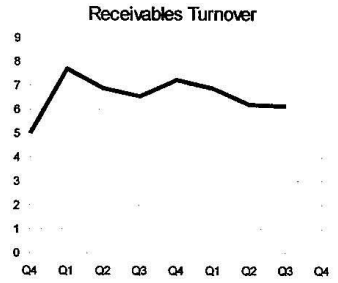
Ratios

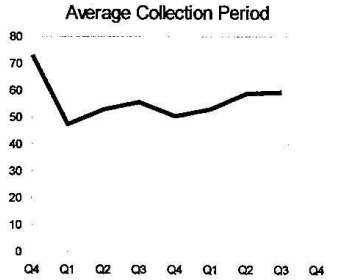
	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	
Current Ratio		4.41	2.09	2.16	2.1	2.32	2.4	2.87	4.52	
Quick Ratio		4.41	2.03	2.16	2.09	2.23	2.05	2.61	3.99	
Cash Ratio		0.36	1.11	0.46	0.43	0.16	0.29	0.65	1.63	
Receivables Turnover		5	7.7	6.89	6.56	7.24	6.88	6.2	6.14	
Average Collection Period		73	47.39	52.96	55.67	50.45	53.09	58.86	59.47	
Inventory Turnover		1.82	2.41	3.7	0.79	1.34	0.95	0.93	0.91	
Inventory Period		200.93	151.41	98.77	463.6	273.04	382.87	393.83	402.69	
Debt Ratio		13.3%	39.8%	39.0%	51.0%	44.9%	43.5%	37.8%	27.6%	
Debt-to-Equity Ratio		15.4%	66.2%	64.0%	104.2%	81.4%	77.1%	60.8%	38.1%	
Gross Profit Margin		24.7%	36.6%	44.4%	52.7%	51.8%	54.0%	58.8%	53.9%	
Goal		55.0%	55.0%	55.0%	55.0%	55.0%	55.0%	55.0%	55.0%	55.0%
ROA		-2.88%	-2.17%	2.59%	3.89%	7.66%	10.29%	9.73%	4.91%	
Goal		12.00%	12.00%	12.00%	12.00%	12.00%	12.00%	12.00%	12.00%	12.00%
ROE		-3.32%	-3.61%	4.25%	7.95%	13.90%	18.23%	15.65%	6.79%	
EPS		-0.1	-0.13	0.16	0.31	0.63	1.02	1.02	0.48	

