

**A Dissertation**

**Entitled**

**The Antecedent and Consequences of a Strategic  
Orientation that Leads to Organizational Structure,  
Performance, and Competitive Advantage**

**By**

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Presented in Partial Fulfillment of the Requirements for the Doctor of  
Philosophy Degree in Manufacturing Management and Engineering

  
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**An Abstract of**

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This research, through structural equation modeling (SEM), sought to discover the relationships between the chosen strategic dimensions of an organization and its functional components that lead to innovative performance. Firms selected for this research were ones that compete in industries that create innovative new products. The functional units, as described here, refer to the market orientation, supply management orientation, and the manufacturing orientation. A slight modification of market orientation and supply management orientation were performed for the purpose of this research. Manufacturing orientation was developed using items developed by Boyer and

McDermott (1999) concerning strategy in operations. These three orientations than lead to how innovations are managed which created another new construct called ‘Innovation Management’. Innovation management contained two elements, the level of innovation or innovative drive, and customer alliance. The final part of the model looks at business performance both internally and in relation to the competition.

Another new concept, strategic alignment, was developed in this study as a latent construct. Strategic alignment measured how the orientations followed the desired strategic dimensions of the organization. In addition, strategic alignments effect on both innovation management and business performance were captured. The new scales for all three, manufacturing orientation, innovation management and strategic alignment, were found to be significant and valid. A total sample of 182 respondents made for a response rate of just over 12%. Preliminary research, a pilot study, and large sample study were performed. Overall, this research adds to the present literature, aids in future research, and supports findings of recent studies.

*Dedicated to Cheryl and Marissa*

*Whose love, support, and belief in me, made this possible.*

## **Acknowledgement**

Through the help and guidance by my committee, this research came to fruition. Redirecting me and keeping me in focus made this research what it is thanks to Dr. Lim. His assistance has made me a better researcher as I was directed to discover different aspects myself. Dr. Pope was very influential in aiding me to improve in proof reading my work. In line with this, Dr. Sharkey also aided in how phrasing can really make a difference. After the readability was improved, Dr. Hartley helped me correct the structure by putting the proper elements where they should be according to proper publishing techniques. Dr. Hartley passed on recent review comments from a major journal article to aid my understanding of the structure expected when I publish.

Others outside the committee were also very helpful. Dr. Ragu helped me with a quick introduction to AMOS so that I could use it for my data analysis. Dr. Rao who was always there to help answered other statistical questions. Other faculty about the College of Business delivered other items such as paper and answers to those last minute questions. The computer department, especially Maggie, who helped me launch my web survey and adjust for any glitches. Of special note was Barb, that secretary who always had that extra cup of coffee ready or a quick snack.

Outside the realm of academics were my wife and daughter who helped me cope with this process. Sometimes the answers did not seem concrete, but my wife was always there to give me the required push. She worked the whole time to support us as I worked

through obtaining a PhD. In fact, her work played a slight role in some of my research. My daughter never seemed bothered by the whole idea; she would just say, “Dad is that dissertation done yet?” I am not sure if this was good or bad in that she may believe that when she write a paper, it can take her a year or more. The rest of the family always seemed to cheer me on and say, “I’m glad it’s you and not me!” I must admit it does take a bit of dedication to finish, but for the final result, I will be doing what I have found I really do enjoy.

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# **Chapter 1**

## **Innovative Organizations**

### **Introduction**

Innovation is commonly defined as the creation of new concepts or processes that will make the human interaction easier or simpler. Innovations are typically referred to as creative because they are different from the existing products or services. In the early literature, defining product innovation is the process of bringing new technology into use (Galbraith, 1973). Based on this definition, new technology could refer to a very wide span of innovations. Innovation developed through NPD is of interest to many industries as a way of obtaining a competitive advantage, increasing market share, or maintaining an organization's position in their particular market.

Several authors have defined product innovation in many different ways (Garcia and Calantone, 2002, Tatikonda and Montoya-Weiss, 2001, Sahay and Riley, 2003). Innovation can refer to the process that followed or to the newness of a product to both



the organization and the customer, all in varying degrees. Developing innovation can be within the organization, outside the organization, or even through a collaborative effort internally and externally to the organization. The main two types of innovation most widely used in the literature are incremental and radical. Incremental innovations reinforce prevailing market structures and competitive positions as they strengthen existing barriers to entry, whereas radical innovations transform prevailing market structures and demolish prevailing barriers to entry (Abernathy and Clark, 1985).

Reference to radical innovations has been as discontinuous in the literature as supported by a meta-analysis on innovation/innovativeness conducted by Garcia and Calantone (2002). In their study, several constructs represented innovation/innovativeness such as product innovativeness. The most commonly used ones in the literature were: radicalness or discontinuous, newness to organization, technical content, newness to market, newness to technology and newness to customer. In addition, innovations can be broken down into degrees of newness such as new to world, new to industry, new to the scientific community, new to market (place), new to organization, or new to the customer. There does not seem to be a consensus among authors concerning the different types of innovation or the type of organization that develops them.

### **Problem Statement**

Starting with the basics, incremental innovations are alterations to existing products that might range from a material change all the way to a completely new design of a product

that replaces the current model. Radical, discontinuous or really new innovations, referred to as radical innovations from this point on, are completely new products either to the organization producing them or to the world. New to the organization would mean that it is an existing product, but the organization of interest has not produced this product previously. New processes and materials might be involved in the NPD. Radical innovations that are new to the organization and the world typically fill a gap in the existing demand for a product that does not exist either within the organization or within the market as a whole. It appears that there is no consistent definition of what is considered a 'high', 'moderate' or 'low' degree of innovativeness or how innovation correlates with incremental, radical, or some other typology. While these studies have identified various types of innovation, the alignment between the innovations and the organization's strategy is still in its infancy (Garcia and Calantone, 2002).

Only a few articles have gone further in the delineation of this concept of innovation and its alignment to strategy. For example, Griffin and Page (1996) proposed six different strategies an organization may use to perform NPD originally introduced by Booz (*et. al.*, 1980). The overall premise of the framework is to include both, the market aspects of strategy, and the technology. The six strategies in the framework are new-to-the-world, new-to-the-company, additions to existing lines, improvements, cost reductions, and repositioning. Each of the strategies focused on accomplishing different organizational or market goals. The premise was matching these six innovation strategies in a portfolio manner against each of the four strategic orientations introduced by Miles and Snow

(1978) of Prospector, Defender, Analyzer, and Reactor. Each innovation strategy represented as a percentage of its use according to each strategic orientation typology.

This particular study (Griffin and Page, 1996) built a case for using all the measures of innovation in a portfolio format to display the different combinations of innovation used by an organization. Being a preliminary study between strategic orientation and product portfolios, the findings were not indicative of expectations as found in other studies concerning strategic orientation. Prospectors were performing the majority of radical innovations, whereas Defenders, Analyzers and Reactors mainly performed additions to existing lines. This would imply that from a strategic perspective the outcome for the Prospector is truly first-to-market, agreeing with Miles and Snow's typology (1978), however, it is limited in its findings for the other typologies. In closing, Griffin and Page (1996) state their research supports that successful measurement should follow strategy. On the downside, bias may be present due to a small selective sample and the respondent's ability to read into the questions. However, this study did build a correlation between innovation and an organization's strategy, which was unrepresented in the literature. The real issue and the objective of this research, is to go further in depth and extend the study to include the organizational structure that occurs between the strategic orientation and the resulting innovation and to distinguish the types of innovation drivers produced according to that organizational structure.

Taking a strategic position or strategic orientation was the main topic for Miles and Snow's (1978) original work when they introduced four strategic typologies. These four

typologies, Defender, Prospector, Analyzer, and Reactor, all specified a type of strategic focus the organization should possess. The four typologies should separate the different organizations according to their strategies. Each typology contains a certain set of attributes that would determine how the organization should function or perform. Different areas that have been researched concerning the four typologies are the relationships between typologies (Snow and Hrebiniak, 1980; Conant *et. al.*, 1990), distinctive competence (Snow and Hrebiniak, 1980), organizational performance (Snow and Hrebiniak, 1980; Conant *et. al.*, 1990), distinctive marketing competencies (Conant *et. al.*, 1990), analysis of measurement accuracy in paragraph form (James and Hatten, 1995), alternative measures of the typologies (Shortell and Zajac, 1990), a potential moderator of the market orientation performance relationship (Matsuno and Mentzer, 2000), a measure of success for project strategy (Griffin and Page, 1996), and strategic planning characteristics and innovativeness between strategies (Veliyath and Shortell, 1993).

From four distinct strategic orientations, Venkatraman (1989) later introduced six key dimensions to determine an organization's strategic orientation that partially included Miles and Snow's (1978) measures. Venkatraman (1989) believed that a strategic orientation was multi-faceted and immeasurable by a single construct. Therefore, he developed six dimensions that include Aggressiveness, Analysis, Defensiveness, Futurity, Proactiveness, and Riskiness. Sabherwal and Chan (2001) were one of the first to combine Miles and Snow's measures in combination with Venkatraman's measures. Their study investigated the alignment of business strategy with IS strategy to measure

business performance. The findings did support better performance with more appropriately aligned strategies. In another study using Venkatraman's measures, strategic orientation's affect on a market orientation was tested (Morgan and Strong, 1997). The results demonstrated that the dimensions of Proactiveness, Analysis and Futurity had significant positive relationship to market orientation. Within the strategic orientation of an organization, regardless of the measures used, a specific structure develops based on the decisions made pertaining to NPD. This would infer that different functional units of the organization are strategically aligning to the needs of the organization.

Market orientation has been touted in recent years to be a key ingredient for successful organizations. There are two streams of market orientation researched, one that describes a market orientation as a philosophical approach and another that is activity related and conceptualizes it as a company behavior (Narver and Slater, 1990; Deshpande' *et. al.* , 1993). Market orientation fundamentally establishes tenets of organizational behavior with respect to an organization's business constituents (customers, competitors, and internal functions), which unequivocally influences organizational performance (Han *et. al.*, 1998). Narver and Slater (1990) suggested separating market orientation into three main components of customer orientation, competitor orientation and interfunctional coordination where the effect of a market orientation measured against organizational innovativeness. Along with these, three dimensions of market orientation, the use of two decision criteria are employed, a long-term focus and a profit objective. They found a positive relationship between market orientation and profitability for commodity

producing organizations that measured above the median for market orientation use. The relationship of organizational innovativeness is believed to be a mediator of market orientation leading to corporate performance. The results of a study by Han (*et. al.*, 1998) showed mixed results with weak findings that market orientation would support facilitating an organization's innovativeness. The difference warrants further research as depicted by these two studies.

The degree of market orientation as either an activity or a philosophy is a driver pushing the level of NPD and product innovativeness. Drucker (1954) suggested that marketing and innovation are two basic functions of the organization. The level of market-orientated behavior by the organization implies the extent to which market orientation influences an organization's innovation activities and outcomes (Atuahene-Gima, 1996). A market orientation driven by customer orientation positively influenced the increase in the new-to-the-world products and reduction of the number of me-too products developed (Lucas and Ferrell, 2000). Likewise, Lucas and Ferrell (2000) found that greater emphasis on interfunctional coordination increased product line extensions and reduced me-too products.

Yet not all studies have concluded that a market orientation leads to better innovations. Bennett and Cooper (1981) found that a strong market orientation leads to imitation and marginally different products. Gatignon and Xuereb (1997) only detected a significant relationship between product innovation and the extent to which the market orientation was interfunctionally coordinated. The pursuit of market orientation may well be a

laudable aim. However, organizations appear to differ significantly in the extent to which they exhibit traits associated with a market orientation (Morgan and Strong, 1997). Narver and Slater (1990) argue that Miles and Snow (1978) were incorrect in their assumption that a market orientation is not always appropriate; instead, they suggest that an organization should try to achieve an optimal level of market orientation. Regardless of the level of market orientation, the organization must structure properly. This structure will require a certain amount of cooperation between marketing and manufacturing to be fully successful with market orientation and innovation.

Manufacturing plays an important role in the innovation process leading to NPD. A very recent study of eight manufacturing organizations showed that almost half were developing new to the world products (Ettlie and Subramaniam, 2004). Swink (1999) measured the threats to new product manufacturability in terms of complexity, product newness, technology uncertainty, design outsourcing and project acceleration leading to new products manufacturability. The relationship was moderated and directly influenced by manufacturing involvement, supplier influence, collaborative environment, and top management support. Some significance indicated the potential importance of a particular organizational structure. However, the evidence of the direct impact of intense manufacturing involvement in NPD has been rather weak (Fleischer and Liker, 1992; Swink, 1999).

NPD projects draw on the equipment, skills, resources and personnel that must work together to achieve the overall objectives of the project (Dougherty, 1992; Alder, 1995).

This is to say that one of the main uncertainties faced in NPD is that of technology uncertainty (Wheelwright and Clark, 1992; Iansiti, 1995; Barnett and Clark, 1996). In other words, it is even more difficult when the NPD project requires skills or technologies outside the normal realm of capabilities of the manufacturing unit. Manufacturing would then need to train or hire new individuals, purchase new machinery, or find an outside supplier capable of providing the required skills. The implication would be that a certain level of structure in manufacturing capabilities is relevant for higher performance. Citing higher performance was due to greater integration of suppliers into consumer product manufacturing that achieved superior product quality, delivery reliability, process flexibility, and cost leadership (Rosenzweig *et. al.*, 2003).

A distinct connection provided to manufacturing through supply chain partnering can be a valuable asset. Many articles have had a repeating theme of supplier management improving product quality and other aspects of manufacturing performance (Narasimhan and Jayaram, 1998). When there are pressures exerted to reduce costs, time to market, and increase product quality and variety, purchasing units within organizations have switched from an operational mode to a strategic mode to be efficient in manufacturing (Carter and Narasimhan, 1996; Nishiguchi, 1990). Using suppliers for non-core activities has become a necessity for organization survival and the need monitor constantly core activities. The different activities provided by suppliers can enhance the organization's capabilities. Findings that support this statement are found in various studies that show improved product development times (Clark, 1989; Clark and Fujimoto, 1991), better product quality and reduced costs (Ragatz *et. al.*, 1997), and making suppliers fully



responsible for the design of components, systems, processes, or services they will supply (Ragatz *et. al.*, 2002).

Many facets of supplier involvement in the NPD process have been studied and tested (Ragatz *et. al.*, 1997; Choi and Hartley, 1996; Vickery *et. al.*, 2003; Prahinski and Benton, 2004). Findings range from formalized procedures with routine communications between partners positively influencing the buyer-supplier relationship (Prahinski and Benton, 2004) to the relationship between supply chain integration and organization performance being indirect (Vickery *et. al.*, 2003). Also found was the rejection of outside ideas, because of a “not invented here” mentality, to integrate suppliers into NPD that can yield substantial price, delivery timing, and quality benefits (Ragatz *et. al.*, 1997). All of these examples, point towards the advantages associated with stronger involvement or integration with suppliers.

Not all research on suppliers has had positive results. Hartley (*et. al.*, 1997) found that suppliers have little practical influence on the project’s overall technical success and King and Penleskey (1992) noted a negative impact on project development time when suppliers delay their activities. It is not always clear when a supplier should be involved in the NPD process (Brown and Eisenhardt, 1995). The lack of consistency of the preceding warrants further study into the supplier relationship with an organization. With a specific strategic focus, an organization should be consistent in their exchanges with suppliers. This relationship should add strength to the overall alignment of the organizational structure.

Alignment would refer to organizational functions such as marketing or manufacturing having a clear understanding and relationship between them working toward a common goal. The premise of an alignment within an organization has been studied by several authors (Bozath *et. al.*, 2001; Papke-Shields and Malhotra, 2001; Joshi, Kathuria, and Porth, 2003). The focus of organizational alignment has been between marketing and manufacturing (St. John and Hall Jr., 1991), new ventures and their interface with manufacturing and marketing (Deane, McDougall, and Gargeya, 1991), marketing-manufacturing's joint involvement across stages of NPD (Song and Swink, 2002), and aligning marketing and manufacturing strategies with the market (Berry, Hill, and Klompmaker, 1999). The results of these studies have advocated different combinations of sales, engineering, manufacturing, marketing, and R&D to pursue effectively NPD or enhanced organizational performance. When strategy is included in the alignment, the results have pointed towards increased influence and involvement (Papke-Shields, and Malhotra, 2001), coalignment (Venkatraman, 1990), or dealing with conflict and morale (Hausman, Montgomery, and Roth, 2000). Most of the research focuses on the NPD arena with results supporting cooperation between marketing and manufacturing having a positive effect on new product performance (Zirger and Maidique, 1990; Calantone, Droge, and Vickery, 2002; Griffin, and Hauser, 1992). Worth noting, these studies have only focused on the internal alignment within the organization, leaving an opportunity for findings concerning alignment that would include suppliers and/or customers.

The concept of alignment between marketing and manufacturing should be different with the addition of suppliers. Different abilities enabled using the supply partners should have

varying effects on the marketing-manufacturing relationship. This would naturally lead back to what strategy an organization possesses and how the structure is formed because of past strategic choices. When strategy was identified using Miles and Snow's typology or Venkatraman's dimensions, the results only showed an association with the chosen strategy of the organization with some type of profitability measure (Matsuno and Mentzer, 2000), type of innovation strategy (Griffin and Page, 1996), information system strategy (Sabherwal and Chan, 2001), marketing competency (Conant *et. al.*, 1990), or revalidation of the measures (Zahra and Pearce, 1990; James and Hatten, 1995).

As previously noted, NPD has been the success measure for several studies concerning alignment. Very few authors have endeavored to include the strategic typologies of Miles and Snow (1978) with NPD outcomes (Lul and Yang, 2004; Dyer and Song, 1998). If an organization chooses a specific strategic typology, structures the organization through a market orientation, manufacturing orientation and supply management orientation (Shin *et. al.*, 2000), the resulting innovation management should reflect more conclusive results indicative of these choices. The addition of both the supply management orientation and manufacturing orientation will further define the separate functions of the organization. Having a clearer organizational structure should simplify the research concerning an organization's drive for innovation management. The elements of innovation management will be the result of the choices concerning strategic orientation and the resulting organizational structure.

## **Research Questions**

*Research Question 1:* Will the choice of a specific strategic orientation have a positive effect on the level of (a) market orientation, (b) Supply Management Orientation, and (c) manufacturing orientation?

*Research Question 2:* Can an organization be strategically aligned?

*Research Question 3:* Will the innovation management strategy be measurable?

## **Contribution**

This study will provide organizational structures based upon the alignment to the strategic orientation and innovation management. The measuring strategic orientation will be in a portfolio manner displaying the degree of each strategic dimension used to define clearly strategic intent of the organization. The strategy should be reflected in the practices of the market orientation, supply management orientation and manufacturing orientation. Between management's choice of strategic orientation and the functional components alignment to it, a latent construct called strategic alignment will be measured. Strategic alignment will be tested for its impact upon the innovation management and the business performance. Through this process, new constructs will be developed to aid in future research.

## **Chapter 2**

# **Theoretical Foundations**

### **Introduction**

This chapter presents the theories this research is based upon. Contingency theory, core competencies, and resource-based view theories are used.

### **Contingency Theory**

Lawrence and Lorsch (1967) developed the contingency theory. This theory is based on the match or coalignment of an organization with its environment on at least two levels. The first level, consisting of the structural features of each subunit, should be suited to the specific environment in which it exists. In other words, similar to Skinner's (1974) Focus Factory, each subunit should control its own functions and the organization itself should move as a unit. Each unit will face a different set of contingencies as will the organization overall. This leads to the second level of the differentiation and mode of

integration. A larger organization should be suited to more complexity in the environment in which the organization operates (Scott, 2003). The basic premise of contingency theory is how individuals develop the possible scenarios that may occur due to a specific event and then choosing an alternative. The alternative chosen will be the result of the beliefs and practices of that individual. An organization, whether it is at the subunit level or as a whole, will perform a similar task in decision-making to handle contingencies. Contingencies are believed to affect organizations in varying ways creating a multitude of possible outcomes.

### **Open Systems**

The main premise of contingency theory concerns the structure of the organization. Contingency theory was developed in conjunction with open systems (Boulding, 1956). Open systems refers to the outside inputs that come in from the environment, their internal transformation process within the organization and outputs that are sent back out to the environment. Put in context, a demand from the environment for a product not yet developed leads to the internal transformation or innovation within the organization and delivered to the customer. The final product developed by the organization is representative of the output to the environment. How the input is changed depends upon the organizational structure. In short, the better a structure is, the better the organization is at handling contingencies, and the more efficient the organization should become over time. Although, the real test is when contingencies change, so must the organization. Most of the literature deals with organizations as imperfect entities that improve to deal

more efficiently with predictable contingencies. Therefore, contingency theory assumes that changes in contingencies create variation around an essential organizational form (Clegg *et. al.*, 2005).

Contingency theory is based upon positivism in that the theoretical constructions, such as the organizational structure, may be unobservable, but hypotheses concerning the properties of these constructs may be tested (Clegg *et. al.*, 2005). Proponents of positivism argue that organizations and the behavior observed within them are a patterned and controlled result of causal mechanisms. Mechanisms here refer to the social facts or the items that cannot be imagined away, such as the environmental or physical attributes of the organization like size. Measurement in contingency theory has mainly dealt with three variables, environment, technology, and size. Technology will be defined as the production methods used at the organization of interest for this research.

Early findings by Burns and Stalker indicated differences in mature versus dynamic environments. Organizations in mature environments seemed to be more mechanistic and bureaucratic in nature, whereas, organizations that were in dynamic environments tended to be more flexible and organic. Woodward (1965) argued that the more routinized production was the more structured the organization becomes. In other words, mass production would be easier to structure than batch production. Pugh and Hickson (1976) found support for size being the determining factor for organizational structure and as the size increased, the more bureaucratic organizations become. As organizations become more bureaucratic through specialization, standardization and formalization, size is

affected. Another argument for change in contingencies came from Perrow (2002) who stated that size is a dependent variable caused by growth and that the major cause of structure is the technology use in the organization.

Based on the preceding statements concerning contingency theory, an organization structured properly to respond to its contingencies should outperform those that are not. Managers in positions of control make strategic choices about how they will configure the organization, which determines the technology and structures (Child, 2002). The contingencies coming from the environment will be varying in the speed with which they appear. In the case of NPD, contingency theory would dictate that the organizational structure be predicated on the degree of product innovativeness undertaken and the contingencies involved within the operating environment. This would imply that a turbulent market would require more market orientation to deal with such volatility because of the multiple contingencies. Likewise, a mature market, with less turbulence, will require a lower degree of market orientation due to fewer contingencies. Manufacturing could take a larger role in improving cost and quality with less turbulence provided by a mature market.

### **Functional Determinisms**

It is believed through time that organizations develop 'functional determinisms'. This refers to the mechanisms that regulate organizations or what is seen as an interactive effect between the structure of an organization and its functions (Clegg *et. al.*, 2005).



These mechanisms could be the invisible linkages between marketing and manufacturing that enable an organization to perform at the level it does according to the contingencies that occur. Proponents of this model argue that functions that tend to be more efficient or effective are adopted. These organizations tend to survive longer than other organizations. From this, one could infer that different organizations become effective and efficient at various functions that they encounter through regular routines. So, using the linkages provided by the functional determinism should aid in the research of the alignment between functions.

### **Contingency Theory and Innovation**

Based upon contingency theory, innovation, dependent upon the degree chosen, could be fraught with contingencies. An incremental innovation may seem to be simpler in nature, but the technology that exists within an organization may not be appropriate for the new task. Therefore, developing new strategies for dealing with changing contingencies is required. Typically, it would lead one to the assumption that incremental innovations would be more of an internal issue and radical innovations would lead to more internal and external issues concerning contingencies. Testing the organization, this way would lead to different structures and practices the organization follows, instigates and incorporates. Organizations would adopt different strategic structures that allow for the best overall fit with the environmental contingencies. Aligned with this concept, an organization would choose its supply chain partners according to the strategic orientation

formed. To leverage the environmental contingencies, whether they are internal or external, the organizations can use suppliers as solutions to their contingencies.

### **Core Competencies**

Through developing routines and dealing with the changing contingencies, the organization will develop effective skill sets and become more proficient with different technologies. These will become the core competencies of the organization (Prahalad and Hamel, 1990). Core competencies are defined as the collective learning in the organization, especially how to coordinate diverse production skills and integrate multiple streams of technologies. This knowledge comes from dealing with contingencies and leads to the improved routines that in effect develop the core competencies. The tangible link between identified core competencies and end products are referred to as core products that are the physical embodiments of one or more core competencies (Prahalad and Hamel, 1990). These core products are typically developed from innovations within the organization or in combination with a supplier. This could imply that the development of some of the innovations that are to deal with contingencies could become the core competencies of the organization.

### **Resource-Based View Theory**

The concept of core competencies fits well with the premise of the resource-based view (RBV) of the organization. The RBV theory develops from two main assumptions, that

there is heterogeneity of organizations, and that resources are immobile. The contention of heterogeneity would coincide with the idea of different strategic orientations existing across organizations creating different resource and capability sets in a multitude of combinations. Through the uniqueness of these resource and capability sets, immobility suggests or represents that no two organizational structures would be identical in formation nor would the resources be allocated similarly. RBV asserts that organizations gain and sustain a competitive advantage by deploying valuable resources and capabilities that are inelastic in supply (Wernerfelt, 1984; Barney, 1986, 1991), referring to the organization's ability to manipulate these capabilities and resources to their advantage. This would lead to the conclusion that not all organizations will have a sustained competitive advantage, except the ones correctly structured that adjust to contingencies.

Quoting from Wernerfelt's (1984) original article "...resources and products are two sides of the same coin" implies that the resources available to an organization determine the products that are developed. Caves (1980) defined resources as those (tangible and intangible) assets, which are tied semipermanently to the organization at a given time. How an organization structures with its suppliers can also be a determining factor, since the suppliers are contributing to the resource and capability pool. Resources, markets, mergers and acquisitions can represent resources acquired through diversification. These four measures would conform to the framework being established here. Resources would entail not only the raw materials and capabilities required, but also what suppliers provide.

All organizations must serve some type of market and the resources would most likely determine the type of diversification taken within each market. Through growth or demand, mergers and acquisitions will occur to diversify the different resources an organization possesses or requires. This is to say that an organization will use what it has at its disposal in order to achieve its strategic mission. If an organization were highly skilled in the ways of a specific type of production method, this would be an internal resource that the organization could build upon. Through this resource, or core competency, the organization may choose to perform the capability for other organizations as a form of diversification that also provides growth. This in turn enlarges the organizations market and represents an opportunity for a merger or acquisition.

The strategy of the organization will originate from three distinct theories used to build a foundation for this study. First, contingency theory (Lawrence and Lorsch, 1967) deals with the contingencies coming into action that an organization must deal with and the structure created. These contingencies are not only taken into consideration when starting a project, but throughout that project, new contingencies occur. As contingencies repeat, organizations develop new practices that become their core competencies (Prahalad and Hamel, 1990). The core competencies become the strengths of the organization. Through diversification of resources, these same strengths can be further enhanced which is by the Resource-Based View (Wernerfelt, 1984).

## **Chapter 3**

### **Conceptual Model**

#### **Introduction**

This chapter explains the elements of the model and they differ from the existing research. The chapter concludes with the development of the hypotheses to be tested.

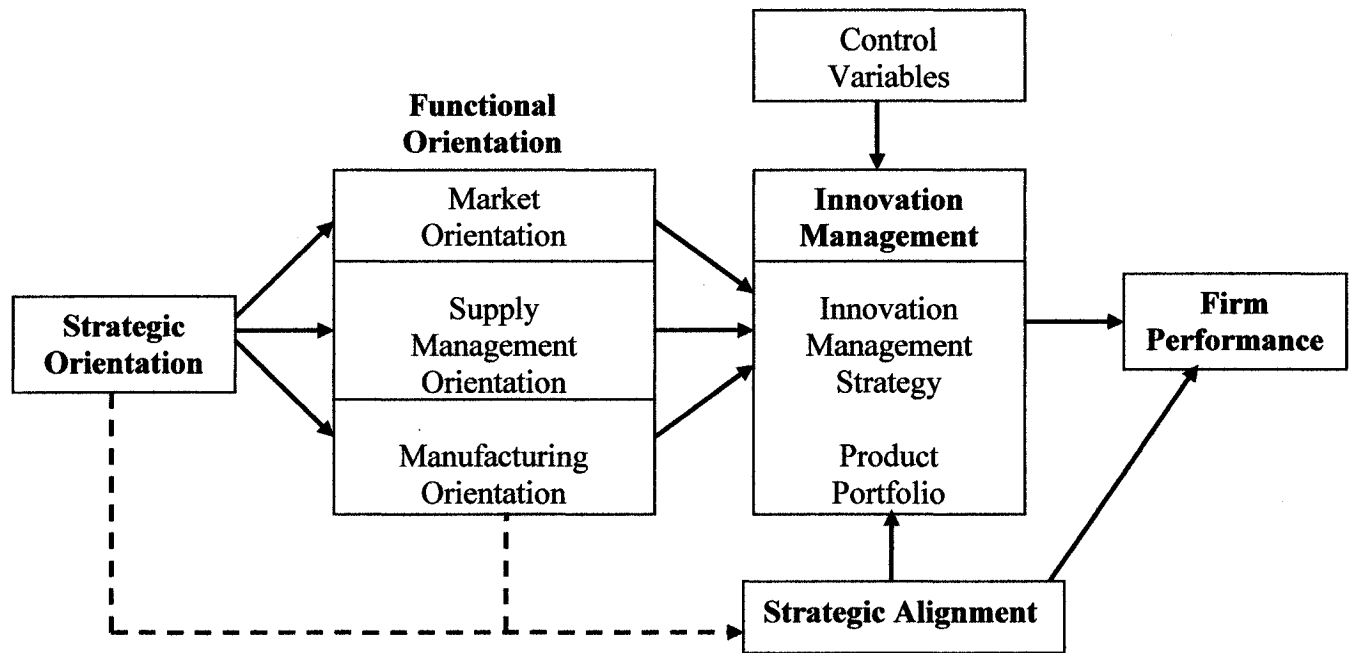
#### **Model Development**

The first two chapters reviewed the constructs of innovation and strategic orientation. The definition of innovation presented in several different ways and the degree of a specific type of innovation has not really been distinguished (Garcia and Calantone, 2002). Strategic orientation or strategic dimensions have mainly been used to measure the strategy of the organization (Miles and Snow, 1978; Venkatraman, 1989). Using the strategic measures with functional areas of the organization, mixed findings were the result. Griffin and Page (1996) did put strategic orientation together with an innovative

product portfolio, but the study was small, selective, and did not include the structure of the organization.

Innovations in the literature have mainly stemmed from the NPD arena or in combination with market orientation (Han *et. al.*, 1998). Some findings have led to the conclusion that marketing and manufacturing should be aligned to enhance processes overall performance. However, even though the alignment between marketing and manufacturing has had positive results, suppliers have not been involved in the alignment. Supplier involvement has appeared in the NPD literature, but mixed findings also resulted for the benefits that are referenced (Choi and Hartley, 1996; Forker *et. al.*, 1997). A more structured organizational approach should show the true benefits of supplier involvement. Suppliers taken together with marketing and manufacturing would create a stronger construct when it pertains to alignment due to the closer relationships with suppliers that organizations are developing. This alignment develops through the influence of the organization's strategy.

Based on theory, a dynamic organizational structure will be constructed between the chosen strategy and ending with the innovations produced. Out of the organizational structure, a strategic alignment will emerge resulting from the collaboration between market orientation, supply management orientation and manufacturing orientation. However, even though the strategic alignment will be the indirect result of the structural combination, it will have a direct effect on the innovation management and the resulting NPD portfolio mix.



**Figure 1:** Strategic antecedents and consequences of innovation management.

### **Model's Unique Contribution**

This particular model is unique in the relationships shown from previous models in the literature. Strategic orientation has been introduced to measure the focus of an organization and that is as far as the model progressed (Miles and Snow, 1978; Venkatraman, 1989). An organization that chooses a particular strategic orientation would structure their organization to meet the requirements indicated by that orientation. If product innovativeness is incremental in nature, it is most likely that the innovation management is to maintain market share or reduce cost. This would imply that manufacturing is more of a focus. It would be more desirable to have long-term relationships with manufacturing and suppliers with less of a market orientation. Support for this developed in the premise that without a strong market orientation and performing

incremental innovations, the requirement to look for alternative suppliers for different resources would be lower. Likewise, an organization structured for radical product innovativeness would lean more towards a market orientation rather than manufacturing and shorter term or changing relationships with supply partners. Typically, with radical innovations it is more an internal endeavor and details are not shared outside the organization due to the importance of the innovation and the potential of losing valuable knowledge. This would require a search for suppliers with specific talents or skills to aid in parts of the project, allowing suppliers to see only a small portion. Innovation management represents different drivers of the organization such as the type of customer alliance, and the level of innovations pursued. When considering incremental or radical product innovativeness there should exist a certain type of balanced alignment among the functional components involved that serves the goals of the organization.

The outcomes produced by the different levels of strategic dimensions adopted by organizations will be a strong influence on the level of product innovativeness. The size of the organization, the number of business units, market turbulence, and technology turbulence should all contribute to the development of the structure of the organization and the degree of product innovativeness. How an organization approaches all of the facets in combination should have definite effects on the organization's product innovativeness affect on the organizational performance. This would suggest that a large organization with many business units, each performing different levels of product innovativeness, might have several different internal structures and varying external arrangements to accomplish the highest level of performance.



The connection provided through managing the supply chain correctly can positively leverage product innovation into a competitive advantage if positioned correctly. Taken in this light, suppliers may be a buffer against market turbulence and technology turbulence. For example, an organizational capacity constraint can overcome with the addition of the correct supplier. Viewing the organization as horizontal, the supplier becomes an extension of the organization through long-term agreements. Based upon the preceding premises, an organization that establishes itself properly for new product innovativeness should display a distinct organizational structure fitting to its strategy. This structure should enable the organization to develop smoothly a product innovation portfolio that provides the highest level of performance the organization can achieve. The structure chosen would also be indicative of the environment dictated by the organization's competition. The literature contains references to many different organizational structures linked to product innovativeness; however, this study will use a structure developed from strategy to create an alignment to produce innovations.

Finally, other contributions from this research are the development of strategic alignment, manufacturing orientation, and innovation management. The strategic alignment will be an indirect result of the levels of market orientation, supply management orientation and manufacturing orientation. Supply management orientation has only recently been introduced (Shin *et. al.*, 2000) and only tested for buyer performance and supplier performance. Manufacturing orientation has had little mention in the literature and it typically is denoted as being similar to Miles and Snow's (1978) Defender typology (Mavondo, 1999). This study will further the construct of manufacturing orientation into

more established elements creating a clearer definition for both academics and practitioners. The introduction of Innovation Management into the literature has not. Therefore, the findings of this research should be more complete with the inclusion of an organizational structure created from strategic dimensions resulting in a strategic alignment.

### **Strategic Orientation**

The following sections will introduce two of the most popular author's scales for measuring strategic orientation.

### **Miles and Snow's Strategic Orientation Typologies**

In 1978 Miles and Snow introduced their strategic typologies. The four typologies that presented are Defender, Prospector, Analyzer, and Reactor. Each of the four strategies has their own strengths and weaknesses. Support for the concept of strategic orientation appears repeatedly through the literature by various authors (Snow and Hrebiniak, 1980; Conant *et. al.*, 1990; Shortell and Zajac, 1990; Veliyath and Shortell, 1993; James and Hatten, 1995; Zahra and Pierce, 1990; Matsuno and Mentzer, 2000, Segev, 1989). Various findings have contributed to the growing literature displaying the inherent qualities and downsides of each typology.

## **Defender**

The Defender represents an organization that literally defends their chosen territory from the competition. The Defender typically serves a narrow portion of an established market. Continuous line production, as depicted by Hayes and Wheelwright (1979), would probably be the most common manufacturing practice, with a narrow range of products typically possessing high quality and low price. This is because the Defender's focus is on the overall efficiency and effectiveness of operations. The following is Miles and Snows (1978) original narrative measure for the Defender.

*Defenders are organizations which have narrow product-market domains. Top managers in this type of organization are highly expert in their organization's limited area of operation but do not tend to search outside of their domains for new opportunities. As a result of this narrow focus, these organizations seldom need to make major adjustments to their technology, structure, or methods of operation. Instead they devote primary attention to improving the efficiency of their existing operations.*

Although support has developed for the Defender construct, different studies have brought different strengths and weaknesses to light. Findings of quality, centralization, and organizational age were pertinent in a study by Segev (1989). In other words, the addition of the organization's age is important in developing the efficiency and market a Defender acquires. Defenders are apt to take less risk as found by James and Hatten

(1995) in a study of banks. They found that both Analyzers and Defenders make less venturesome financial decisions. When a Defender tries to increase market share, sales growth, and percentage of new product sales by increasing their market orientation, it produced a negative effect (Matsuno and Mentzer, 2000). This could be an indication that Defenders do not focus heavily on market orientation. Matsuno and Mentzer (2000) also found that Defenders, making up just over twenty one percent of the total mix in their study, have the highest ROI, but the lowest percent of market share, new product to total product sales, and relative sales growth. This would support the premise that Defenders are somewhat conservative and strive for low cost. In addition, Defenders are not the strongest in planning process formality as found by Shortell and Zajac (1990). Whereas, another study by Conant (*et. al.*, 1990), points to the Defender as being very thorough in planning but limited to only their own realm. This would suggest that as processes are established, the Defender stays with the established products and processes they know. Finally, Griffin and Page (1996) supported that Defender's focus on effectiveness and efficiency and not on growth from product development.

### **Prospector**

The Prospector is more daring and therefore is more innovative than the other orientations. The Prospector employs a broad range of products and varies between batch production or assembly line production. In a study by Conant (*et. al.*, 1990) the Prospector was found to be strongest in the majority of categories such as: knowledge of industry trends; awareness of organizational market strengths and weaknesses, marketing

planning process, allocation of marketing department resources, integration of marketing activities, skill to segment and target markets, new service development processes, quality of service offerings, effectiveness of pricing programs, advertising effectiveness, and control and evaluation of marketing activities. Prospectors are typically more interested in being first to market than having the lowest price. Prospectors want to grow their organizations through new services, new markets, and become more diversified (Shortell and Zajac, 1990; Veliyath and Shortell, 1993). All the new markets, services and diversification indicates that Prospectors take higher financial risk (James and Hatten, 1995) and they receive the most gain in market share, sales growth, and percentage of new product sales by increasing their market orientation (Matsuno and Mentzer, 2000; Conant *et. al.*, 1990). Griffin and Page (1996) state growth, including future, present and past as the most prevalent among Prospectors. The following is Miles and Snows (1978) original paragraph style measure for a Prospector.

*Prospectors are organizations which almost continually search for market opportunities, and they regularly experiment with potential responses to emerging environmental trends. Thus, these organizations are often the creators of change and uncertainty to which their competitors must respond. However, because of their strong concern for product and market innovation, these organizations are not completely efficient.*

## **Analyzer**

The Analyzer observes both the Defender and the Prospector and attempts to balance their strategy somewhere in between (Shortell and Zajac, 1990; Veliyath and Shortell, 1993; James and Hatten, 1995). Analyzers would rather be second to market after the Prospector and have efficiencies closer to that of Defenders. The Analyzer construct did not appear to be that strong in an original study by Snow and Hrebiniak (1980). Similar to the Defender, the Analyzer gains little if anything from increases in their market orientation even though they typically are second in financial performance (Matsuno and Mentzer, 2000) and desire less risk (James and Hatten, 1995). This is not to say that the Analyzer uses the same level of market orientation as the Defender, because the Analyzer also mimics the Prospector. Some studies have found more Analyzers than Defenders as supported by James and Hatten (1995), and, Matsuno and Mentzer (2000). The mixed results between different studies may be due to the sample used or the measurement of the Analyzer construct. It would seem that with a somewhat more aggressive approach to the market than the Defenders, the Analyzers should have a somewhat stronger market orientation. The description of the Analyzer would lead one to believe that they have a balanced structure concerning the different orientations as presented here. The following is Miles and Snows (1978) original paragraph style measure for an Analyzer.

*Analyzers are organizations which operate in two types of product-market domains, one relatively stable, the other changing. In their stable areas, these organizations operate routinely and efficiently through use of formalized*

*structures and processes. In their more turbulent areas, top managers watch their competitors closely for new ideas, and then rapidly adopt those which appear to be the most promising.*

## **Reactor**

The Reactors are just as the name implies as being in a state of reaction. Reactions occur to the environment as necessary as no real plans are developed. Reactors were represented in one study through government-regulated industries (Snow and Hrebiniak, 1980) when most studies have foregone the construct of Reactor due to the weakness of the measure (Conant *et. al.*, 1990; Shortell and Zajac, 1990; Veliyath and Shortell, 1993; James and Hatten, 1995; Zahra and Pierce, 1990; Matsuno and Mentzer, 2000, Segev, 1989). In other words, no organization really wants to list their organization as strictly reactionary, so some studies included it only to say it exists but the number of Reactors are typically found to be low in count compared to the other three types (Conant *et. al.*, 1990; Matsuno and Mentzer, 2000) or totally removed from the study (James and Hatten, 1995; Shortell and Zajac, 1990; Veliyath and Shortell, 1993). No real strength is shown in any category for Reactors, although, they were a very close second in knowledge of their competitors (Conant *et. al.*, 1990). This might imply that Reactors should respond more effectively, but it would appear that they wait too long to implement changes to become effective. There appears to be a lack of action in forecasting or implementation planning. The following is Miles and Snow's (1978) original paragraph style measure for a Reactor.

*Reactors are organizations in which top managers frequently perceive change and uncertainty occurring in their organizational environments but are unable to respond effectively. Because this style of organization lacks a consistent strategy-structure relationship, it seldom makes adjustments of any sort until forced to do so by environmental forces.*

### **Venkatraman's Strategic Dimensions**

Venkatraman (1989) introduced six key dimensions to develop a strategic orientation. Questions pertaining to scope develop a framework of the six dimensions according to a particular organization. These questions pertain to the hierarchical level, the domain, and intentions versus realizations. The hierarchical level would refer to the studied level of the organization that best suits the objective of the study. This particular study focuses on the organizational level. A large organization with several business units might have each business unit focusing on different levels of product innovativeness. This concept is similar to the main topic for Skinner (1974) in reference to the 'Focused Factory' concept where each business unit operates independently to meet their own requirements. The domain would refer to the functional units involved within that business unit and pinpoint the one in charge. In other words, if manufacturing were dominant, manufacturing should be the domain of study. Lastly, upon completion of a project it will become evident whether the strategy is realized during the process or followed as originally intended. With the foundation understood in these three areas, the key dimensions measurements



are a prediction of the type of organizational strategy that exists. The conceptualizations of the six key dimensions are Aggressiveness, Analysis, Defensiveness, Futurity, Proactiveness, and Riskiness. These six key dimensions together make up what Venkatraman (1989) called the Strategic Orientation of Business Enterprises (STROBE) as a multidimensional construct for measuring the strategic orientation.

### **Aggressiveness**

Aggressiveness refers to a stance that an organization takes with respect to resources for attaining an enhanced market position faster than the competition. Accomplishing this could be through market development, investments to improve market share, or a competitive position provided through product innovations. Through changes in the organizational structure and the use of external suppliers, this dimension illustrates a very competitive organization. Aggressiveness reflects upon the words of Wernerfelt's (1984) resource-based view of the organization. Wernerfelt comments on how an organization through acquisitions, mergers or diversification can gain an advantage over the competition. This would align with the dimension of Aggressiveness as used here.