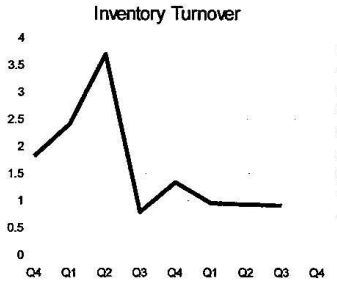


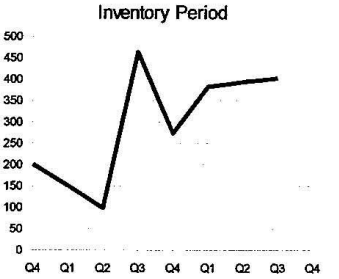


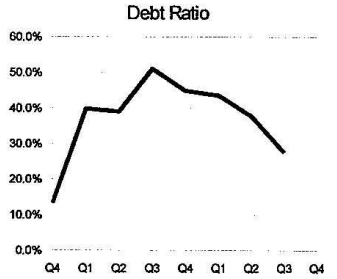




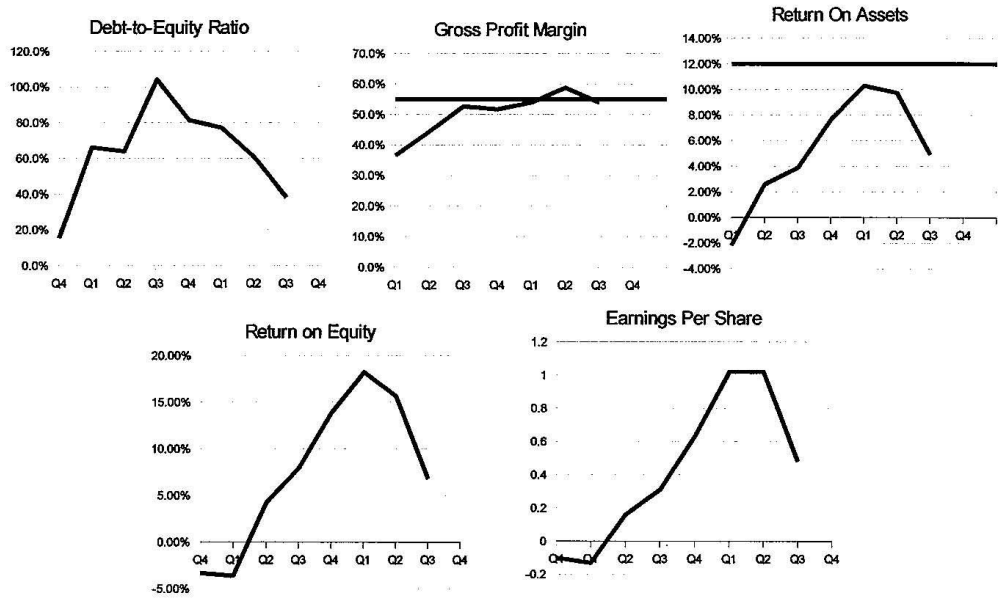


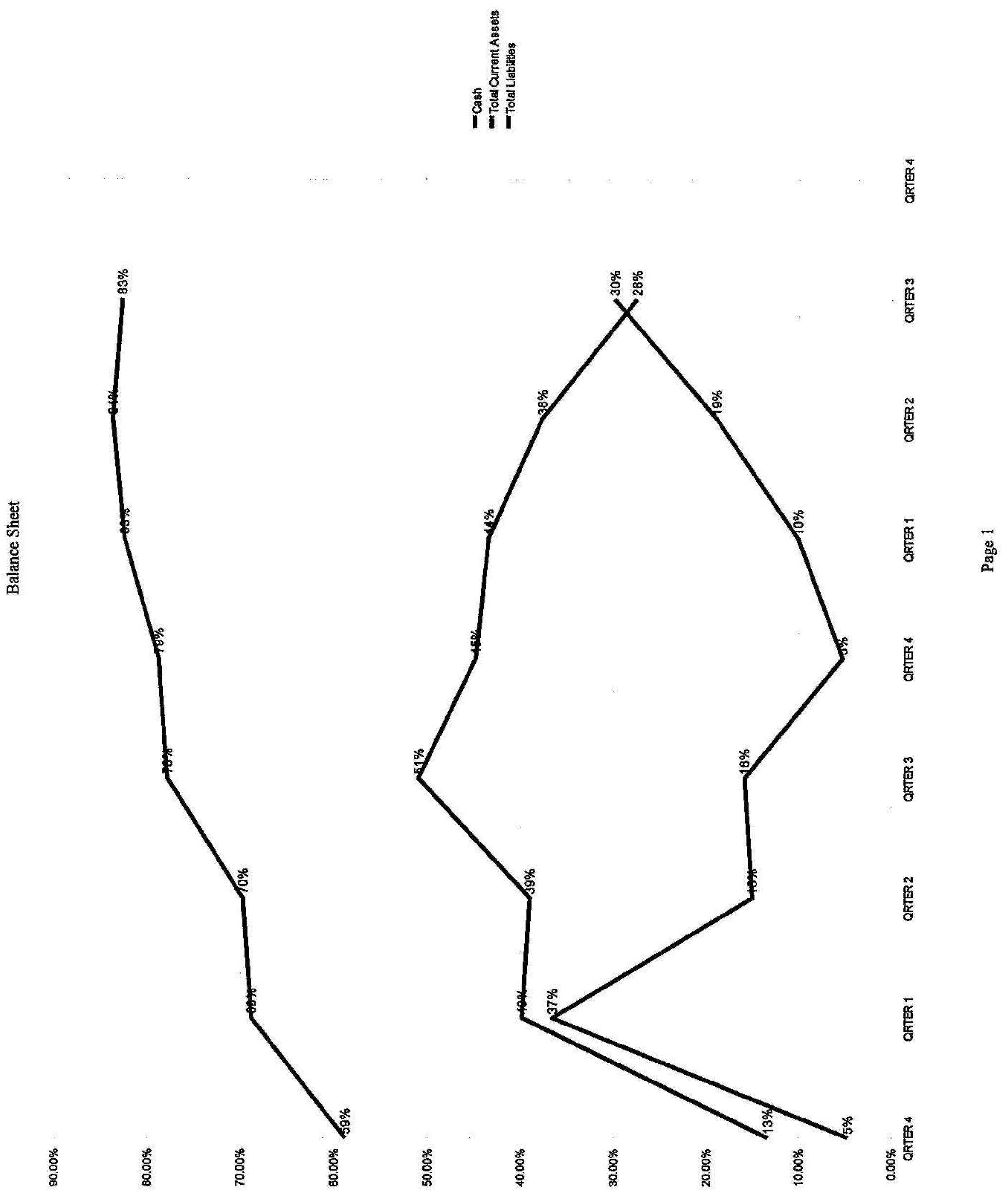