Aggressiveness as a strategic dimension would mean that the organization is poised to relinquish profit to gain market share. Long supplier relationships will not necessarily be the case due to the changes that take place within the environment the aggressive type chooses. The market orientation will be highly developed to enable the organization to overcome its competitors. Since low cost is not always the focus here, the manufacturing

orientation will be low. In other words, manufacturing will have to be more flexible away from a manufacturing orientation and suppliers will have to support the needed capabilities or skills. Radical innovativeness will likely be rare in products produced by this dimension due to the structure and desire for increased market share by this dimension.

### **Analysis**

The Analysis dimension refers to the problem solving and decision-making ability of the organization at all levels. This is not to be confused with Miles and Snow's Analyzer in that Analysis here is not just referring to being between the Defender and Prospector. Analysis refers to the tendency of an organization to research a new concept to its fullest prior to making a decision. In a similar light, Analysis is comparable to comprehensiveness as used by Venkatraman adapted from Fredrickson (1984). Comprehensiveness is indicative of being very thorough in one's planning. In addition, with the Analysis dimension, the organization believes it has internal consistency in overall resource allocation involving the project chosen (Grant and King, 1982). This could imply an interpretation of requiring a higher level of inter-functional coordination. These attributes would infer that the Analysis dimension is rather cautious in its practices yet intelligent in the way the organization approaches business decisions that should lead to high stable performance.

The strategic dimension of Analysis will choose a Supply Management Orientation that attempts a lowest cost. This will lead to a majority of supplier relationships developed for the long-term. Due to the nature of the Analysis dimension, decision-making is routine to obtain better results, so change is inevitable, but not constant. The market orientation will most likely move between a strong and weak emphasis based on changes in information concerning different projects. The manufacturing orientation would be similar to the market orientation in that it will move between a strong and weak focus, similar to a balancing act, possibly leveraging one against the other. The strength of this particular strategic orientation predicated itself as more balanced focus than the Proactiveness and the Defensiveness dimensions which will enable the Analysis dimension to develop radical innovations when required. Their suppliers will most likely aid in the development of their product innovations.

### **Defensiveness**

The dimension of Defensiveness also emphasizes efficiency and low cost in production in the same way that Miles and Snow's Defender construct does. Defensiveness is almost like a militaristic position that an organization would take strategically to defend their position. Low cost and quality being the focus, reinvestment into the organization will most likely be into manufacturing updates or supplier relationships that would enable a higher quality standard or cost reduction. This dimension signifies consistent performance within their chosen market.

An organization that has strength in the strategic dimension of Defensiveness will be one that is conservative in the nature of its operations. That organization will emphasize efficiency in operations to provide the lowest cost and highest quality. To provide those attributes in a product it will be necessary to develop a relationship with suppliers that are not only dependable, but also of high quality. Switching suppliers typically increases the cost, so a long-term relationship with a supplier will be very important. Likewise, a large number of suppliers are not as efficient or cost effective as close relationships with a smaller group of suppliers, so reduction in the number of suppliers is also important. Quality is a major issue because the Defensiveness dimension is serving only a portion of a market with a narrow product range and fewer suppliers. The Defensiveness dimension takes time to establish itself in their environment (Segev, 1989). Focusing mainly on a manufacturing orientation, the market orientation will not be of utmost importance other than supporting what are most likely mature products Defenders produce. Again, by controlling the market orientation the can be costs control. With efficiency as the main driver, only incremental or minor innovations are attempted from a standpoint of cost and quality with the option of help from their suppliers with the innovation.

### **Futurity**

Futurity establishes the organization's position concerning the long-term considerations such as effectiveness contrasted against the considerations of the short-term efficiency of the organization. In other words, how effective in the long-term is the purchase of new equipment, in terms of the return on investment, weighted against the immediate increase

in performance over what the performance is now. A prime example would be a new assembly line placed into operation in a plant to increase efficiency that is obsolete a year later. The question posed would be whether a new assembly line would generate adequate returns to justify the long-term investment of upgrading the system now or to stay with the existing line. What distinguishes the dimension of Futurity here is that the decision's backbone is on the long-term outlook.

Futurity as a strategic dimension will display an organization as having a long-term or a futuristic outlook. Their supplier arrangements will mainly be long-term with the option of changing a small percentage of their suppliers if necessary. Market orientation will be in the moderate range to capture the innovations and to stay on course for long-term survival. The manufacturing orientation will be based on long-term efficiency but flexible enough to change with the market. Again, the strategic dimension of Futurity will be more aligned between the supply chain, marketing and manufacturing. This balance will provide the Futurity dimension the ability to develop varying levels of innovative products.

### **Proactiveness**

Proactiveness is another dimension that aligns with Miles and Snow's (1978) construct of Prospector in that it looks at emerging industries and new market opportunities. Proactiveness includes the practice of strategically eliminating mature or declining operations in favor of newer operations. Proactiveness almost seems to combine the

dimensions of Aggressiveness and Analysis. Proactive organizations are aggressive in getting products to market and they analyze the consequences of each opportunity prior to development. This would imply that a market orientation is required to be strong within the organization to comprehend the needs of the market.

The Proactiveness dimension is the near opposite of the strategic dimension of Defensiveness. Being proactive strategically would mean that the organization moves ahead with new ventures wanting to be first-to-market. Most supplier relationships are more on a short-term basis because of the changing market conditions. Proactiveness will mean that the market orientation be highly developed to enable the organization to stay close to the customer and move forward with new innovative products quickly. The manufacturing orientation will be low due to the requirement of flexibility in operations and quality or low cost will not necessarily be the main drivers. Radical innovations in product development would be more common as strength with this dimension.

### **Riskiness to Risk Aversion**

The final dimension, Riskiness, reflects the organization's propensity for risk in resource allocation, choices of markets and products. This dimension also looks at the level of risk inherent in different decisions. As example, one organization's drive is to be first-to-market whenever possible, while another organization will wait for a proven technology to adopt it. Each organization will have its own level of Riskiness that it is willing to

accept. As strengths concerning different dimensions develop, the shape of the organization's strategy will come into focus.

Risk aversion is a strategic dimension that was developed by Jaworski and Kohli (1993) to replace Riskiness. The difference is in the measurement of the risk. Risk Aversion represents a propensity to avoid risky undertakings as where Riskiness looks at the degree of risk an organization is willing to accept. Under Risk Aversion, risk is calculated to keep the organization as guarded as possible within the realm it chooses to operate. With strength in Risk Aversion, ties are formed with suppliers to obtain low cost. The emphasis on long-term relationships with suppliers is very important and they would likely go in and observe their suppliers to ensure compliance. A market orientation would not be as emphasized due to the element of risk involved when changes occur and the resulting costs. On the other hand, manufacturing orientation would be highly emphasized to obtain high efficiency throughout their operations, although they would be more willing to update outdated machinery. Following the overall strength of this dimension, innovations will be incremental in nature to avoid lost profitability.

### **Findings with Venkatraman's Dimensions**

An analytical orientation for a business found to strong covariance with Defensiveness, Futurity, and Proactiveness. This would imply that these three dimensions are more detail oriented and structured to work to optimal conditions in their normal operating environment. Findings related the dimension of Aggressiveness to the Riskiness

dimension most likely due to the amount of risk taken by an aggressive stance. Defensiveness was positively and significantly related to profitability but not growth, whereas Proactiveness was positively and significantly related to both growth and profitability. Support these statements are Venkatraman's (1989) findings and point to the conclusion here that one organization will vary in the amount or percentage of each dimension they possess which supports that a strategic orientation is multi-dimensional.

Morgan and Strong (1998, 2003) testing Venkatraman's (1989) six dimensions performed two studies. In the first study, each strategic dimension is in relation to market orientation. Findings for Proactiveness, Analysis, and Futurity were all positive and significant associations with market orientation. In their later study, hypotheses stated for each dimension concerning its effect on business performance. The results pointed to the dimensions of Defensiveness, Analysis and Futurity as typically exhibiting higher levels of business performance. This seems oppose what previous studies have brought forward using Miles and Snow's typologies in that the Defender and generally the Analyzer were lower performing than the Prospector (Matsuno and Mentzer, 2000; Veliyath and Shortell, 1993). In other words, using Morgan and Strong's (2003) newer findings, steady business performance outperforms the risk inherent in the other dimensions of Aggressiveness, Proactiveness and Riskiness. Although as pointed out by Morgan and Strong (2003), Aggressiveness, Proactiveness, and Riskiness are associated with a more entrepreneurial type style of business approach. Since most studies are taken at a point in time as opposed to longitudinally, the strength of each dimension may change under the



context of new products or projects. These findings also imply that the strength of the dimension may vary based upon the industry in which the organization exists.

### **Market Orientation**

Two pairs of researchers, Narver and Slater (1990), and Kohli and Jaworski (1990, 1993), established the foundation for a market orientation construct. Narver and Slater (1990) developed a model of market orientation based on competitor orientation, customer orientation and interfunctional coordination that should lead to a long-term profit focus. A customer orientation and a competitor orientation reflect the proper activities that allow the organization to obtain the best information about their buyers and suppliers and disseminate that information throughout the organization. Interfunctional coordination represents the inter-organizational functions working together to satisfy the needs of the targeted customers. In other words, once the disseminated information is throughout the organization, the internal functions need to work towards customer satisfaction using the information as a tool. Statistical significance was found for the market orientation construct and an observation was made that businesses having the highest degree of market orientation are also associated with being the most profitable. This finding contradicts what Miles and Snow's typology found concerning the construct of Defender that actually lost market share as the market orientation is increased (Matsuno and Mentzer, 2000).

Kohli and Jaworski (1990) first defined several propositions in a theoretical presentation built from interviews. As the authors built their case, they define market orientation as: "... the organization wide generation of market intelligence pertaining to the current and future customer needs, dissemination of the intelligence across departments, and organizational responsiveness to it." This coincides with Narver and Slater's model in that the premise of information and its distribution throughout the organization is critical to an organization's success. What is different about their study is that there are antecedents that must be in place before the market orientation can work. These antecedents are a senior management focus, interdepartmental dynamics, and organizational systems. A senior management focus has been readily adapted to various different topics as a measure contributing to project/product success. Interdepartmental dynamics refers to the formal and informal relationships between inter-organizational departments. This is accomplished through measurement of conflict, connectedness, and concern for others ideas. Organizational systems are the relationships between functions and indicate the degree of alignment.

Following their theoretical study, Kohli and Jaworski (1993) released an empirical study using intelligence generation, intelligence dissemination, and responsiveness as measures of market orientation taken from their definition. In this study, the authors used a more in depth measurement scale to test their model. The measurement items were represented by the employees who indicated their organization commitment, esprit de corps and business performance, all moderated by the environment. The environment consisted of market turbulence, competitive intensity, and technological turbulence. Market

orientation had a positive significant effect on overall performance, organizational commitment, and esprit de corps, although, the environment had no moderating effects on business performance. A possible conclusion drawn may be that the environment in which the organization exists determines the degree of market orientation.

Testing market orientation in a NPD setting might be more appropriate given the different strategies of proactive and responsive as categories. Narver (et. al. 2004) found support for this contention in a study concerning market orientation and NPD. The responsive strategy represents how the focus in past studies measured the market orientation, whereas introducing a proactive strategy to capture and understand the latent needs of customers (Narver *et. al.*, 2004). Also introduced with the proactive orientation and responsive orientation is innovation orientation, where together all three orientations are used to develop the market orientation construct. As a result, the three orientations predict the level of new product success. Bureaucratic organizational form, market turbulence, and technological turbulence serve as control variables with new product success. The findings for responsive market orientation have no positive or significant effects, although the proactive market orientation had positive significant effects on new product success. Innovation orientation found positive and significant relations to both a responsive and proactive market orientation and new product success. This finding would suggest that innovation and a market orientation work together. The control variable, bureaucratic organizational form found a significantly negative relation to both responsive and proactive market orientations leading to the conclusion that formal control, associated with bureaucratic organizations, may hamper performance in the

context of market orientation and NPD. All three-control variables had no significant positive effects on market orientation. Again, the interpretations of this finding could be an adjustment in the market orientation to adapt to turbulence. The findings of this study used exploratory methods and a small sample size, which would indicate further testing be performed to further validate the construct.

Some studies have found that a market orientation is not always positive. Frosch (1996) found that excessive market orientation leads to shortsighted research and development. Market orientation has also been criticized for leading to incremental and trivial product development (Bennett and Cooper, 1979). Following the works of several economists (Landes, 1998; Dickson, 2000), they describe super innovations as those that exceed other technical innovations in that they increase the speed, efficiency and effectiveness of the transmission of new ideas and technologies between individuals and cultures. Rather than consumption leading production, as market orientation practitioners might argue, “New production and consumption processes feed on each other, changing behavior with catalytic repercussive effects...” (Dickson, 2000). This suggests that more collaboration between functions is required and that market orientation is not the answer to all performance issues as once believed. It also suggests that the higher the level of innovation, the better performing the new product will be due to the collaboration.

The belief is that Narver’s (*et. al.*, 2004) study contained the most appropriate measures for market orientation. The study focused on NPD and innovation. The two aspects of market orientation, reactive and proactive are a good fit to the theme of this study.

## **Supply Management Orientation**

A supply management orientation was introduced and tested by Shin (*et. al.*, 2000). The terms “supply chain” or “supply chain management” find wide usage throughout the literature in reference to completion of manufacturing resources (Choi and Hartley, 1996; Forker *et. al.*, 1997). Having stated this, the authors (Shin *et. al.*, 2000) tested the relationship between supplier and buyer in terms of a long-term relationship, supplier involvement, the degree of quality focus in supplier selection, and reduction in the number of suppliers. A reduction in the supplier base forces an organization to enter into a closer relationship with suppliers and facilitates more sharing of knowledge. The study found support for a supply management orientation positively affecting the quality and delivery for the buyer; and the quality, delivery, cost, and flexibility for the supplier. Of importance, a lack of significance in cost savings for the buyer measured more in the improved quality and delivery rather than in physical cost savings as supported by Shin’s (*et. al.*, 2000) findings. A finding of weak flexibility for the buyer may indicate that flexibility is more of an attribute required of the supplier. Therefore, the measurement of product innovativeness should include suppliers.

The objective would be to choose an organization’s supply chain partners according to the degree of flexibility required. In other words, the suppliers fill the gap in the organizations resources, dependent upon what it may be. Once an organizational structure is established, the requirements will determine the strength of the supplier relationships. Many studies have dealt with supplier selection, supplier relations and types of supplier

involvement, but not developed within the organizational structure. Therefore, if management adopts a supply management orientation, it will most likely display a consistent pattern of supplier relationships. Adoption of some of the measures used by Shin (*et. al.*, 2000) for supply management orientation will occur.

### **Manufacturing Orientation**

After an extensive literature search very little evidence was found that empirically tests or even develops a framework for manufacturing orientation. Mavondo (1999) operationalized manufacturing orientation as a distinctive competence for controlling costs through routinization of operations, investing in efficient manufacturing technology and focusing on a narrow range of activities. A distinctive competence refers to those things an organization does especially well in comparison to its competitors (Selznick, 1957). Mavondo (1999) felt that ‘variability’ and ‘analyzability’ were the underlying factors of the concept. As the analyzability of a task decreases, the variability increases, and tasks become less routine. This belief is what separates regular manufacturing from NPD.

Collectively, manufacturing orientation was defined as “routinization of tasks permits lowering of the average and marginal costs, enabling a organization to reduce prices or increase profits or both (Miles and Snow, 1978; Porter, 1980) and allows for more competitive decision making since cost cutting innovations are particularly attractive because their effects are more predictable”. Mavondo’s (1999) actual hypothesis testing

concluded that manufacturing orientation was negatively related to product innovation and positively related to marketing effectiveness. This would indicate that innovation was not that intensive under conditions of strong manufacturing orientation and marketing effectiveness would be in alignment with the efforts to keep the product selling under a Defender pretext. No relationship was found between manufacturing orientation and financial performance.

One other study, a research paper, also developed the construct of a manufacturing orientation. Hausman (*et. al.*, 2000) presented manufacturing orientation as an organizational culture and climate conducive to using the manufacturing function proactively for a competitive advantage. Past this definition, manufacturing orientation was stated as reflecting a boundary-spanning approach to manufacturing (Clark, 1996), or a neo-operations strategy (Roth, 1996). Nothing concrete developed for the measurement of the construct other than one measure. The measure was “Manufacturing’s importance to the strategy of this business unit”. The measure was ranked from one to seven with one being low and seven as high. No substantial findings were noted for a manufacturing orientation.

The conceptualizations of manufacturing orientation seem to be somewhat incomplete. However, these approaches are important and the manufacturing orientation in this particular study will use past measures developed by Boyer (1998). Representing this construct are cost, quality, delivery, and flexibility. These scales have previously measured manufacturing strength labeled as competitive priorities. The measurement

items used will indicate the apparent position or focus employed in manufacturing practices and implicates the overall strength of manufacturing within the organizational structure.

### **Strategic Alignment Overview**

It has been stated that a primary contributor to product success is a strategic focus (Zirger and Maidique, 1990). A strategic focus could be interpreted as the strategic position or orientation an organization develops to obtain their desired goals. Organizations should choose projects that build upon the firm's existing technological, marketing and organizational competences (Zirger and Maidique, 1990). The proposition here is that the strategic alignment of the market, manufacturing and the suppliers will focus upon the chosen combination of strategic dimensions. Typically, the findings in the literature have been only concerned with a particular strategy used in the study. Strategic alignment displayed as a latent variable will be due to the choices the organization makes.

### **Alignment**

Alignment has been stated as simply the simultaneous use of a variety of coordinating mechanisms that will assist firms in achieving better coordination between departments (St. John and Hall, 1991). With communications as a primary measure, Ruyter (*et. al.*, 2000) found that manufacturing managers see marketing managers as the communicators, however the problem develops when marketing managers cannot understand



manufacturing's jargon. Empirically testing alignment through managers, Kahn and Mentzer (1994) revealed that marketing managers perceive greater dependence upon manufacturing, whereas manufacturing managers perceive less dependence on marketing. This would imply that marketing has the belief that manufacturing is working with them when in reality; they may not be due to a poor understanding. Papke-Shields and Malhotra (2001) showed that involvement and influence of manufacturing managers enhance business performance through the alignment of the business and manufacturing strategies. This could be interpreted as business strategies representing the strategic orientation and the manufacturing strategies representing the alignment of marketing, manufacturing and relevant suppliers.

Including NPD in studies of alignment, Song and Swink (2002) found that joint marketing and manufacturing involvement produces greater positive impacts on new product success in radical NPD projects, which oppose the findings by Song and Montoya-Weiss (1998). A conclusion here would be that the better the alignment, the more efficient the project. In the same study, regarding a product's competitive advantage, marketing and manufacturing's joint involvement was found to be effective in business and market analysis for incremental NPD projects. This would support the contention that the degree of alignment will vary negatively with the difficulty of the innovation. Tatikonda and Montoya-Weiss (2001) provided theoretical confirmation that product development capabilities do affect market success. The provision of product development capabilities could be by an alternative source such as suppliers. These results build support for this study. Literature concerning the concept of alignment is

mainly limited to the internal functions of the organization and overlooks contributions from suppliers.

Alignment using suppliers has been introduced in various ways. Rho (*et. al.*, 1994) used interface congruence to represent alignment with different functions by the organization. Measuring interface congruencies accomplished by the factors of strategic objectives, coordination mechanisms, manufacturing flexibility, vendor relationships, and customer relationships. Vendor relationships did not show a significant relationship with interface congruence. However, it did show a significant direct relationship with manufacturing flexibility and thus, seemed to indirectly influence interface congruence through the relationship with manufacturing flexibility. A possible connection created here could be for improved alignment of suppliers with manufacturing to be capable of providing the necessary technologies.

A competitive advantage may develop with the overall alignment of the organization. A study by Rosenzweig (*et. al.*, 2003) theoretically and empirically establishes the ways supply chain integration leads to increases in competitive capabilities and improved business performance, providing evidence previously lacking in the literature. Results show that consumer product manufacturers with high integration intensity achieve superior product quality, delivery reliability, process flexibility, and cost leadership. The integration intensity referred to is a type of alignment that enables the organization to be more efficient and effective. This supports one of the objectives of this study in that

alignment with suppliers should create an addition to the organization making it more capable and more profitable.

The resource-based alliance formation argument suggests that firms use alliances to locate the optimal resource configuration in which they are able to maximize the values of their resources relative to other possible combinations (Das and Teng, 2000). Thus, alliances or here referred to as alignments; use a collection of value creating resources that a firm independently would not create. Alliances provide access to information, resources, technology, and markets (Ireland *et. al.*, 2001). Das and Teng (2000) proposed that pooling of resources could produce substantial benefits for alliance partners. In particular, firms search for partners having specialized resources that are not readily available from others (Doh, 2000). With correct internal alignment between functions that coordinate with each other and supply partners, the strategy should be easy to coordinate.

### **Product Innovativeness**

As products mature or a request comes forth for something that does not exist in a product line, innovations become the answer to the problem. Product innovativeness is what differentiates a new product from an existing product. Multitudes of measures and scales have been used to measure innovation. The support for this comes from a broad study performed by Garcia and Calantone (2002). Out of twenty-one empirical studies, fifteen constructs were used and measured by at least fifty-one distinct scale items. Out of

the fifteen constructs presented in the study, product innovativeness was the most used construct. The confusion in the literature is what perspective an author takes with respect to product innovativeness. The definition is typically newness or originality, whereas others have used; new-to-the-world (Song and Montoya-Weiss, 1998), new-to-the-adopting-unit (Ettlie and Rubenstein, 1987), new-to-the-industry (O'Connor, 1998), new-to-the-market (Kleinschmidt and Cooper, 1991; Meyers and Tucker, 1989) and new-to-the-customer (Maidique and Zirger, 1984). As with economics having a micro or individual level and a macro or world level, so does innovativeness. Innovativeness at the macro level would be new to the industry, market or world, whereas, innovativeness at the micro level would be to the organization or the customer. Finding support for this is in the works of Maidique and Zirger (1984), and Kleinschmidt and Cooper (1991). Innovativeness could take on a functional perspective, which would imply that either marketing or manufacturing would become the dominant driving force.