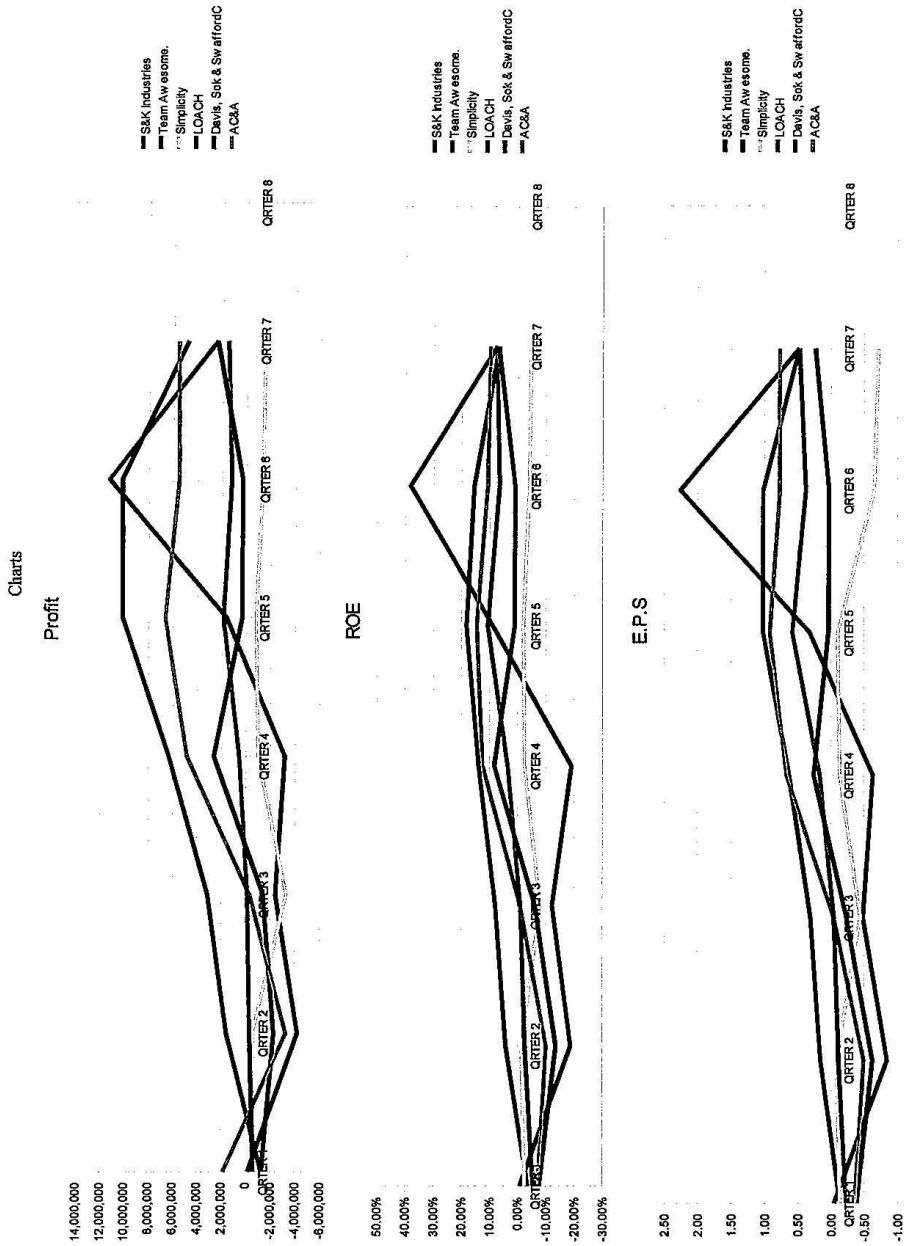




Ratios







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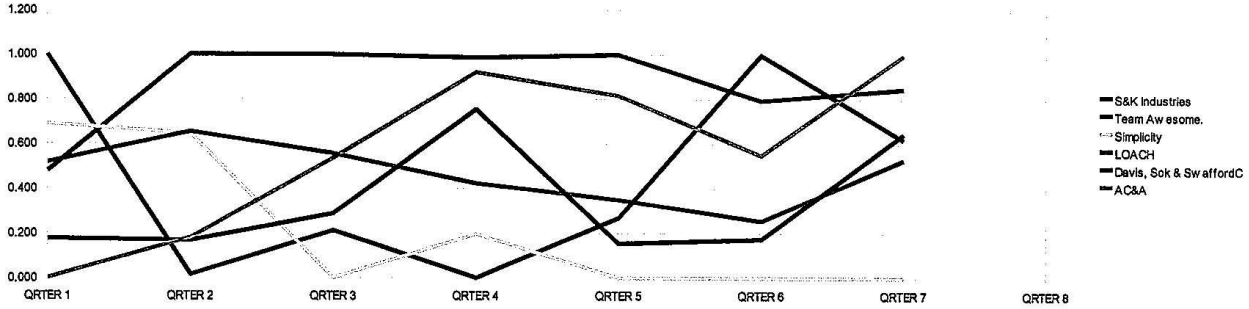

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