Griffin and Page (1996) to differentiate between levels or types of innovativeness introduced six different innovation strategies. These six strategies are new-to-the-world, new-to-the-organization, addition to existing lines, improvements, repositioning, and cost reductions. New-to-the-world refers to an innovation that conquers problems that could not be solvable before. An automobile that attains 100 miles per gallon would be a good example. Problems may occur when the price of this type of innovation is high or the customer acceptance is low. With this type of innovation there definitely is some inherent risk, but with this risk may be associated the reward of new market share and/or higher profitability. New-to-the-company innovations are exactly what the name implies. This

represents an innovation that is new to the organization even though the product already exists elsewhere in the market. An organization that makes automobiles that suddenly decides to make lawnmowers would be a good example. It was not their core business, but they adopt the new line to gain more diversification and market share. These first two measures are radical innovative strategies for the organization, whereas the following four innovative strategies are adjustments to prior products or referred to as incremental.

As products mature, employing different strategies to keep the present market share or even grow it are used. Product improvements are alterations to existing products that create the new standard or model for that product to replace the existing one. Line extensions are more of the same product only in a different color or size. Typically used to ward off competitors or broaden a product's appeal (Urban *et. al.*, 1993), they can lead to revenue growth. Product repositioning refocuses the target market for a product to gain revenue through sales growth. Sometimes all the facets of a new product are not entirely discovered and repositioning allows a product to be redirected to the proper audience. A good example would be an I-Pod player used to transport data files besides the music files. Lastly, cost reduction products can be a matter of producing the same product at a lower cost to aid a mature product when competition increases or sales are dwindling. Only the new-to-the-world innovation strategy produces an entirely new product. The other five innovation strategies may alter the product itself or the market in which it is used. After organizations have adopted different strategic orientations, the construct of innovation will become apparent according to the NPD project undertaken.

Ettlie and Subramaniam (2004) reduced the number of categories to four from Griffin and Page's (1996) six. Their four categories are minor modification, significant upgrade, new-to-the-world, and new-to-the-industry. Representative of incremental innovations are minor modification or significant upgrade and representing radical innovation are new-to-the-world or new-to-the-industry. Along with these four measures of innovation, they introduced four different ways to choose a product. The four ways are by market pull, technology push, competition or any combination. In supporting the innovation type with the demand style, there are several different possible alternative reasons why an organization innovates. Their findings point to emergent patterns that organizations use in approaching incremental and radical innovations in different ways. In other words, as the innovation unfolds, new patterns are developed. They also suggested that the findings supported the contention that companies aspire to be adaptable. This adaptation again supports the contention of dealing with contingencies and developing a structure to embrace innovation.

This study will combine the measures of Ettlie and Subramaniam (2004), Griffin and Page (1996). Representing incremental innovations are cost reductions, minor modifications and significant upgrades. Cost reduction is a design change to save on cost such as combining two parts into one for simplicity or using a less expensive material. A minor modification will represent changes to a product to keep it competitive such as an added option to a particular product. Lastly, a significant upgrade would entail a completely new model in design to replace the previous product that has a few modifications. Representing radical innovations are by new-to-the-world or new-to-the-

industry. New-to-the-world will represent innovations that are new to the customer and the organization. New-to-the-industry will be new to the organization, but not the customer. These five measures should cover all aspects of innovations produced within the organization.

### **Research Hypotheses**

This section develops the foundation for the development of the hypotheses.

#### **Strategic dimension's effect on organizational structure**

Very little literature has tested the relationship between strategic orientation and market orientation. This issue provides valuable insight into market orientated activities and behaviors that must be somehow articulated by the organization in a manner that can leverage business performance and related outcomes (Morgan and Strong, 1998). Due to the weakness of measures in the literature, few empirical findings are conclusive that build any strength for theoretical arguments. The basis for the measures used for this study use Venkatraman's (1989) strategic dimensions with the substitution of Risk Aversion (Jaworski and Kohli, 1993) for Riskiness. The following will provide a basis for each strategic dimension.

The Aggressiveness dimension was negatively related to market orientation suggesting a generally weak, inverse relationship between the aggressiveness manifest in competitive

strategy and the level of market orientation exhibited by firms (Morgan and Strong, 1998). This implies that the aggressiveness dimension should exhibit a low level of market orientation, which is counterintuitive for a dimension that goes after market share. Aggressors in their haste to create more market share will most likely not analyze the market as well as other dimensions. Therefore, with their drive for market share, the Aggressiveness dimension will not rate high in supply management orientation or manufacturing orientation. The competitive nature of the dimension will create needs that the present suppliers or manufacturing will not be able to fulfill, making it necessary to find resources wherever the Aggressiveness dimension can. Further support for this was found by Wong and Sanders (1993) stating that aggressive pushers are not innovative. The lack of innovation would imply a weaker match overall for the different orientations.

The Analysis dimension is considered to represent the overall problem solving approach for strategic decision making resulting in attempts to secure a complete understanding of the issues in both organizational and environmental contexts (Miller and Friesen, 1984). Furthermore, this dimension refers to the nature of internal systems used in the execution of competitive strategy to achieve the desired objectives (Grant and King, 1982; Venkatraman, 1989). Through this complete understanding internally and externally of the organization, the Analysis dimension should be more balanced and aligned in its market orientation, supply management orientation and manufacturing orientation. There is partial support for a balanced alignment in the findings of Matsuno and Mentzer (2000) in that Analyzers were found to gain little if any benefit by increasing market orientation, which would translate to higher focus on other orientations. Although, being analytical in



nature implies some increased level of market orientation. With the Analysis dimension, rapid changes would be almost none existent in supply management orientation or manufacturing orientation due to the calculating nature of this dimension.

Defensiveness was found to encourage an internal focus for organizational strategists, which deflects attention away from the external environment of the organization (Morgan and Strong, 1998). This would imply that the dimension of defensiveness is more focused on supply management orientation and manufacturing orientation as opposed to a market orientation. Griffin and Page (1996) support this notion with their findings in that Defenders focus on effectiveness and efficiency and not on product development growth. In addition, other studies have pointed to the Defender as focusing on low cost and quality (Segev, 1989; Miles and Snow, 1978) which forces an organization to be stronger in supply management orientation and manufacturing orientation.

Futurity represents preparedness for, and positioning in, future environmental situations that are at the heart of a strategic management mission. Although gauging the explication of competitive futures is extremely complex, planning for the evolving marketplace is still crucially important in competitive strategy (Piercy and Morgan, 1994). Significant with its relationship to market orientation, futurity describes the aspect of an organization's strategic orientation that is able to anticipate and potentially contribute to the evolution of markets (Jaworski and Kohli, 1996). This dimension may be developing product innovations that extend into future markets. A supply management orientation would be of interest due to its long-term relationship focus with suppliers building the

future of the organization. Forecasting turning points in future markets may require the supply management orientation to change. Therefore, the belief is that both the market orientation and the supply management orientation would take on a moderate focus. The manufacturing orientation would rank higher in the organization's focus to guarantee long-term results, yet provide some flexibility.

Proactiveness describes the initiative adopted by firms to continuously search for rapidly growing opportunities (Slater and Narver, 1993) and experiment with responses to changing marketplace conditions (Lynn *et. al.*, 1996; Venkatraman, 1989). Proactiveness has typically been compared to Prospectors (Venkatraman, 1989). Prospectors would find it more beneficial to develop and use market information systems and strategic support systems rather than operating systems (Sabherwal and Chan, 2001). This would imply that this dimension would be higher in the use of market orientation and lower in the use of manufacturing orientation. This is partially supported by Conant (*et. al.*, 1990) who found that prospectors were high in market orientation. Shortell and Zajac (1990) findings stated that market research was the highest for prospectors when compared to analyzers and defenders. Likewise, Veliyath and Shortell (1993) also found support for the contention that prospectors are perceived to have greater market research competence, key personnel involvement and innovativeness in the strategies produced by their strategic planning systems than possessed by defenders. All this would also indicate that supply management orientation would be weaker due to the changes in the organization's position created by a strong market orientation, inferring changing demands on the capabilities of suppliers.

The dimension of Riskiness has been defined as the propensity of the organization to take risk (Venkatraman, 1989). In a study by Morgan and Strong (1998), there were no findings for a relationship between Riskiness and market orientation. Although in a study by Jaworski and Kohli (1993), the findings showed that top manager's risk aversion does not appear to affect intelligence generation or dissemination, but it seems to have a negative effect on the responsiveness of the organization. Therefore, Risk Aversion will be used in this study to represent the degree of risk an organization is willing to accept. Despite the fact that business' gains and losses may be high from new product introductions serving new and existing customers, market orientation requires that firms be tolerant of risk and accept possible failures (Jaworski and Kohli, 1993). This would imply that an organization that measures high in Risk Aversion is not going to be high in market orientation. Indeed, it has been posited that in the market oriented firm, where senior executives encourage an acceptance of risk and acknowledge certain failures as inevitable, junior executives will be more inclined to develop new customer offerings in response to changing needs (Kohli and Jaworski, 1990). In opposition to this, one could suggest that rather than jeopardize existing performance, market oriented firms experience limited risk because the continuous monitoring of customer and competitor environments allow future responses and informed actions to be grounded in company insights (Morgan and Strong, 1998). Therefore, the degree of Risk Aversion will affect the choices in market orientation, supply management orientation and manufacturing orientation.

In summation, these strategic dimensions will determine the structure of the organization and the resulting strength of strategic alignment required. Morgan and Strong (1998) found that proactiveness, analysis, and futurity in strategic orientation are all positive and significant in their association with market orientation. In 2003, Strong and Morgan stated that organizations that emphasize the trait of defensiveness, analysis and futurity in strategic orientation typically exhibit high levels of business performance. They go on to further state that these strategic dimensions are conservative in nature, relative to non-associative scales of proactiveness, riskiness and aggressiveness, and reveal that high performing businesses are distinctly cautious. Prudent and judicious use of their defensive skills, analytical capabilities and future focused management make them top performers. An aim of this study is to discover new insights concerning strategic orientation that will add to the growing literature. The following hypotheses position is to measure the affect of strategic orientation on market orientation, supply management orientation and manufacturing orientation.

***Therefore:***

***Hypothesis 1a:*** Strategic orientation will have an effect on the level of market orientation.

***Hypothesis 1b:*** Strategic orientation will have an effect on the level of supply management orientation.

***Hypothesis 1c:*** Strategic orientation will have an effect on the level of manufacturing orientation.

## **The effect of organizational structure on innovation management strategy**

Each of the orientations, market, supply management and manufacturing, will contribute to the type of innovations that are developed. Several authors have studied the relationship between market orientation and innovation.

Narver (*et. al.*, 2004) presents a proactive market orientation found to be significantly related to new-product success and innovation orientation. The new study was exploratory, but all of the results for a proactive market orientation were positive. The study was conducted using the relationship between NPD and market orientation measuring both reactive and proactive market orientation. There were no significant findings for a reactive market orientation. A plausible explanation may be in the work of Atuahene-Gima (1995) stating that market orientation has a significant positive relationship with innovation-marketing fit, but when the effects of innovation are gradually removed, market orientation's influence is minimal. This would imply that as innovations move towards incremental in design; market orientation will have a weaker focus. This supports the contentions of this study.

Dependent upon the measures involved for market orientation, similar themes have appeared in the earlier literature. A customer orientation was found to be stronger when market conditions are uncertain and a competitor orientation when markets are more stable (Han *et. al.*, 1998; Gatignon and Xuereb, 1997; Salomo *et. al.*, 2003). Narver's (*et. al.*, 2004) measures are more inclusive of customer orientation rather than competitor orientation. The proactive market orientation is partially supported by the findings of

Olson (*et. al.*, 1995), who stated that as the level of difficulty increases in product development, so does interdependency among functions, hence, the market orientation.

Other findings with market orientation and innovation made by Lucas and Ferrell (2000) indicated that greater customer orientation increases new-to-the-world products and reduces the number of me-too products. Greater emphasis on competitor orientation increases the number of me-too products and reduces the number of line extensions and a greater focus on inter-functional coordination increases the number of line extensions and reduces the number of me-too products. These findings again support the contention of a proactive market orientation being stronger than a responsive market orientation. A responsive type market orientation would indicate that the organization is more focused on the competition and responding to compete. The findings point towards improved methods for testing the market orientation relationship, but clear definitions for the levels of innovation are still non-existent.

Only a couple of studies have compared strategic orientation with product innovativeness (Griffin and Page, 1996; Ettlíe and Subramaniam, 2004). One study finds that incremental innovations dominate (Griffin and Page, 1996) while the other finds moderate strength for radical innovations (Ettlíe and Subramaniam, 2004). However, both studies have a similar limitation in that they both used small and selective samples. A large sample study with an improved definition of innovation categories that includes an organizational structure has not appeared in the literature.

Varying levels of market orientation, supply management orientation and manufacturing orientation will occur according to the strategic orientation levels chosen. The innovation management will also echo this strategy. Findings by Song and Montoya-Weiss (1998) found a low level of strategic planning activities for radical innovations and a high level of strategic planning for incremental innovations were common among the industries in the study. This would imply that radical innovations, having a lower level of strategic planning is due to the unknown nature of the NPD project. If strategic planning were higher as stated with incremental innovations, suppliers and manufacturing should be more involved causing increased technical activities that require more strategic interaction.

***Therefore:***

***Hypothesis 2a:*** Market orientation will have an effect on innovation management.

***Hypothesis 2b:*** Supply management orientation will have an effect on innovation management.

***Hypothesis 2c:*** Manufacturing orientation will have an effect on innovation management.

### **Strategic Alignment's effect on Innovation Management and Business Performance**

Organizations will attempt to align each function and partner to its strategic orientation. Strategic alignment here refers to the ability of each of the functions to align with the strategy of the organization. Many studies as previously mentioned (Shortell and Zajac, 1990; Veliyath and Shortell, 1993) have addressed how closely an organization follows a

strategic orientation. This study attempts to show the strategic alignment of functions as an organization. Venkatraman's (1989) measures for strategic orientation are more appropriate for this designation. The multi-dimensional aspect allows each organization to contribute according to what is required. For example, if an organization is strong in the proactiveness dimension, more marketing will be required to pursue actively this intent. Therefore, this type of organization would measure high in market orientation. In opposition to this, if the organization measures high in the defensiveness dimension, the market orientation would be weaker.

One of the main drives of this research is to view the organization as specific orientations, market, supply management, and manufacturing, utilized in accordance to the strategy of the organization. Strategic alignment will reflect the adherence of the different orientation to the chosen strategic dimensions. This is more of a holistic approach that uses the structure of the organization to measure the strategic alignment as a latent variable. The strategic alignment will enable the organization to accomplish its objectives as a single unit. In other words, a large organization will move smoothly as one unit.

***Therefore:***

***Hypothesis 3a:*** Strategic alignment will have an affect on the innovation management.

***Hypothesis 3b:*** Strategic alignment will have an affect on the business performance.



## **Innovation management's effect on business performance**

Danneels and Kleinschmidt (2001) found that the innovativeness of a product is multi-dimensional for a firm and that some elements of product newness relate to newness in marketing terms and other newness in technological terms. It would seem possible from this statement that both marketing and manufacturing make a difference in the degree of product innovativeness. The financial performance of a product does not so much depend on whether the product stays close to home in terms of the markets or the technologies it uses, but whether it fits with the firm's existing marketing and technological competences (Danneels and Kleinschmidt, 2001). This statement finds support from Narver (*et. al.*, 2004) who stated that an organization must be focused on "finding needs and filling them" instead of "making products and selling them". This would infer that customer focused products would be superior to a manufacturing dictated product. This follows the premise of this research supporting the contention of a strategically aligned organizational structure.

Zhou (*et. al.*, 2005) broke down innovations into market-based and technology-based. The market-based innovations are representative of departures from existing mainstream markets. Market-based innovations involve new and different technologies that create a set of limits and unusually new customer values for emerging markets (Benner and Tushman, 2003; Christensen and Bower, 1996), which were referred to as discontinuous innovations by Zhou (*et. al.*, 2005). Technology-based innovations adopt new and advanced technologies to improve customer benefits relative to existing products for

those customers in existing markets. The authors (Zhou, *et. al.*, 2005) refer to these as radical innovations. Subscribing to these definitions, a market-based innovation would follow the strength of a market oriented organization, whereas, the technology based-innovations follow more towards a manufacturing oriented company looking to improve its situation.

Dependent upon the strategic orientation of the organization, the management of the innovations created is directed by the innovation management strategy. This is to say that the innovation management strategy should reflect the goals of the strategic orientation of the organization and enable the resulting structure of the organization. So if an organization mainly focuses on being proactive in the market, the innovation management strategy would direct towards radical type innovations to capture emerging markets. This type of strategy should measure low in Risk Aversion.

Internally to an organization, Cooper (*et. al.*, 2001) found that there appears to be a direct link between whether senior management in a business recognizes portfolio management to be important and is committed to achieving results. Although, it was also found that marketing/sales managers and operations/production managers continue to be perceived as seeing portfolio management as less than vital to the organization, even among the best performers (Cooper *et. al.*, 2001). All functions strategically aligned would create the best portfolio possible. If the strategic orientation develops correctly throughout the organization, the innovation management strategy should focus specifically on the potential performance from the innovative product portfolio.

Its perceived drivers and innovation history will be measures of the innovation management strategy. Perceived drivers would be the ongoing effort by an organization in the current environment to develop newer innovative products. As new developments occur, records are retained for future use. The innovation history would be the past records kept as the organization learned from past NPD projects. The combination of past innovative experience and the drivers of the innovation strategy should help create conclusive results concerning innovation management.

***Therefore:***

***Hypothesis 4:*** Innovation management will have an effect on business performance.

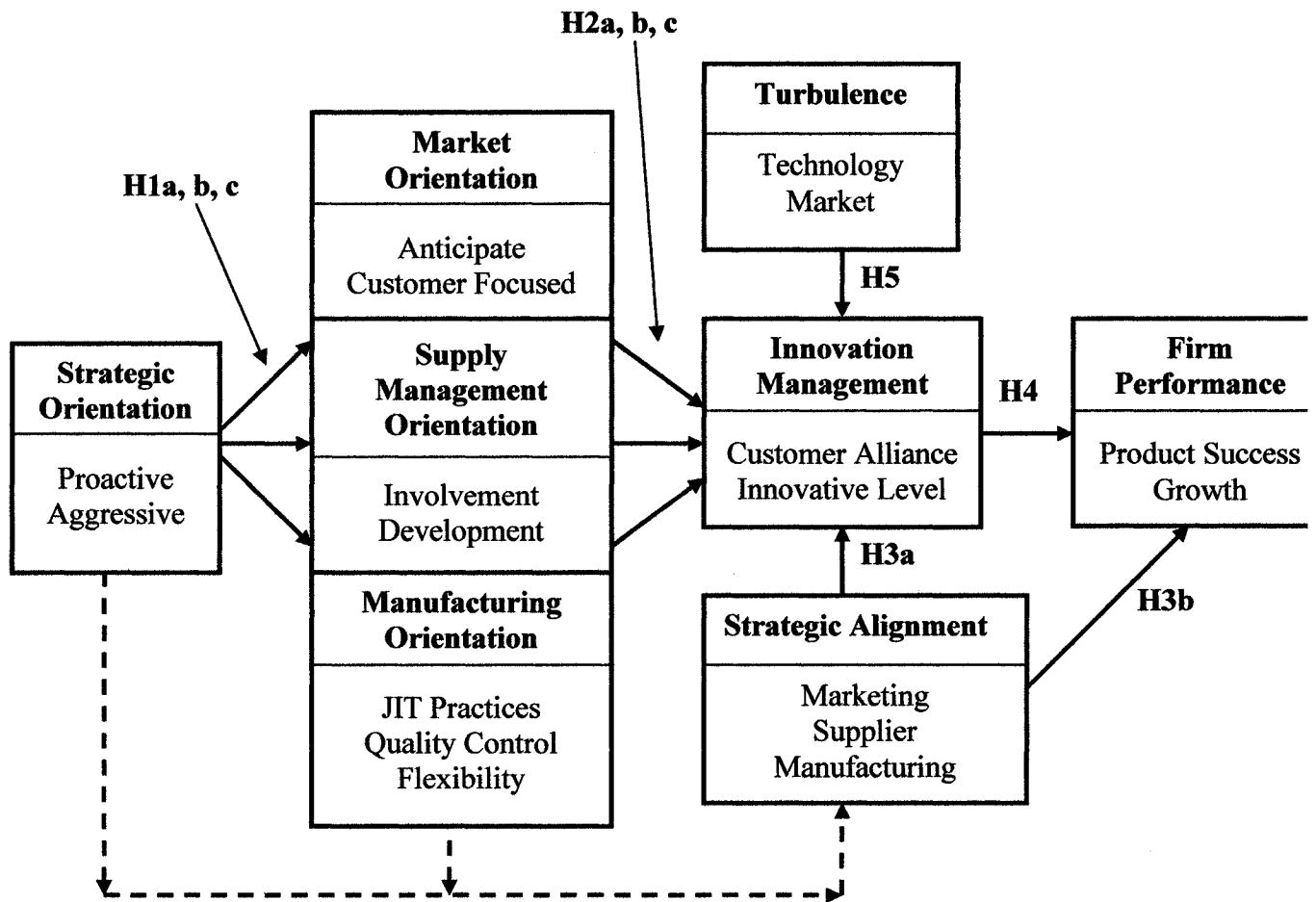
### **Control Variables**

Control variables are included to enhance the findings of a study. The control variables take different items such as company size or the market an organization competes within into consideration in relationship to the overall results. Put simply, they help equalize the results to be comparable amongst organizations in different environments. A common control variable is organization size (Hitt and Ireland, 1985), which works with hypothesized relationships. A very large organization could have several business units each developing its own products. In such a case, each unit would be the target of study. Technological turbulence and market turbulence use Narver's (*et. al.*, 2004) measurement scales. These two measures scales lacked significant in their study, but the study was

exploratory and the sample size was relatively small. Technology turbulence would represent the rate of the change in technology within their specific market or industry environment. Newer technology can change the form and speed of competition. Market turbulence would represent the competition in the market concerning the customer. An organization competing in a mature market faces very different challenges than an organization competing in an emerging market. The age of the organization and the type of industry will also be measured to ensure validity.

***Therefore:***

***Hypothesis 5:*** An organization that is affected by higher environmental turbulence will show a higher level of innovation management.



*Figure 2: Model for Testing*

## **Chapter 4**

### **Measures**

#### **Introduction**

This chapter explains the measurement items and scales used for each section of the model to be tested.

#### **Basis for Measures**

The development of the measures for this research has their foundation firmly linked to prior research. With a pilot study, measures will be fine-tuned to create a survey for large sample testing. The initial testing allows the researcher to test the measurement items validity and relationships among constructs. The strength of the final set of measurement items must be highly calibrated prior to testing the final sample.

### **Strategic Orientation**

The measures for this study will be adapted from Sabherwal and Chan's (2001) study concerning strategies in information systems. Within their study, they created and tested eighteen measures that were a combination of Miles and Snow's (1978) typology and Venkatraman's (1989) key dimensions. Their actual measures would be included to safeguard accuracy. Each measure will be developed as an index ranging from one, representing strongly disagree to five, representing strongly agree.

### **Market Orientation**

Market orientation will use a slightly modified version of the recent instrument developed by Narver (*et. al.*, 2004). Whereas, Narver's (*et. al.*, 2004) study used two levels of market orientation, this study will have three levels. The three levels will be responsive, proactive, and futuristic. Responsive will be as the name infers as reactionary. A proactive market orientation will mean that the organization is planning for tomorrow's new version of their product. The final level, futuristic, implies the organization is developing products for the future that are now non-existent. These measures should further define the types of strategic choices made providing better clarification of the different types of organizations. A strong market orientation has long been thought to be an antecedent to high profitability, although a strong manufacturing orientation may lead to high profitability with a balanced supply chain. This construct will use a five point scale from strongly disagree to strongly agree.

## **Supply Management Orientation**

The measurement of supply management orientation will use a part of the instrument developed by Shin (*et. al.*, 2000). Of interest here are the measures concerning long-term supplier relationships and the reduction in the number of suppliers. The remaining measures will be supplied a forth coming paper by Lim (*et. al.*, 2006 proposed). These measures further quantify the position the organization adopts in relation to suppliers. This construct will use a five point scale from strongly disagree to strongly agree.

## **Manufacturing Orientation**

Creating the scale for manufacturing orientation will use measures originally developed by Boyer (1998) for competitive priorities. The main constructs consist of cost, quality, delivery, and flexibility. These well recognized four scales are included quite often in the manufacturing literature. The measures will be representative of manufacturing's position within the organization. How focused manufacturing is will dictate its position or orientation. An organization that ranks very high in all categories should be high in manufacturing orientation, although, this would be difficult for most organizations to accomplish. This type of argument has been discussed by Boyer and Pagell (2000) in terms of manufacturing strategy that when all categories are ranked high they are: (1) world class organizations that can successfully battle on numerous fronts, (2) unclear in their strategy and they are pursuing a jumbled collection of priorities, or (3) they do not have a clear strategy and the measures do not detect subtle differences.



The strength of this study will be that the other orientations, market and supply management, are also being measured and help isolate the strengths or weaknesses. The use of the competitive priorities will act as a proxy for the degree of manufacturing orientation. This is legitimate in the respect that the constructs will be determined with a manufacturing focus. This construct will use a five point scale from “to a very small extent”, “to a great extent”.

### **Product Innovativeness**

Following the path of the model, after the market orientation, supply management orientation and manufacturing orientation, product innovativeness is developed. Product innovativeness was chosen following a study performed by Garcia and Calantone (2002). They performed a meta-analysis of studies using different constructs for innovation/innovativeness. Of the fifteen constructs used for innovation/innovativeness, product innovativeness was the most widely used. The measure of innovativeness defines the degree of “newness” of an innovation (Garcia and Calantone, 2002). For this study, product innovativeness defines the degree of differentiation from existing products the organization produces. Actual measures for the degree of product innovativeness will be developed from the combination of Etlie and Subramaniam (2004), and Griffin and Page’s (1996) measures. For incremental innovation, the categories will be separated into cost reduction, minor modification or significant upgrade. Cost reduction is a design change to save on cost, such as replacing a metal part with a plastic one or developing a part that will replace several in an assembly. A minor modification will represent changes

to a product to keep it competitive, such as adding an option to a particular product or a new color option. Lastly, a significant upgrade would entail a completely new model in design to replace the previous product. New-to-the-world or new-to-the-industry products will represent radical innovations. This measurement of this construct will use different types of innovation as previously stated and measured by a scale of 100 points. In addition, this construct will use a five point scale from strongly disagree to strongly agree, to cover pertinent concepts concerning innovative practices.

### **Control Variables**

Technological turbulence and market turbulence will be adopted from Narver (*et. al.*, 2004). The measures consist of five items for technological turbulence and four items for market turbulence. Each will be set to a corresponding scale to keep the survey as common as possible. The type of industry measured will use a scale developed by Swink (1999). Typical measures of the organization will be used such as company size; market competed in, gross sales, number of employees, and the age of the business. These constructs will use a five point scale from strongly disagree to strongly agree.

# **Chapter 5**

## **Data Collection**

### **Introduction**

This chapter explains the methods and procedures of gathering and testing the data. Employed in this research are a literature review, a pilot study, and a large sample study are.

### **Sample**

The group sampled should be representative of organizations that are actively pursuing different levels of innovation. A somewhat broad mix of organizations should be included to insure generalizability. The following SIC codes will be selected as the target of this study: SIC 28: Chemicals and Allied Products; SIC 34: Fabricated metal parts (except machinery and transportation equipment); SIC 35: Industrial and commercial machinery; SIC 36: Electronics, electrical equipment and components; and SIC 37:

Transportation equipment. These particular industries are of interest due to the nature of the products manufactured are constantly improved or replaced. Chemicals and electronic components are constantly being updated, reinvented or very new products. Commercial machinery and transportation equipment are currently under heavy scrutiny to be more efficient, forcing them to be more innovative within their existing products produced. For these reasons, these categories are very relevant to the focus of this research. Within these organizations, the target respondent will be the individuals that are involved in the daily decisions concerning the development of new innovative products. These individuals may be a manager in marketing, manufacturing, development, or a vice president.

Using only five industry codes, comparisons made between industries will not be overly stressing the sample size requirements of multivariate statistical analysis. Although the scope of alternative explanation will be somewhat limited due to the use of only five SIC codes. Alternatively, the generalizability of the research results will increase by the representation of a broad spectrum of industry and process types. Both discrete and process industries are in this sample. SIC code 28, the chemical and allied products industry is most likely a process-based industry, whereas SIC codes 34, 35, 36, and 37 are more likely to be discrete product manufacturers. The choice of multiple SIC codes creates an advantage over other studies that only include one or two SIC codes.

## **Pilot Study**

The pilot study used twenty individuals from local organizations within the Northwest Ohio to Southeast Michigan area. The sample for the pilot study was a convenience sample in that the participants were strictly from the local area making access much easier. This group is used to adjust the measurement scales to their highest level of performance for accuracy prior to large sample testing. The participants collected came from contacts made on both a local and university level. The measurement tool was hand delivered to the pilot survey participants. The following describes the context of the pilot sample requirements for companies used.

1. The individual must be in a position to contribute to the strategy and innovative direction of the organization.
2. The organization must be within the SIC codes representing electronics, chemicals, and manufacturing industries.
3. The organizations involved must be competing at on a national basis serving several states across the United States.

## **Pilot Study Methods**

Twenty responses made up the pilot study. Cronbach alpha assesses the reliability of the measurement items and factor analysis used to test for unidimensionality. Cronbach's alpha (Cronbach, 1951) is a measure of reliability. More specifically, alpha is a measure of the acceptable lower bound for the reliability of the survey. The basis for the

computation of Cronbach's alpha is number of items in the survey ( $k$ ) and the ratio of the average inter-item covariance to the average item variance. Churchill (1979) emphasized the need to reduce or purify weak factors using factor analysis. Factor analysis displays the strength of each measurement item from zero to one, with one being a perfect predictor. In addition, factor analysis separates the measurement items into different dimensions or factors that explain the findings and ones that do not add to explanatory power, which are removed (Weiss, 1970). Items with extremely low analysis scores, removing 0.4 or lower items are typical unless there is proposed sound reasoning for keeping such measures. Some measurement items may cross-load, meaning that they show explanatory power for more than one factor. Difference between cross-loadings may appear in each items score. For instance, if an item has a high loading of .7 and loads upon another factor at .3, it may not be relevant at this time to remove the measurement item.

Furthermore, a factor analysis may uncover factors using Principal Components Analysis and a Varimax Rotation, which reveal more factors than originally hypothesized. Such a rotation aligns the axis better with the data, in other words, more of the data will fall upon the axis providing better results. If this is the case, an alteration of the research may be necessary. However, due to the relatively small sample size of a pilot study, it is difficult to remove items. Since the pilot study is at a local level and Cronbach's alpha is somewhat dependent upon sample size, certain attributes of the items may not appear worthy until tested with a larger sample. This is not to say that items with very weak loadings should not be dropped from the research. It is to note that retaining lower than

normal scores if they can be supported logic and supporting literature. After removal of items, performing factor analysis again is necessary and scrutiny of the results for higher factor loadings such as recommended by Nunnally (1978) to an alpha level of 0.7 or higher. Factors found to have a high number of predictors are removed to shorten the length of the measurement scale to improve the overall quality of the results.

### **Pilot Study Results**

This section will discuss each construct from the conceptual model and the findings of the factor analysis developed from the pilot survey. Each section will discuss the survey items representing the measurement item and the actual factor loadings developed from the pilot survey.

**Table 1: Strategic Orientation**

<b>Code</b>	<b>Survey Item</b>	<b>Loading</b>	<b>Factor</b>
So1	We develop strong relationships with our suppliers	.755	2
So2	We develop strong relationships with our customers	-.873	5
So3	We optimize coordination across our departments and/or product lines	-.624	4
So4	There is a constant drive to improve efficiency	.802	2
So5	We tend to be number oriented and analytical in our operations	.427	3
So6	We require detailed factual information to support our day-to-day decision making	.672	1
So7	We develop comprehensive analyses of each business opportunity or challenge we face	.680	1
So8	Our business decisions generally follow tried and true paths	.828	3
So9	We adopt a rather conservative view when making major decisions	.791	3
So10	In general, our mode of operations is less risky than that of our competitors	.729	4
So11	We generally increase capacity (i.e., prepare to handle greater volume of business) before our competitors do the same	.568	1
So12	We are usually first ones to introduce various products and/or services in the market	.654	2, 5
So13	We adopt innovations early	.736	2
So14	The performance measures reviewed by the senior management team emphasize long-term business effectiveness	.759	4
So15	Our criteria for budget considerations generally reflect long-term considerations	.753	2
So16	We sacrifice current profitability to gain market share	.783	1
So17	Gaining market share is more important than cash flow	.857	1
So18	We frequently use price cutting to increase market share	.786	1

All items were of high validity with very little cross-loading. Cross-loadings represented in the table are listed the strongest factor loading first according to the factor it was associated with, followed by next strongest factor loading and so forth. The single cross-loading was ignored because of its previous use in another study by Sabherwal and Chan (2001). At an alpha suppression level of 0.5, only one cross-loading remains. Item So5



has a low factor loading, but the relevance of this item based on prior research warrants keeping this item. Upon the strength of the items, all will be kept for the large sample study.

**Table 2: Market Orientation**

<b>Code</b>	<b>Survey Item</b>	<b>Loading</b>	<b>Factor</b>
Mo1	We measure customer satisfaction systematically and frequently	.714	3
Mo2	Our strategy for competitive advantage is based on our understanding of our customers needs	.796	1
Mo3	We are more customer focused than our competitors	.685	1
Mo4	We strive to keep steady market share	.876	1
Mo5	We respond to customer feedback concerning improvements in our products	.746	1
Mo6	We help our customers anticipate developments in their markets	.791	1
Mo7	We continuously try to discover additional needs of our customers of which they are unaware	.731	1
Mo8	We incorporate solutions of perceived customer needs into our new products	.783	1
Mo9	We are constantly researching how to improve our products	.657	1
Mo10	We innovate to create a new generation of products for tomorrow	.754	2
Mo11	Our product innovations require educating our customers	.728	3
Mo12	Customer visions are translated into revolutionary product innovations	.701	3
Mo13	The innovations we develop today create tomorrow's market	.762	2
Mo14	We invest heavily into products that show strong future worth to create new product categories	.847	4
Mo15	We extrapolate key trends to gain insight into what users in a current market will need in the future	.752	2
Mo16	We innovate to make today's products obsolete in the future	.837	2

The measurement items for Market Orientation used came almost directly from Narver (*et. al.*, 2004). Slight wording changes made to the scale reflects a third concept called future market orientation. Seven measurement items were directly from Narver, the other

nine were variations to better separate the measurement items into distinct categories. Again, listed cross-loadings are in order of the strongest factor loading in descending order. At a higher alpha level of 0.5, the cross-loadings are no longer existent and all items score highly, above 0.65. Due to the established nature of these measures from previous studies, the small sample size, and the lack of cross-loadings, all measurement items are retained.

**Table 3: Supply Management Orientation**

Code	Survey Item	Loading	Factor
Spo1	We strive to establish long-term relationships with our suppliers	.902	1
Spo2	We actively try to reduce the number of suppliers	.589	2
Spo3	We consider suppliers contributions when making technology decisions for new products	.757	1
Spo4	NPD projects are selected based on the flexibility of our suppliers	.711	1
Spo5	We develop new products that can be produced by our current suppliers	.825	1
Spo6	We develop new innovative products that require new suppliers	.636	1
Spo7	Suppliers are involved in NPD projects as a partner	.813	2
Spo8	Suppliers are involved in NPD projects from the very inception	.931	2

Using Shin's (*et. al.*, 2000) measurement items as a foundation, reworded items are fit this research. The measurement items needed better focus towards innovative topics. Again, listed cross-loadings are in order of the strongest factor loading in descending order. At a higher alpha level of 0.5, the cross-loadings are no longer existent and all items score highly, above 0.63. Since the overall strength of all of the measures was relatively high, they are retained.

**Table 4: Manufacturing Orientation**

<b>Code</b>	<b>Survey Item</b>	<b>Loading</b>	<b>Factor</b>
Mf1	Reducing inventory	.823	3
Mf2	Reducing production costs	.663	3, 1
Mf3	Increasing capacity utilization	.649	3
Mf4	Offering consistent, reliable quality	.721	1
Mf5	Improving conformance to quality	.794	1
Mf6	Providing fast deliveries	.796	1
Mf7	Meeting delivery promises	.895	1
Mf8	Reducing production lead time	.868	1
Mf9	Ability to make rapid design changes	.742	2
Mf10	Make adjustments to capacity quickly	.837	2
Mf11	Offering a large degree of product variety	.810	2
Mf12	Adjusting product mix	.812	2

All measurement items were from Boyer and McDermott (1999) with only slight wording modifications to items to move them into an active tense. Again, listed cross-loadings are in order of the strongest factor loading in descending order. At a higher alpha level of 0.5, only one cross-loading exists and all items score highly, above 0.65. Retaining the item in question is the Mf2, which relates to reducing production costs, is due to its actual application in practice today.

**Table 5: Innovation Management**

<b>Code</b>	<b>Survey Item</b>	<b>Loading</b>	<b>Factor</b>
II1	Customer input dictates new directions for innovative new products	.909	4
II2	Efforts are made to understand the real future desires of our customers	.700	4
II3	Customer feedback creates new innovative products	.858	4
II4	Our organization has a reputation for being highly innovative in the marketplace	.587	1
II5	Our organization studies market trends to determine innovative new products	.706	1
II6	Being first to the market with new innovative products is a driving force for our organization	.600	1, 2
II7	The overall purpose of our innovative new products are to set new market trends	.790	1
II8	In our industry, it is essential to develop new innovative products to survive	.805	1
II9	In our industry sector, aging products require new innovative features to maintain market share	.877	1
II10	Our industry is well established and highly innovative products are rare	-.801	3
II11	Our industry typically follows innovations that other industries develop first	-.873	3
II12	Competition in our market demands highly innovative new products	.797	1
II13	We develop new products to create new barriers	.623	1
II14	Our organization cooperates with competitors to create innovative new products	.897	5
II15	The culture within our organization enables innovation	.927	2
II16	The structure of our organization enables the creation of highly innovative products	.844	2
II17	Being innovative in product design is discouraged within our organization	.951	6
II18	Our organization actively seeks innovative new product ideas through mergers and acquisitions	.742	5

Innovation Management was several different concepts taken from the literature in both academic and practitioner publications. Again, listed cross-loadings are in order of the strongest factor loading in descending order. At a higher alpha level of 0.5, only one

cross-loading exists and all items score highly for exploratory research, above 0.60. Being that these are newly developed measures, retaining all of the items is justified by the small pilot sample size.

**Table 6: Strategic Alignment**

<b>Code</b>	<b>Survey Item</b>	<b>Loading</b>	<b>Factor</b>
Sa1-1	Primary source – Marketing	.718	4, 3
Sa2-1	Primary source – Manufacturing	.778	3
Sa3-1	Primary source - Suppliers	.813	3
Sa4-1	Strategic priorities – Marketing	.809	4
Sa5-1	Strategic priorities – Manufacturing	.879	3
Sa6-1	Strategic priorities - Suppliers	.599	3
Sa7-1	Capabilities – Marketing	.861	3
Sa1-2	Capabilities – Manufacturing	.912	1
Sa2-2	Capabilities - Suppliers	.908	1
Sa3-2	Value – Marketing	.944	1
Sa4-2	Value – Manufacturing	.954	1
Sa5-2	Value – Suppliers	.898	1
Sa6-2	Resource allocations – Marketing	.927	1
Sa7-2	Resource allocations – Manufacturing	.944	1
Sa1-3	Resource allocations – Suppliers	.626	2
Sa2-3	Strategic decisions – Marketing	.849	2
Sa3-3	Strategic decisions – Manufacturing	.671	2, 1
Sa4-3	Strategic decisions – Suppliers	.875	2
Sa5-3	Building capabilities – Marketing	.756	2
Sa6-3	Building capabilities – Manufacturing	.914	2
Sa7-3	Building capabilities – Suppliers	.921	2

Strategic Alignment developed on the premise built into this research pertaining to the organizational structure, represented by the Market Orientation, Manufacturing Orientation and Supply Management Orientation, Strategic Alignment to the Strategic Orientation. Again, listed cross-loadings are in order of the strongest factor loading in descending order. At a higher alpha level of 0.5, only two cross-loadings exist and all

items score highly, above 0.65. Being that these are newly developed measures, retaining all of the items is justified by the small pilot sample size.

**Table 7: Business Performance**

<b>Code</b>	<b>Survey Item</b>	<b>Loading</b>	<b>Factor</b>
Bp1	Sales growth	.823	1
Bp2	Satisfaction with sales growth	.743	1
Bp3	Market share gain	.806	1
Bp4	Return on corporate investment	.804	1
Bp5	Net profit position	.900	1
Bp6	ROI position	.869	1
Bp7	Customer retention rate	.789	2
Bp8	Product quality	.892	2
Bp9	New product success rate	.657	2
Bp10	Satisfaction with return on sales	.911	1
Bp11	Overall position	.725	2

All of the business performance measures are either reflective of how the company views itself internally or against the competition. No cross-loadings found and all items score highly, above 0.65. The items break into two distinct factors and therefore retaining all measurement items for this construct is justified.

Again, addressing the issue of cross-loadings in this research, discussing each item found to have a cross-loading in the pilot test prior to continuing the large sample research. Starting in order with Strategic Orientation, only one factor cross-loaded, this was item So12. Item So 12 states “We are usually the first ones to introduce various products and/or services in the market”, this statement is indicative of innovative organizations today. This represents an excellent measure of organizations that create new breakthrough products, therefore, retaining it for the large sample survey. In addition, item So5

had a factor score of .427. Factor scores above .40 are of value for most research. Item So5 states, “There is a constant drive to improve efficiency”. In the study by Strong and Morgan (2003), this measurement item ranked highly and retaining it is justified.

One last issue with Strategic Orientation is that one factor developed using only one item. So2 stated that “We develop strong relationships with our customers” which is a consistent practice in present organizations. With a larger sample, this item should fall into another factor with more responses and retaining it will be justified. This issue also exists with Market Orientation and Innovation Management. Market Orientation item Mo14 states, “We extrapolate key trends to gain insight into what users in a current market will need in the future”. This measure was from Narver’s (*et. al.*, 2004) study and retaining it is justified. For Innovation Management, item II17 states, “Being innovative in product design is discouraged within our organization.” This measure is believe to be key to this research concerning innovation in that it will show the strength among the organizations responding as far as innovative products. Based upon this logic, retaining this item is justified.

Manufacturing Orientation involved a cross-loading with item Mf2 that states that a firm focuses on “Reducing production costs”. Reducing production costs is an extremely important issue to organizations that strive to deliver the best value to the customer. With a reduction in production costs, an organization can better focus on other internal issues as well. Therefore, retaining item Mf2 is justified for the large sample survey.

Innovation management contained one cross-loading on item II6. II6 states, “Being first to the market with new innovative products is a driving force for our organization”. This item speaks to the issue of developing break-through products that enable an organization to lead the way in their industry. For this very reason and the small pilot sample size, retaining this item is justified.

Strategic Alignment evolved to measure something that the literature has not really yet addressed. All of the items had relatively high scores, although two items had cross-loadings. Item SA1-1 considers marketing from the viewpoint of competitive advantage within the organization. Most organizations would consider marketing to be a competitive advantage, so retaining the item is justified. Item SA3-3 is also cross-loaded as stated previously and concerns the organization emphasis on the capabilities of supplier management. This could well be a hidden asset for some organizations when they are enabled specific areas provided by the supplier’s talents and attributes. Therefore, retaining this item is justified for the large sample survey.

Concluding the pilot testing, retaining all measurement items have been justified based on the facts that the sample size is relatively small, finding cross-loadings to be weak, and the measurement items scored over the required .5 level. Distinct factors were apparent even though the sample size was small and should be stronger with a larger sample group. Being that the pilot sample was more selective using mainly local organizations; the large sample study will be more random and generalizable in its results.



## **Introduction**

Though research and a pilot study, partial validation of the measurement items is complete. Performing further testing is in the form of a large sample survey. This section will describe that sample and retest the findings of the small sample. Following this will be structural equation modeling to confirm the overall model.

## **Large Sample Study**

The large sample study used email addresses of the companies within the previously mentioned SIC codes. These corporations sought were in accordance to the same guidelines as used in the pilot study. When possible, the appropriate person answered the survey. Emailing 1927 companies was possible with the web as a search tool. Using the Dillman Method (Dillman, 1978) to increase the number of responses was very helpful. This method incorporates the concept of the researcher being an enabler between the respondent and the conclusion to a problem. With this method, the conclusion equals something that the respondent can receive back for spending their time answering the questionnaire. In this case, any respondent could email back the researcher to obtain copies of the results. Again, the same guidelines were as listed.

1. The individual must be in a position to contribute to the strategy and innovative direction of the organization.
2. The organization must be within the SIC codes representing electronics, chemicals, and manufacturing industries.

3. The organizations involved must be competing at on a national basis serving several states across the United States.

Three waves of email surveys went out. The first wave explained the premise of the research and asked for assistance in completing the research. Approximately one month later, the second wave followed the first expressing a similar tone and thanking those who had answered the survey. Finally, two weeks after the second wave, a third wave went out. Again, thanking the participants that answered the survey and adding a note as to the final purpose of the research in both dissertation terms and publication terms. An advantage of the online survey is that this particular program did not allow the same IP address to submit more than one survey. This would aid in the overall reliability of the study.

### **The Data**

The three waves of emailed surveys netted 182 useable responses from the population of 1927. From the 1927 main sample, 22 percent returned undeliverable as shown by tracking the emails. Of that 22 percent, 3 percent deleted without reading. This reduced the overall sample size to 1503 creating a response rate of 12.1 percent. Accounting for the 3 percent or 58 responses unopened, would reduce the respondent percent to 11.7. Although, the belief of this study is that a deleted unopened email does not clearly identify to the recipient what the email entailed. To explain, Hui and Wold (1982) determined that PLS or SEM (structural equation modeling) estimates improved and their

average absolute error rates diminished as sample sizes increased. Similarly, Chin and Newsted (1999) determined that small sample sizes (e.g.,  $N = 20$ ) do not permit a researcher to detect low valued structural path coefficients (e.g., 0.20) until much larger sample sizes (i.e., between  $N = 150$  and  $N = 200$ ) are reached (Marcoulides and Saunders, 2006). Small sample sizes could only be used with higher valued structural path coefficients (e.g., 0.80), and even then will result in “reasonably large standard errors” (Chin and Newsted 1999, p. 333). The following tables describe the respondents according to job title; years at position; type of business; number of employees at the location; years organization has been in business; and, the breadth of the operation.

**Table 8: Job Title**

<b>Job Title</b>	<b>Percentage</b>	<b>Actual Count</b>
Other: CEO, VP, President	49.4	90
Business Unit Manager	15.66	29
Marketing Manager	24.1	44
Project Manager	4.22	8
Launch Manager	1.2	2
Program Manager	1.81	3
Team Leader	3.61	7

**Table 9: Years at Position**

<b>Time at Position (years)</b>	<b>Percentage</b>	<b>Actual Count</b>
Less than 2	18.67	34
2-5	28.31	52
6-10	27.71	50
11-15	8.43	15
16-20	5.42	10
21-25	7.23	13
26-30	1.22	2
Over 30	3.01	5

**Table 10: Number of Employees at Location**

<b>Employees at Location</b>	<b>Percentage</b>	<b>Actual Count</b>
Less than 10	8.43	15
10-50	19.88	36
51-100	14.46	26
101-500	31.93	58
501-1000	7.23	13
1001-5000	12.65	23
5001-10000	2.41	4
Over 10000	3.01	5

**Table 11: Number of Years in Business**

<b>Years in Business</b>	<b>Percentage</b>	<b>Actual Count</b>
Less than 2	1.2	2
2-5	4.22	8
6-10	8.43	15
11-15	7.23	13
16-20	9.04	16
21-25	7.83	14
26-30	3.61	7
Over 30	58.44	106

**Table 12: Industry**

<b>Industry</b>	<b>Percentage</b>	<b>Actual Count</b>
Automotive	12.50	23
Bio-tech	6.02	11
Chemicals	15.06	27
Communications	3.01	5
Computers	4.82	9
Manufacturing	28.92	53
Research	1.20	2
Transportation	0.07	1
Government	0.07	1
Technology	9.04	16
Other: Mainly Mfg. Related	18.07	33

**Table 13: Breadth of Operation**

<b>Breadth of Operation</b>	<b>Percentage</b>	<b>Actual Count</b>
Domestic	12.05	22
National	4.22	8
Multinational	21.69	39
Global	62.04	113

## Non-Respondent Bias

Checking non-respondent bias is to make sure that the responding candidates do not differ from those who did not respond from the total sample. Responses typically come in waves. In other words, all responses to a survey do not all arrive simultaneously. Respondents are somewhat reminded to respond to gather the largest sample possible from the population. Three waves occurred. According to research by Venkatraman (1989), late respondent's profiles parallel those of non-respondents. Therefore, choosing certain variables to compare between waves is a common practice. The following tables display the overall the difference between waves. Performing a Chi-square test to compare the expected return; the percentage contained in the large sample, versus the observed return, to the actual respondents. As shown in both tables, no significant difference had shown between the total sample and those who replied at a 0.05 significance level.

**Table 14: Employees at Location Non-Respondent Bias Test**

<b>Variables</b>	<b>Sample</b>	<b>Observed</b>
<b>Employees at Location</b>		
Less than 10	116	15
10-50	385	36
51-100	385	26
101-500	482	58
501-1000	193	13
1001-5000	193	23
5001-10000	58	4
Over 10000	116	5
$(\chi^2 = 7.516, df = 7, p = .377)$		

**Table 15: industry Non-Respondent Bias Test**

Variables	Sample	Observed
<b>Industry</b>		
Automotive	231	23
Bio-tech	135	11
Chemicals	289	27
Communications	77	5
Computers	116	9
Manufacturing	482	53
Research	39	2
Transportation	19	1
Government	58	1
Technology	193	16
Other	231	33
$(\chi^2 = 6.064, df = 10, p = .809)$		

Also of concern is the difference in each wave of respondents. Each wave should be similar in the type of respondent. An ANOVA test measured the means by comparing the difference between two waves at a time. First, comparing the type of industry, and then comparing the number of employees. As can be seen in the table below, no significant results found, meaning that there is not any significant difference between samples.

**Table 16: Survey Waves Compared Non-Respondent Bias Test**

Waves Compared	Significance
Industry – 1 to 2	.151
Industry – 1 to 3	.440
Industry – 2 to 3	.117
Employees – 1 to 2	.707
Employees – 1 to 3	.697
Employees – 2 to 3	.385

## **Factor Analysis of the Large Sample**

Again, performing factor analysis is required to reduce the chance of error in the models. Typically, exploratory factor analysis is the reduction of unwanted data or removal of low factor loading items. Also, items that cross-load onto other factors are scrutinized much more now that the sample size has increased. Each of the following tables represents a construct in the overall model, its appropriate measurement items, its factor loading, and which factor or factors it affects. After the initial analysis, removal of poorly performing items improves the overall factor score.

Within each table, available is a value displaying the KMO value or The Kaiser-Meyer-Olkin Measure of Sampling Adequacy. This statistic indicates the proportion of variance in each set of variables that is common variance, referring to an underlying cause. Values closest to one are indicative of factors that will be useful in explaining the data. The KMO measures the sampling adequacy and to proceed should be greater than 0.5 for a satisfactory factor analysis.



**Table 17: Factor Analysis of Strategic Orientation**

<b>Strategic Orientation</b>		<b>KMO = .751</b>		<b>KMO = .699</b>	
		<b>Alpha = .820</b>		<b>Alpha = .765</b>	
<b>Code</b>	<b>Survey Items</b>	<b>Loading</b>	<b>Factor</b>	<b>Loading</b>	<b>Factor</b>
So1	We develop strong relationships with our suppliers	.461	2	.532	3
So2	We develop strong relationships with our customers	.474	3	.546	4
So3	We optimize coordination across our departments and/or product lines	.460	1, 2		
So4	There is a constant drive to improve efficiency	.727	1	.683	1
So5	We tend to be number oriented and analytical in our operations	.832	1	.874	1
So6	We require detailed factual information to support our day-to-day decision making	.681	1	.767	1
So7	We develop comprehensive analyses of each business opportunity or challenge we face	.714	1	.740	1
So8	Our business decisions generally follow tried and true paths	.550	5, 1		
So9	We adopt a rather conservative view when making major decisions	.859	5	.875	4
So10	In general, our mode of operations is less risky than that of our competitors	.764	5	.817	4
So11	We generally increase capacity (i.e., prepare to handle greater volume of business) before our competitors do the same	.450	3, 2		
So12	We are usually first ones to introduce various products and/or services in the market	.913	3	.903	4
So13	We adopt innovations early	.848	3	.848	4
So14	The performance measures reviewed by the senior management team emphasize long-term business effectiveness	.821	2	.813	3
So15	Our criteria for budget considerations generally reflect long-term considerations	.870	2	.865	3
So16	We sacrifice current profitability to gain market share	.868	4	.867	2
So17	Gaining market share is more important than cash flow	.857	4	.859	2
So18	We frequently use price cutting to increase market share	.754	4	.757	2

As shown in the table above items: removal of So1, So2, So3, So8 and So11 were due to low factor loadings or cross-loading. Ready for the next stage of testing, the measurement items separated into four distinct factors.

**Table 18: Factor Analysis of Market Orientation**

<b>Market Orientation</b>		<b>KMO = .861</b>		<b>KMO = .852</b>	
		<b>Alpha = .907</b>		<b>Alpha = .888</b>	
<b>Code</b>	<b>Survey Item</b>	<b>Loading</b>	<b>Factor</b>	<b>Loading</b>	<b>Factor</b>
Mo1	We measure customer satisfaction systematically and frequently	.623	3	.619	2
Mo2	Our strategy for competitive advantage is based on our understanding of our customers needs	.803	3	.807	2
Mo3	We are more customer focused than our competitors	.827	3	.840	2
Mo4	We strive to keep steady market share	.645	3	.637	2
Mo5	We respond to customer feedback concerning improvements in our products	.688	3	.678	2
Mo6	We help our customers anticipate developments in their markets	.722	2	.717	3
Mo7	We continuously try to discover additional needs of our customers of which they are unaware	.764	2	.770	3
Mo8	We incorporate solutions of perceived customer needs into our new products	.735	2	.764	3
Mo9	We are constantly researching how to improve our products	.705	2	.710	3
Mo10	We innovate to create a new generation of products for tomorrow	.733	1, 2		
Mo11	Our product innovations require educating our customers	.676	1	.675	1
Mo12	Customer visions are translated into revolutionary product innovations	.736	1	.738	1
Mo13	The innovations we develop today create tomorrow's market	.829	1	.842	1
Mo14	We invest heavily into products that show strong future worth to create new product categories	.764	1	.767	1
Mo15	We extrapolate key trends to gain insight into what users in a current market will need in the future	.516	1, 2		
Mo16	We innovate to make today's products obsolete in the future	.723	1	.724	1

Removing items that measured weak and cross-loaded, led to the results shown in the table above. Removal of items Mo10 and Mo15 were due to cross-loading on item Mo 10 and a weak factor loading on item Mo15.

**Table 19: Factor Analysis of Supply Management Orientation**

<b>Supply Management Orientation</b>		<b>KMO = .802</b>		<b>KMO = .766</b>	
		<b>Alpha = .812</b>		<b>Alpha = .773</b>	
<b>Code</b>	<b>Survey Item</b>	<b>Loading</b>	<b>Factor</b>	<b>Loading</b>	<b>Factor</b>
Spo1	We strive to establish long-term relationships with our suppliers	.428	1	.392	2
Spo2	We actively try to reduce the number of suppliers	.578	1	.567	1
Spo3	We consider suppliers contributions when making technology decisions for new products	.648	1,2		
Spo4	NPD projects are selected based on the flexibility of our suppliers	.789	2	.802	2
Spo5	We develop new products that can be produced by our current suppliers	.880	2	.884	2
Spo6	We develop new innovative products that require new suppliers	.697	1	.723	1
Spo7	Suppliers are involved in NPD projects as a partner	.784	1	.804	1
Spo8	Suppliers are involved in NPD projects from the very inception	.769	1	.781	1

Removing items that measured weak and cross-loaded, led to the following results as shown in the table above. Removal of item Spo1 and Spo3 was justified. Removing Spo1 was due to a weak factor loading and removal of Spo3 was due to cross-loading.

**Table 20: Factor Analysis of Manufacturing Orientation**

<b>Manufacturing Orientation</b>		<b>KMO = .831</b>	
		<b>Alpha = .887</b>	
<b>Code</b>	<b>Survey Item</b>	<b>Loading</b>	<b>Factor</b>
Mf1	Reducing inventory	.747	3
Mf2	Reducing production costs	.792	3
Mf3	Increasing capacity utilization	.755	3
Mf4	Offering consistent, reliable quality	.845	1
Mf5	Improving conformance to quality	.812	1
Mf6	Providing fast deliveries	.724	1
Mf7	Meeting delivery promises	.725	1
Mf8	Reducing production lead time	.606	1, 2
Mf9	Ability to make rapid design changes	.738	2
Mf10	Make adjustments to capacity quickly	.640	2
Mf11	Offering a large degree of product variety	.812	2
Mf12	Adjusting product mix	.822	2

Removing items that measured weak and cross-loaded, led to the following results in the table above. Item Mf8 is cross-loaded, although retained for confirmatory factor analysis due to the strength of the initial measurement.

**Table 21: Factor Analysis of Innovation Management**

Innovation Issues		KMO = .868		KMO = .831	
		Alpha = .851		Alpha = .786	
Code	Survey Item	Loading	Factor	Loading	Factor
II1	Customer input dictates new directions for innovative new products	.751	3	.610	1
II2	Efforts are made to understand the real future desires of our customers	.730	3	.765	1
II3	Customer feedback creates new innovative products	.711	3	.725	1
II4	Our organization has a reputation for being highly innovative in the marketplace	.715	1		
II5	Our organization studies market trends to determine innovative new products	.510	3	.600	1
II6	Being first to the market with new innovative products is a driving force for our organization	.704	1, 2		
II7	The overall purpose of our innovative new products are to set new market trends	.544	1, 2		
II8	In our industry, it is essential to develop new innovative products to survive	.837	2	.813	2
II9	In our industry sector, aging products require new innovative features to maintain market share	.678	2	.778	2
II10	Our industry is well established and highly innovative products are rare	-.601	2	.617	3, 1
II11	Our industry typically follows innovations that other industries develop first	.711	4	.803	3
II12	Competition in our market demands highly innovative new products	.742	2	.790	2
II13	We develop new products to create new barriers	.583	1	.515	2
II14	Our organization cooperates with competitors to create innovative new products	.512	4		
II15	The culture within our organization enables innovation	.774	1	.714	1
II16	The structure of our organization enables the creation of highly innovative products	.757	1	.694	1
II17	Being innovative in product design is discouraged within our organization	.708	4	.671	3
II18	Our organization actively seeks innovative new product ideas through mergers and acquisitions	.496	1, 4		

Removing items that measured weak and cross-loaded, led to the above results for Innovation Issues. Removal of items II6, II7, II14, and II18 were justified. Items II6, II7, and II18 were removed due to cross-loadings. Removal of item II14 was due to a weak score.

**Table 22: Factor Analysis of Strategic Alignment**

<b>Strategic Alignment</b>		<b>KMO = .877</b>		<b>KMO = .869</b>	
		<b>Alpha = .878</b>		<b>Alpha = .866</b>	
<b>Code</b>	<b>Survey Item</b>	<b>Loading</b>	<b>Factor</b>	<b>Loading</b>	<b>Factor</b>
Sa1-1	Primary source – Marketing	.834	1	.833	1
Sa2-1	Primary source – Manufacturing	.883	1	.884	1
Sa3-1	Primary source - Suppliers	.895	1	.892	1
Sa4-1	Strategic priorities – Marketing	.897	1	.895	1
Sa5-1	Strategic priorities – Manufacturing	.816	1	.817	1
Sa6-1	Strategic priorities - Suppliers	.809	1	.814	1
Sa7-1	Capabilities – Marketing	.828	1	.828	1
Sa1-2	Capabilities – Manufacturing	.860	2	.858	2
Sa2-2	Capabilities - Suppliers	.773	2, 4		
Sa3-2	Value – Marketing	.899	2	.906	2
Sa4-2	Value – Manufacturing	.869	2	.891	2
Sa5-2	Value – Suppliers	.841	2	.844	2
Sa6-2	Resource allocations – Marketing	.805	2, 4		
Sa7-2	Resource allocations – Manufacturing	.839	2	.853	2
Sa1-3	Resource allocations – Suppliers	.828	3	.838	3
Sa2-3	Strategic decisions – Marketing	.672	3, 4		
Sa3-3	Strategic decisions – Manufacturing	.874	3	.886	3
Sa4-3	Strategic decisions – Suppliers	.804	3	.818	3
Sa5-3	Building capabilities – Marketing	.862	3	.857	3
Sa6-3	Building capabilities – Manufacturing	.761	3, 4		
Sa7-3	Building capabilities – Suppliers	.855	3	.850	3

Removing items that measured weak and cross-loaded, led to the above results for Strategic Alignment. Removal of items Sa2-2, Sa2-3, Sa6-2, and Sa6-3 were justified.

**Table 23: Factor Analysis of Business Performance**

Business Performance		KMO = .877		KMO = .862	
		Alpha = .914		Alpha = .898	
Code	Survey Item	Loading	Factor	Loading	Factor
Bp1	Sales growth	.797	2	.802	2
Bp2	Satisfaction with sales growth	.797	2	.797	2
Bp3	Market share gain	.869	2	.868	2
Bp4	Return on corporate investment	.892	1	.894	1
Bp5	Net profit position	.906	1	.909	1
Bp6	ROI position	.883	1	.882	1
Bp7	Customer retention rate	.701	3	.704	3
Bp8	Product quality	.834	3	.835	3
Bp9	New product success rate	.754	3	.756	3
Bp10	Satisfaction with return on sales	.629	1	.624	1
Bp11	Overall position	.602	1, 2		

Removing items that measured weak and cross-loaded, led to the following results as shown above. Removal of item Bp11 was due to a weaker score and cross-loading.

#### ***Summary of Large Sample Factor Analysis***

Removal of all measurement items that had low factor loadings or high cross-loadings is now complete as far as factor analysis can go. This section concluded the exploratory testing of the data. The remaining factors will be further scrutinized using confirmatory factor analysis by means of structural equation modeling.

#### **Confirmatory Factor Analysis using Structural Equation Modeling**

The basis for the original conceptual model is upon the researcher's theory and a thorough review of the literature. Development of hypotheses and measurement items are ready to test the connections within the model between constructs. Real world

practitioners will answer these measurement items created using a theoretical foundation. The answers develop the factors that are in the exploratory factor analysis employed in both the pilot and large sample studies. As a final check, factors that passed factor analysis will test with SEM.

First each construct and its measurement items tested individually. This will show if the measurement items show the same discriminant validity and structural relationships as implied by the exploratory factor analysis. After each construct tests to an acceptable level, all constructs test together as stated in the conceptual model. To enable the statistical program to accomplish this task, the sub-constructs of each construct create one. In other words, a sub-construct might contain six measurement items, removal of one through exploratory factor analysis, and another removed because of confirmatory factor analysis, leaving four measurement items. These four items summated together into one sub-construct to reduce the number of levels the statistical program has to calculate. As a result, the structural equation model tested may have eight constructs with thirty sub-constructs.

When testing the model in structural equation modeling, it displays error terms. These can aid the researcher in removal of items that contain a lot of error. Typically, as each independent model is tested, the program calculates modification indices. This displays the amount of covariance, variance, and regression weighting an item possesses. Covariance refers to the amount that two different measurement items possess in explaining the same construct. Obviously, if there is a strong covariance, removal of one



of the measurement items is justified. At this point, the amount of error each term has and checking any other covariance prior to removal of either item. Other fit indices displayed warrants whether or not an acceptable fit is acceptable.

The model fit indicators used in this study are the RMR (root mean residual), GFI (goodness-of-fit index), AGFI (adjusted goodness-of-fit index), and the RMSEA (root mean square residual). The RMR is the square root of the average squared amount by which the sample variances and covariances differ from their estimates obtained under the assumption that your model is correct. The smaller the RMR is the better. Therefore, an RMR of zero indicates a perfect fit (SPSS guide). GFI varies from zero to one, but theoretically can yield meaningless negative values. By convention, GFI should be equal to or greater than .90 to accept the model. AGFI is a variant of GFI, which uses mean squares instead of total sums of squares in the numerator and denominator of one - GFI. It, too, varies from zero to one, but theoretically can yield meaningless negative values. AGFI should also be at least .90. Attainment of a fit index of .9 is not always possible with larger models. Lastly, the RMSEA, should be .05 or less to obtain excellent model fit. Newer research allows for slightly higher results, but it would require substantiation to become reliable.

### **Strategic Orientation**

Taking the constructs in modeled arrangement, Strategic Orientation is first construct tested using structural equation modeling. Using the findings from the exploratory factor analysis allows creation of a model in the structural equation modeling program, AMOS

6.0. The removal of variables judged upon their covariance modification indices provided in the structural equation modeling program. The higher the modification index, the better the resulting model indices with that item removed. The following table depicts the changes made and the resulting model, testing each construct in the same manner.

Table 24: Strategic Orientation

Variable Removed	RMR	GFI	AGFI	RMSEA
None	.071	.902	.853	.071
So8	.066	.923	.879	.058
So14	.057	.945	.909	.037

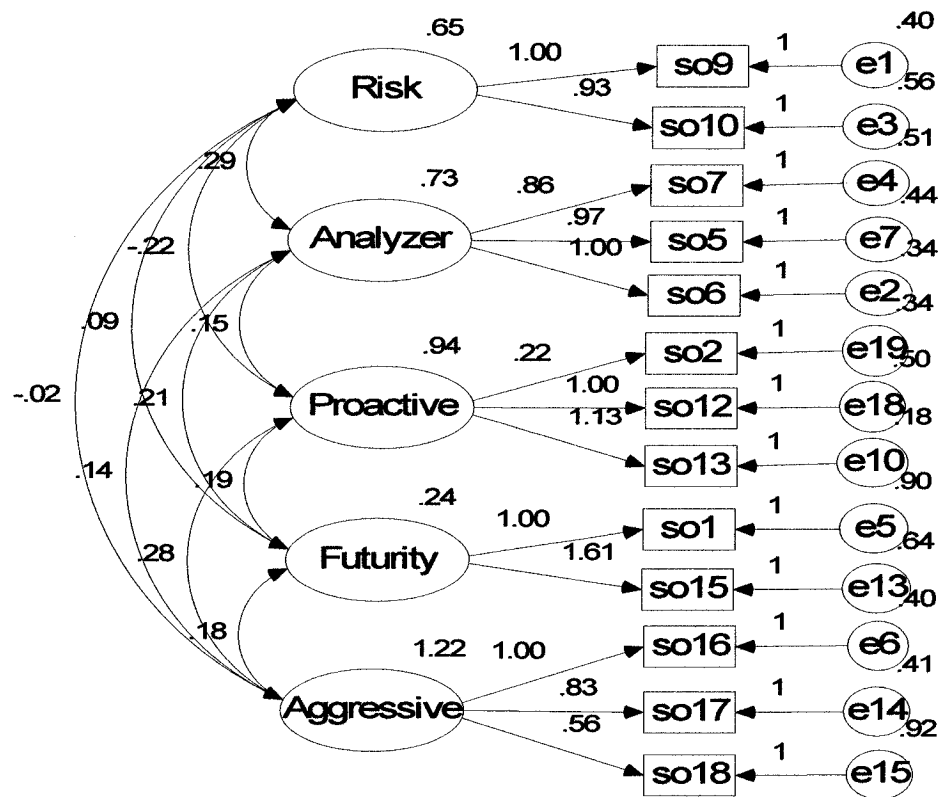


Figure 3: Strategic Orientation Model

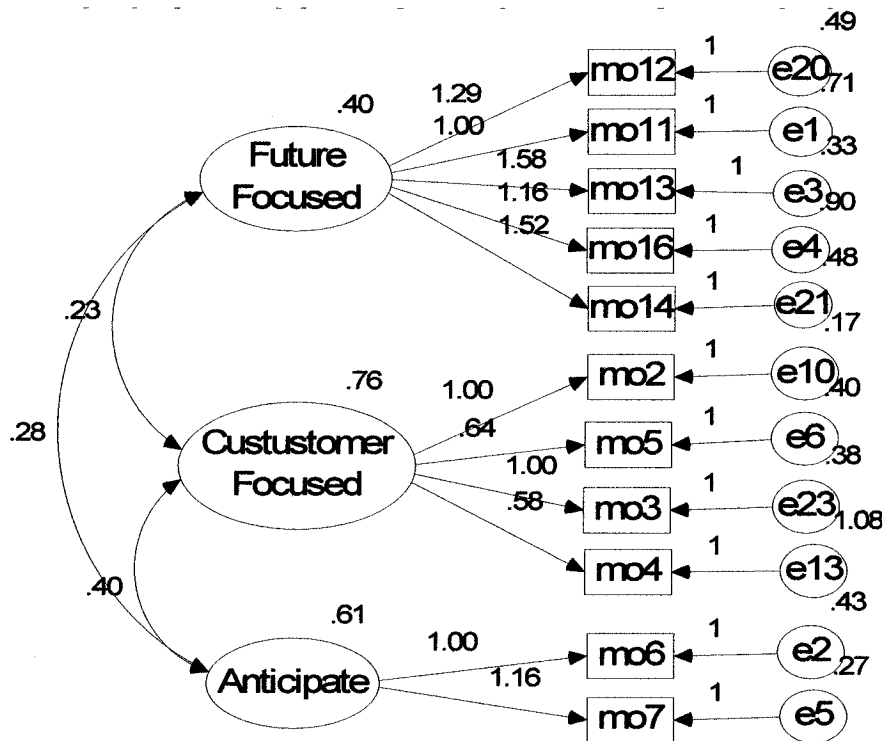
RMR = .057, GFI = .945, AGFI = .909, RMSEA = .037

## Market Orientation

Following the same premise previously mentioned, all items are entered into the model to create the best possible results. The following table depicts the changes made and the resulting model.

**Table 25: Market Orientation**

Variable Removed	RMR	GFI	AGFI	RMSEA
None	.066	.891	.845	.080
Mo8	.067	.916	.877	.066
Mo1	.058	.934	.900	.054
Mo9	.046	.952	.922	.040



**Figure 4: Market Orientation Model**

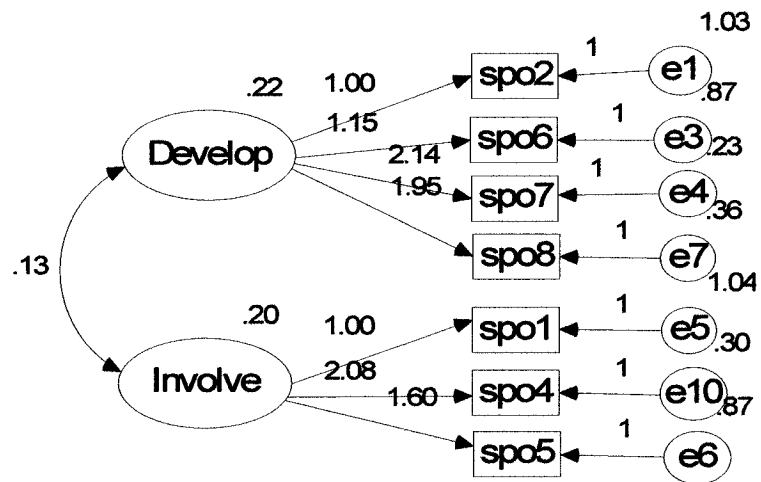
**RMR = .046, GFI = .952 AGFI = .922, RMSEA = .040**

## Supply Management Orientation

Following the same premise previously mentioned, all items are entered into the model to create the best possible results. The following table depicts the changes made and the resulting model.

**Table 26: Supply Management Orientation**

Variable Removed	RMR	GFI	AGFI	RMSEA
None	.053	.981	.959	.000



**Figure 5: Supply Management Orientation Model**

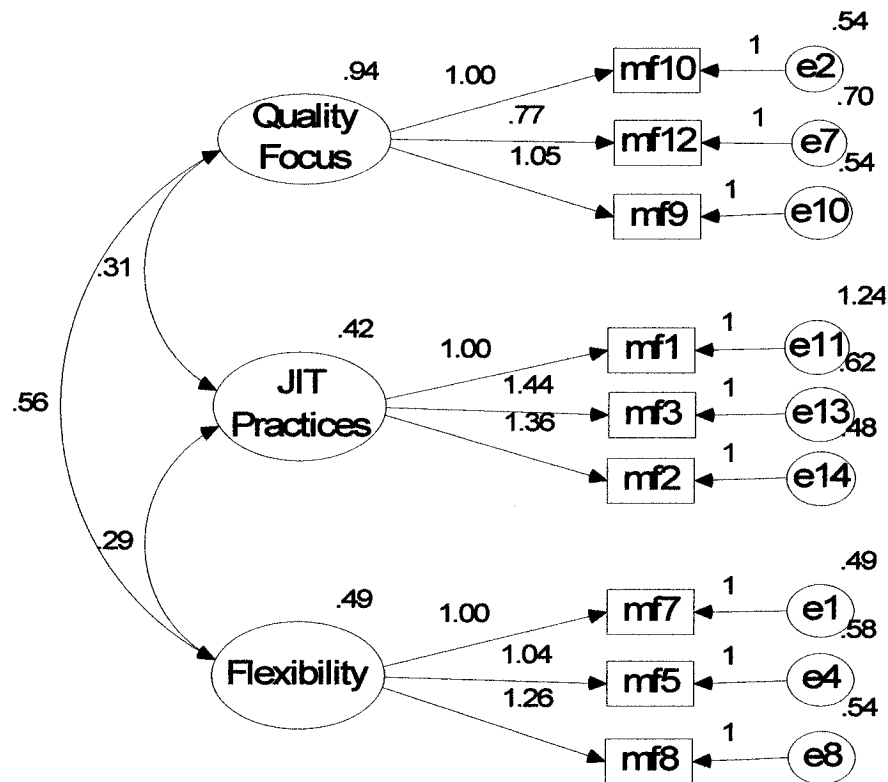
**RMR = .053, GFI = .981, AGFI = .959, RMSEA = .000**

## Manufacturing Orientation

Following the same premise previously mentioned, all items are entered into the model to create the best possible results. The following table depicts the changes made and the resulting model.

**Table 27: Manufacturing Orientation**

Variable Removed	RMR	GFI	AGFI	RMSEA
None	.099	.806	.704	.147
Mf4	.086	.899	.837	.103
Mo1	.067	.942	.899	.071
Mo9	.061	.960	.925	.050



**Figure 6: Manufacturing Orientation Model**

**RMR = .061, GFI = .960, AGFI = .925, RMSEA = .050**

## Innovation Management

Following the same premise previously mentioned, all items are entered into the model to create the best possible results. Using confirmatory factor analysis, found that Innovation Management had a third factor that was actually not plausible. The following table depicts the changes made and the resulting model.

Table 28: Innovation Management

Variable Removed	RMR	GFI	AGFI	RMSEA
None	.070	.923	.875	.087
II3	.048	.944	.904	.066
II15	.045	.942	.899	.071
Mo9	.061	.966	.936	.039

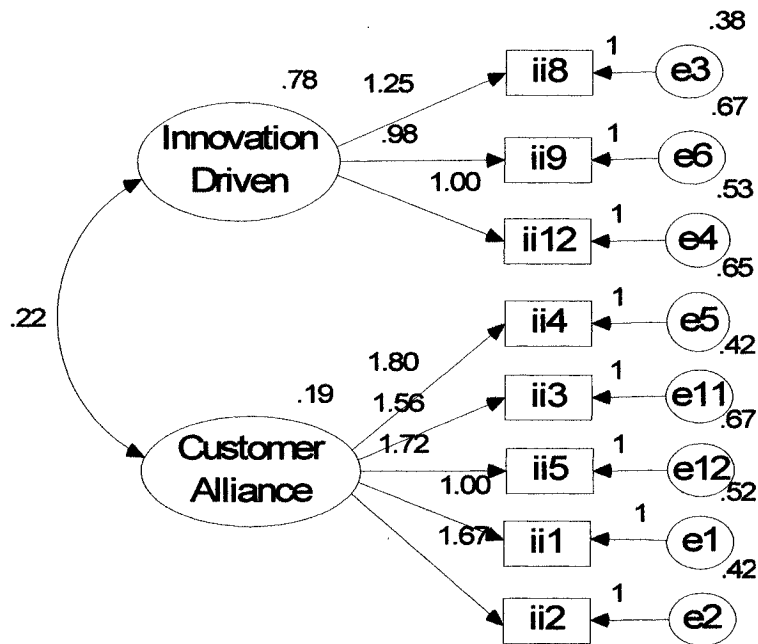


Figure 7: Innovation Management Model

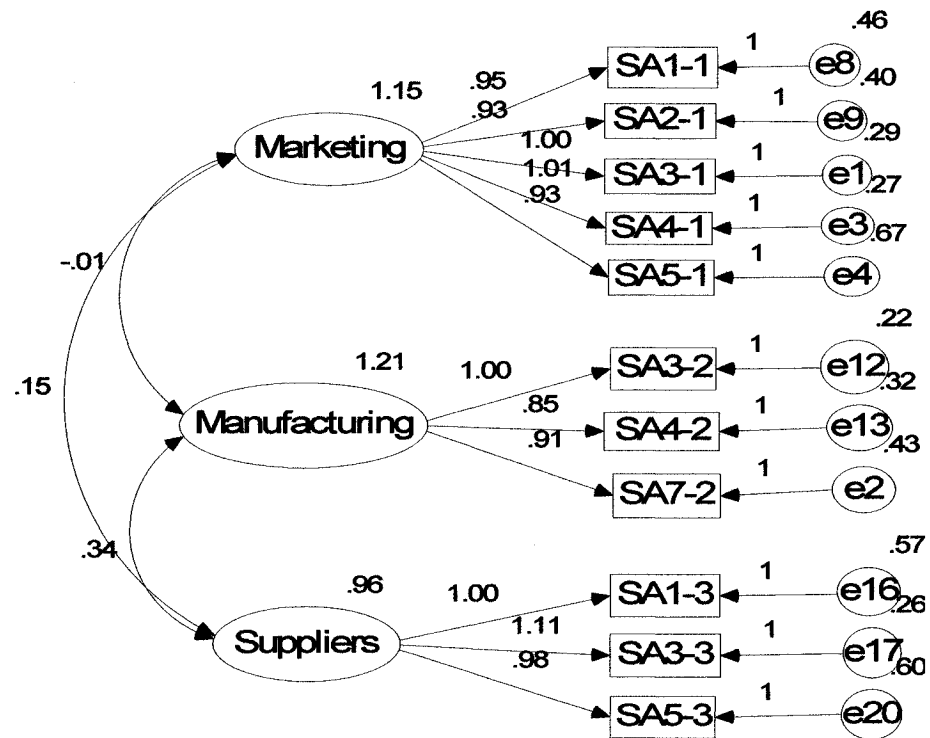
RMR = .045, GFI = .966, AGFI = .936, RMSEA = .039

## Strategic Alignment

Following the same premise previously mentioned, all items are entered into the model to create the best possible results. The following table depicts the changes made and the resulting model.

**Table 29: Strategic Alignment**

Variable Removed	RMR	GFI	AGFI	RMSEA
None	.079	.855	.808	.084
SA6-1	.071	.868	.823	.079
SA7-3	.068	.881	.836	.079
SA4-3	.065	.899	.857	.074
SA5-2	.062	.926	.891	.056
SA1-2	.057	.947	.918	.035
SA7-1	.049	.965	.943	.000



**Figure 8: Strategic Alignment Model**

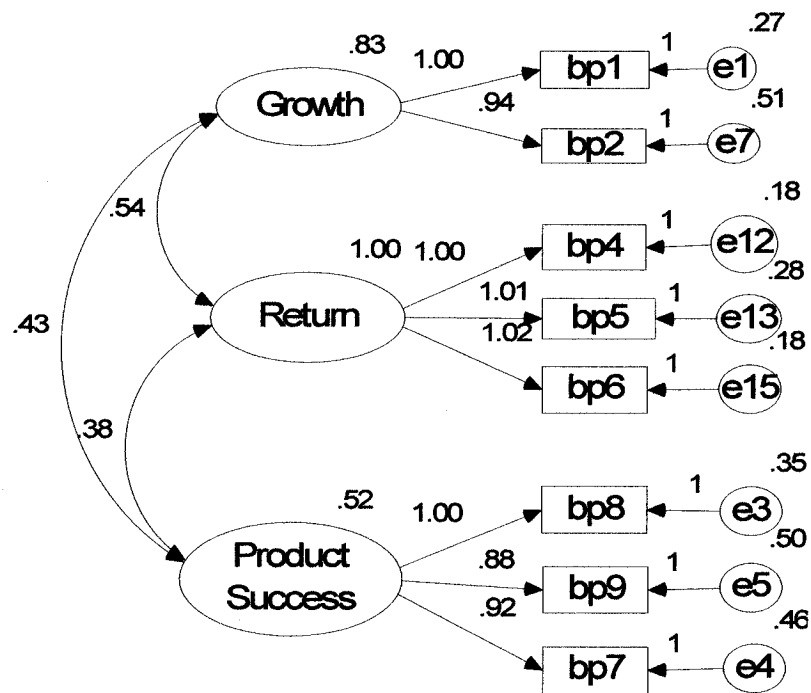
**RMR = .049, GFI = .965, AGFI = .943, RMSEA = .000**

## Business Performance

Following the same premise previously mentioned, all items are entered into the model to create the best possible results. The following table depicts the changes made and the resulting model.

**Table 30: Business Performance**

Variable Removed	RMR	GFI	AGFI	RMSEA
None	.072	.916	.855	.100
Bp10	.042	.945	.896	.079
Bp3	.030	.970	.937	.050



**Figure 9: Business Performance Model**

**RMR = .030, GFI = .970, AGFI = .937, RMSEA = .050**

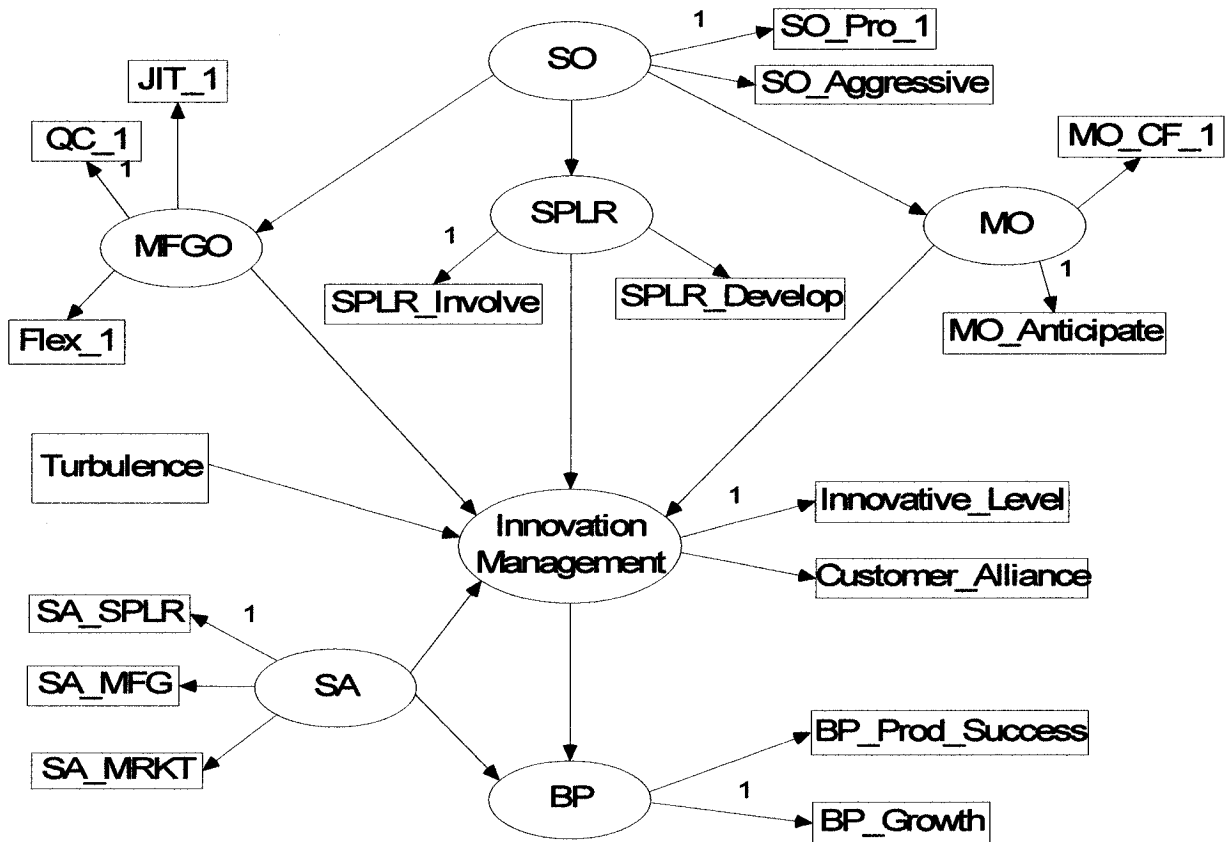


## **Testing the Complete Model**

The overall model used summated items developed from the initial models of each sub-construct and its measurement items. A summated item refers to the reduction of measurement items into a single variable. For example, three measurement items, Spo1, Spo4, and Spo5, determine supplier involvement. These three items averaged together as one mean value to create the summated score. This process reduces the number of levels of variables used in a structural equation modeling program.

The testing process for the large model follows the same rigorous method used in fine tuning each sub-construct. With each sub-construct now represented as a summated score and labeled properly, placement into the model is according to the latent variable it describes. Latent variables are only evident through testing. A latent variable refers to a variable that is unseen, discovered by using the correct measurement items.

The correlation described in the table before were made according to the logic shown in the conceptual model. Correlation 1 connects the error term of the Strategic Alignment construct with Strategic Orientation as depicted in the conceptual model. Correlations 2 and 3 reflect the connection between the Market Orientation, Supply Management Orientation and the Manufacturing Orientation with the Strategic Alignment. Correlation of error terms in the model are a consideration of the theoretical nature of the constructs. The SEM model is almost a duplicate of the conceptual model. The following figure displays the model as tested with SEM.



**Figure 10: Summated Overall Model (As seen from AMOS)**

**RMR = .068, GFI = .918, AGFI = .876, RMSEA = .048**

**Table 31: Legend for model**

Variable	Item	Variable	Item
SO	Strategic Orientation	Flex_1	Flexibility
SO_Pro_1	Proactiveness	Innovation Mgmt.	Innovation management
SO_Aggressive	Aggressiveness	Innovative_Level	Innovative Level
MO	Market Orientation	Customer_Alliance	Customer Alliance
MO_CF_1	Customer Focus	SA	Strategic Alignment
MO_Anticipate	Anticipation	SA_MRKT	Market
SPLR	Supplier	SA_SPLR	Supplier
SPLR_Inovolve	Involvement	SA_MFG	Manufacturing
SPLR_Develop	Development	BP	Business Performance
MFGO	Manufacturing Orientation	BP_Prod_Success	Product Success
JIT_1	Just in Time	BP_Growth	Growth
QC_1	Quality Control	Turbulence	Turbulence

**Table 32: Results of Hypotheses 1, 2, 3, 4, and 5 from SEM Model**

<b>Hypothesis</b>	<b>Significance</b>	<b>Support Level</b>
<b>1a:</b> Strategic orientation will have an effect on the level of market orientation.	.928**	Supported
<b>1b:</b> Strategic orientation will have an effect on the level of Supply Management Orientation.	.362**	Supported
<b>1c:</b> Strategic orientation will have an effect on the level of manufacturing orientation.	.683**	Supported
<b>2a:</b> Market orientation will have an effect on innovation management.	.601*	Supported
<b>2b:</b> Supply Management Orientation will have an effect on innovation management.	.075	Not Supported
<b>2c:</b> Manufacturing orientation will have an effect on innovation management.	-.017	Not Supported
<b>3a:</b> Strategic alignment will have an affect on the innovation management.	-.586	Not Supported
<b>3b:</b> Strategic alignment will have an affect on the business performance.	2.199**	Supported
<b>4:</b> Innovation management will have an effect on business performance.	-.441	Not Supported
<b>5:</b> An organization that is affected by higher environmental turbulence will show a higher level of innovation management.	.644**	Supported

\*\* Significant @ .001 level, \* Significant @ .05 level

### **Explanation of Statistical Findings**

The decomposition and path analysis of models is made possible with the use of structural equation modeling. The validity and reliability of a model is mainly a result of the scales developed to test the hypothesized ideas. The structural equation model should not only meet the requirements of statistical significance for the path coefficient estimates, but also the requirements 'good-fit' between the hypothesized causal model and the sample covariance (Shin *et. al.*, 2000). In addition, a good causal model must

provide a practical and logical interpretation and clearly represent an underlying premise or theory of how certain constructs are related.

The premise of hypothesis one is that the strategic positioning an organization takes will have a positive effect on the functional units. Functional units refer to the Market Orientation (H1a), Supply Management Orientation (H1b), and Manufacturing Orientation (H1c). Hypothesis 1a referring to Market Orientation was supported at a significance level of .001. The estimate of .928 represents that if the Strategic Orientation moves forward one full unit, the Market Orientation would move .928, meaning that these two constructs move almost exactly together. H1b for Supply Management Orientation and H1c for Manufacturing Orientation were also significant below a .001 level and had estimates of .362 and .683 respectively. This finding in itself could lead to further research as adjustments made to the strategy of the organization and the adjustments made to the functional units.

Hypothesis 2 dealt with the relationship of the functional units to the Innovation Management. H2a stated that Market Orientation would have a positive effect on Innovation Management. H2a was significant at .05 level with an estimate of .601. H2b, supply Management Orientation, and H2c, Manufacturing Orientation, were not significant in their relationship to Innovation Management; hence, there is no support for H2b and H2c. Of note, Manufacturing Orientation actually moves slightly in the opposite direction of Innovation Management with an estimate of -.017. It would make sense that

the more focused or capital intensive an organization is in manufacturing the less innovative they would be.

Hypothesis 3 dealt with the Strategic Alignment of the organization and its effect on both the Innovation Management and the Business Performance. H3a stated that Innovation Management would have a positive effect on Business Performance. This hypothesis was not supported and actually had a negative effect. Past literature (Eisenhardt and Tabrizi, 1995; Alder, 1999) has shown that when an organization is innovative, a strict organizational structure or alignment stifles innovation. This finding was not a total surprise. Support was found at a .001 level for H3b concerning Strategic Alignment's effect on Business Performance.

Innovation Management did not have a significant relationship to Business Performance as stated in hypothesis 4. With a point estimate of -.441, no support found for hypothesis 4. This would indicate that the higher the level of innovation, the lower the level of business performance. In other words, to be innovative there is a cost involved for research and creation. It has been heavily covered in the recent literature how organizations are reducing their R&D spending to show higher earnings (Li and Atuahene-Gima, 2001; Ahire and Dreyfus, 2000).

Lastly, hypothesis 5 stated that higher environmental turbulence would have a positive effect on Innovation Management. This hypothesis was significant at a .001 level, specifically in terms of the level of innovation chosen. At an estimate of .644, the

Innovation Management would seem to lag the environment a little indicating that organizations do not change course at every minute indication. The confirmation of the positive direction shows that Innovation Management is an active practice.

## **Chapter 6**

### **Discussion and Conclusion**

#### **Introduction**

This chapter covers the findings, limitations, future research suggestions, managerial implications, and conclusions developed from this research.

#### **Review Discussion**

Innovation as displayed by the works of numerous authors is illusive to capture in its entirety. In attempts to do so, innovation has been defined several different ways in attempts to form it to the research undertaken. As previously mentioned, out of twenty-one empirical studies, fifteen constructs were used and measured by at least fifty-one distinct scale items (Garcia and Calantone, 2002). Typically, there is a wide spread among authors concerning the definition of innovative (Song and Montoya-Weiss, 1998;

Ettlie and Rubenstein, 1987; O'Connor, 1998; Kleinschmidt and Cooper, 1991; Meyers and Tucker, 1989; Maidique and Zirger, 1984).

With Griffin and Page's (1996) introduction of six different strategies organizations could use to perform NPD, all the measures of innovation were in a portfolio format to display the different combinations of innovation used by an organization. The innovation type performed matched to different strategies based on the findings of Miles and Snow's (1978) typologies. Prospectors performed the majority of radical innovations, whereas Defenders, Analyzers and Reactors mainly performed additions to existing lines. Ettlie and Subramaniam (2004) reduced the number of categories to four from Griffin and Page's (1996) six. Instead of matching them to an organizational strategy, innovation tied to different environments. Their findings point towards different organizational structures that organizations aspire to become.

This research attempts to better define innovative products by using the combination of Griffin and Page's (1996), Ettlie and Subramanian's (2004) interpretations. The measurement made in a portfolio manner allows the organizations to answer in a manner that best describes their situation. Clearly constructed definitions are required to be clear to the respondent as to the meaning of each level of innovation. Strategic orientation and organizational structure were also included in the study.

Organizational structure typically been dealt with from the viewpoint of alignment. Zirger and Maidique (1990) stated that the importance of an organization's ability to



build upon existing technological, marketing and organizational competences. St. John and Hall (1991) spoke of alignment as the simultaneous use of a variety of coordinating mechanisms that will assist firms in achieving better coordination between departments. As previously stated, Song and Swink (2002) found that joint marketing and manufacturing involvement produces greater positive impacts on new product success in radical NPD projects. This research looks to find direct measures of such alignment between marketing, manufacturing, and the organization's suppliers.

Alignment with suppliers has typically not been part of alignment studies or stated as such. Rho (*et. al.*, 1994) had referred to it as interface congruence with different functions. Interface congruence or supplier involvement, showed a significant direct relationship with manufacturing flexibility. This could lead to the conclusion that the use of suppliers can add to the flexibility of an organization in its use of suppliers concerning innovative projects. Rosenzweig (*et. al.*, 2003) showed that higher involvement of suppliers lead to superior results. Past research has shown that firms search for partners that have specialized resources that are not readily available from others (Doh, 2000). This study attempts to add suppliers to the marketing and manufacturing alignment research. Because of this alignment, firms should show higher performance.

One of the main objectives of this research is to add new constructs to the literature in terms of manufacturing orientation, innovation management, and strategic alignment. Past attempts at manufacturing orientation have been weak at best. As displayed by Mavondo (1999) manufacturing orientation was negatively related to product innovation

and positively related to marketing effectiveness. As of this time, there are not any pertinent articles concerning Innovation Management. Griffin and Page (1996) had spoke of innovation strategy, but only in reference to the level of innovation performed not the combining factors. Innovation Management may affect the level of the Strategic Alignment as the structure of the organization becomes clear.

### **Discussion of Relevance**

The overall purpose of this study was to establish a framework to enable improved study of an innovative organization. This framework attempted to be all inclusive of the organization's strategy, structure, alignment, and business performance. In other words, to compare this to the production of a simple part, it would be from the raw materials through to the products financial performance. This section discusses an incremental approach used in this research.

First off, this study's basis was on previous research as a foundation to build upon. A goal of this research was to use established measurement scales. Slight modification of some of these scales was necessary to better answer the questions posed in this study. For non-existent scales, the creation of Innovation Management and Strategic Alignment, used support from both academic and practitioner literature. Manufacturing Orientation required a very new scale since one did not exist for this use. The validation, definition and operationalization of new constructs alone are a major achievement.

Three well-known theories support this research. The overall premise of a strategic orientation leading to an organizational structure that aligns to that strategy is a significant contribution. The addition of the innovation management and business performance develop a snapshot of the entire organization. Contingency theory relates to how the decisions made within the organization affect the resulting structures. This follows the basic premise of Contingency Theory in that the input-transformation-output cycle is the basis of the organization.

The core competencies are a result of the decisions made by an organization that become the established structures and practices of the organization. The same practices repeated following the Contingency Theory that are developed and accepted become core competencies. In addition, the resource-based view theory refers to the actual resources possessed by different organizations to accomplish their tasks. The functional unit's configuration could be a resource as used in this research using Market Orientation, Supply Management Orientation, and Manufacturing Orientation. In addition, the focus of the Innovation Management could be both a core competency and a specific or valuable resource. Especially important to the Resource-Based Theory could be the inclusion of suppliers to different organizations and the added capabilities provided. Through the hypothesis testing, Supplier Management Orientation was somewhat significant in Innovation Management and was very significant to the Strategic Orientation.

Manufacturing Orientation now has a foundation to build upon. Between a combination of existing measures for manufacturing strategy and other measures from strategy itself, initial validation appears to be strong for Manufacturing Orientation. Having an orientation for the market, manufacturing and suppliers was important to this research in that an orientation represents a position an organization takes concerning its decisions. Past research had not established such tenets and based most conclusions on management opinions of such alignments and not on measures of actual practices. The three well-recognized latent variables in Manufacturing Orientation, JIT Practices, Quality Focus, and Flexibility are in the present literature, but not always in unison or used as they are in this research. Through validation of a measurement scale for Manufacturing Orientation, other research will be able to utilize this construct.

In conjunction with Strategic Orientation, Manufacturing Orientation was found to be a significant contributor. All responding organizations had some level of Manufacturing Orientation, although, when determining Innovation Management, Manufacturing Orientation could be a hindrance. Proof of this has been stated previously in that an organization that is highly capital intensive would find it difficult being highly innovative. Past research has also shown that a certain level of flexibility is required for an organization to be innovative. Otherwise, supporting the Strategic Orientation of the organization should be fundamental. If manufacturing were not in support of the strategy, higher business performance would not be possible.

The construct of Innovation Management is presently not in the academic literature as a tested construct. Two distinct variables found through testing, Innovative Level and Customer Alliance. Innovative Level represents the level or intensity of product innovativeness experienced by the organization in its environment. Obviously, not all industries experience or practice the same level of innovations. Customer Alliance is exactly as the title implies, as it is a measure of how heavily influenced the organization is by the customers or somewhat partners with its customers to meet their market demands. Also included with Customer Alliance are measures of the customer's involvement in product development. This has been a highly regarded topic lately in research from all practices.

Significantly linked was Innovation Management to Market Orientation, which would indicate that an innovative firm must know their market. This has been a focus of the literature in terms of innovation and Market Orientation. Innovation Management did not have a positive effect on Business Performance. This could be because so much of an organization's investments go into innovative products that never make it to market. Typically, only a small percentage of an organization's innovative products make it to market and are profitable. Both latent variables discovered from the structural equation modeling, Innovation Level and Customer Alliance would cost the organization more than not pursuing innovative products under the aggressive and proactive strategic orientations. This is well displayed by new organizations in today's market that take several years to make any real income due to investments that must be made to be competitive.

Another new construct developed in this research is Strategic Alignment. The use of Strategic Alignment took alignment to a new level in that it includes not only manufacturing and marketing, but also suppliers and the element of strategy. Having the marketing, manufacturing, and suppliers in unison developed a focus upon the strategy of the organization that is the strength of this scale. All three, marketing orientation, manufacturing orientation, and supplier management orientation, were found to be strong variables in this model. As depicted in the conceptual model and proven in the structural model, linking Strategic Alignment to the structure of the organization and its strategy as it affected Innovation Management. This basis for this construct was on such measures as competitive advantage, strategic priorities, capabilities, value, and decisions, as seen by an organization pertaining to the market, manufacturing, or its suppliers.

No support found for a Strategic Alignment having a positive effect on Innovation Management. A possible explanation may come from past studies findings of strict procedures reducing the level of creativity that in turn would reduce the level of innovativeness. Another possible explanation may be the level of involvement required through alignment may be different according to the product developed. As shown in this study, there was a significant negative relationship found between Strategic Alignment and Innovation Management that would support the previous statements.

A key finding was that a Supply Management Orientation and Manufacturing Orientation did not have a significant positive effect on the Innovation Management. An argument could be made in either direction for the finding concerning the Supply Management

Orientation. If a supplier were typically involved in the innovative products of the organization, one would believe there would be a positive effect. Likewise, if using suppliers only for common practices throughout the organization and not sharing innovative materials with suppliers, it would appear there would be a negative effect. It may take too much time to get the suppliers up to speed in developing innovative products with the organization. The actual estimate found from the structural equation modeling did indicate a somewhat significant level at  $p = .097$ . With Manufacturing Orientation, a positive finding may have been counterintuitive to normal findings, in that highly manufacturing orientated or capital-intensive organizations typically are not highly innovative. Again, this all may be dependent upon the level of the competitive environment the organization resides in.

The Environmental Turbulence was found to have a significant effect on Innovation Management. This would support past research concerning an organization's ability to be competitive is related to its performance with new products. As found in the structural model, both the Innovation Level performed and the Environmental Turbulence affected the Strategic Orientation. This again leads an organization back to look at its Market Orientation and assess the changing market conditions. This all reinforces the choices of Proactive and Aggressive strategic dimensions.

## **Managerial Implications**

This research shows that managers should look more closely at not only their internal practices, but also their external practices when it concerns innovative products. Of notice was the finding that aggressive and proactive approaches were the most significant dimensions found in conjunction with innovative organizations. Using these two dimensions as guides should help managers in lesser performing organizations to increase their performance in terms of innovative products. In other words, most organizations practice some type of strategy, but it should extend to their suppliers. Incorporation of suppliers into NPD is becoming a more widely accepted practice in today's organizations. Therefore, the suppliers should have the same strategic focus as the organization to not only gain higher business performance, but also a competitive advantage.

Strategically aligning the organization both internally and externally is important, but too much alignment can be a detriment to innovation. The effect of Strategic Alignment on Innovation Management was proof of this as they are inversely related. This would imply that managers must keep a balance between the degree of alignment and the level of innovations performed. This balance, between innovation and the market, could also be a key to higher business performance as it has been highly supported in the literature (Narver *et. al.*, 2004). Market Orientation in an innovative firm was found to relate positively to performance, but Manufacturing Orientation and supply Management Orientation had little or no effect on Innovation Management.



Manufacturing Orientation was measured by the practices of just-in-time, quality control, and flexibility, that are practiced in today's organizations. These organizations are going to develop innovative new products as permitted by the capabilities of manufacturing abilities. An organization that competes in a highly competitive environment will be required to have a great deal of manufacturing flexibility. Capital-intensive machinery is only going to aid the organization that repeatedly makes the same product such as a paper clip. Organizations that develop digital cameras are going to have to use flexible machines that can adapt to rapidly changing models. If manufacturing is not capable in either the expertise or equipment, suppliers can be used to supplement these areas.

Supply Management Orientation was closely related to Innovation Management, although not highly significant. This could be indicative of the use of suppliers in the development of innovative new products. For example, both AMD and Intel create microchips, but neither organization produces computers. Yet, computers with a new type processor are advertised as the latest innovation. Suppliers used as a horizontal extension of the organization can dramatically increase the capabilities of an organization.

Of utmost importance to managers is the management of innovations. Innovation Management had a negative effect on business performance. This was developed from the perspective of the amount of alliance with customers and the level of innovations performed. Customer Alliance is required with both the physical customers and suppliers to create not only today's innovation, but also tomorrows. Breakthrough innovations can

occur when technology outpaces the market. This still creates a need to discover the customers who will consume that new product. The level of innovation refers to whether there is an incremental change in a product or the product is something the market has never seen. Both, the Customer Alliance and the level of innovation were impacted by the environmental turbulence. If the environmental turbulence is higher, both customer Alliance and the level of innovation are higher.

In summation, managers will have to treat the Market Orientation, Supply Management Orientation and Manufacturing Orientation as a balanced portfolio. These assets of the organization can be actively managed for higher business performance with Strategic Alignment. The effects of Strategic Alignment improved the business performance. Innovation Management may have had a negative effect on business performance, but in the long term, it is how organizations capture more market share and increase profitability. This was indicated by an organization's focus on being aggressive and proactive when it comes to innovative firms.

### **Limitations**

As with most research, a study such as this one uses a snapshot in time. In other words, the responses to the questionnaires are only as good as the point in time used. With the environment typically changing for innovative organizations, alteration of current practices occurs to stay competitive. A longitudinal study would be more comprehensive, but its results would be somewhat limited to the time span taken and the economic

environment occurring during that period. This more than clarifies why research is repeated and typically results in new findings with old scales.

There is always the risk that when respondents answer questions, they do so as they believe you want them answered or their own conceptualization. It is virtually impossible to run a large sample survey and control for all possibilities of error creation. This particular study used an email survey for the large sample and like a mail survey; there is no control over who really responds to the questions. Where applicable, surveys were emailed directly to the person of interest. In other cases, the email contained the dialogue explaining the content of the survey and indicated the desired respondent. Since surveys are anonymous, this will remain an issue.

Even though scales are carefully selected and evaluated, they are not always perfect. What a specific term means to one individual means something entirely different to another. This can lead to somewhat skewed results through strictly the interpretation of meanings. Rigorous evaluation of scales occurred prior to testing. Each new study must evaluate for its own purpose how well particular scales work and if they must be modified or removed to better fit the context of the research.

Generalizability is only as good as the sample taken. Even though a broad sample was used for this research, only a limited number of SIC codes were employed. Other industries may help create entirely different results from using these same scales. Therefore, the generalizability is typically somewhat suspect considering a resulting

sample size of just under two hundred and the use of only five SIC codes. Retesting of these scales will increase their reliability and validity.

This study, as many, had a relatively good sample size (Chin and Newsted, 1999), but larger samples would be more stable. A larger sample size typically creates higher significant results. There is always a risk in research when trying to gain new insights that researchers only receive a small percentage of the total respondents. When performing a study to be generalizable to some degree, it is difficult to gather a large percentage of those respondents. Managers, like researchers are busy and time is money. The value of research is not always seen.

### **Future Research**

This study provides a new framework to study innovative production within an organization. Researchers will be able to follow this testing procedure in pursuit of other new findings. The use of the past literature, pilot study, factor analysis, and structural equation modeling display a clear path to performing research studies such as this one. Researchers can use the new constructs developed here to find new paths of research.

Three new constructs, Manufacturing Orientation, Innovation Management, and Strategic Alignment, have been initially validated and operationalized for use in future research. Better clarification of constructs will bring about a higher level of findings in the

literature. Developing these constructs here will require more validation through research. This is not to say that what has been uncovered in this research cannot progress forward.

With the addition of these new constructs, new avenues of research will be available. Manufacturing Orientation could be matched with Innovation Management and Business Performance to show how well such an organization performs. This new construct was defined to show how an organization chooses its manufacturing practices. With the broad reach of this construct, it would not be limited to studies concerning only innovation. Any research focused on the concept of manufacturing could measure the orientation of the manufacturing and develop a better snapshot of the practices entailed.

Innovation Management will allow future research to better focus on the drivers of innovation. This construct could also be matched to many other constructs that would lead to meaningful results. For example, a new model with Strategic Orientation and Innovation Management alone may lead to slightly different results without the effect of the organizational structure. Breaking down the Environmental Turbulence into its subcomponents of market and technology with Innovation Management could also produce new interesting results. Supply Management Orientation teamed with Innovation Management should lead to revealing indicators for business performance. Many possibilities exist outside the constructs used here.

Another construct, Strategic Alignment, has potential to open new findings in the strategy area. A model constructed of only the Strategic Orientation, Strategic Alignment, and

Business Performance, could aid organizations that are or are not innovative. The perspective that Strategic Alignment takes looks at the relationship between marketing, suppliers and manufacturing and the organization. Taken in a longitudinal study, this construct could have very telling results as the organization changes its alignment strategically. Many possible combinations exist for further research from this study.

## **Conclusion**

As proven by the increase in recent research, innovation research is rapidly increasing (Griffin and Page, 1996; Ettlé and Subramaniam; 2004; Narver, *et. al.*, 2004). This study further validates the construct of innovation. Debarking from the normal practices of measuring just the innovation typologies or strategies, this research introduces Innovation Management. From a different point of view, organizations manage assets, employees, raw materials, and logistics, to name a few. Innovation management should also be a focus and it was significant in this study.

Innovation Management is expensive as shown by the relationship between Innovation Management and Business Performance being negative. This follows with past research findings that have stated that research is costly, hence reducing a firm's level of performance in certain areas. Although, if the innovative products are successful, those lower levels in business performance could turn into positive gains. Without studying organizations on a singular scale to pinpoint successful practices, it is difficult to dissect

the exact framework that makes a particular innovative firm succeed. Therefore, the results found here are more generalizable due to the nature of the organizations surveyed.

For an organization to structure its functional components properly to manage innovative new products should definitely lead to a competitive advantage. Yet an organization must also stay adaptable to market changes (Ettlie and Subramaniam, 2004). This study also found support for adaptability as too much alignment leads to a decrease in innovation as displayed by the findings in the SEM model by an inverse relationship between Strategic Alignment and Innovation Management. Likewise, Innovation Management was not positively correlated to Business Performance. These findings all support that adaptability and the costs required by innovative new products. Otherwise, Market Orientation did have a positive significant effect on Innovation Management that would lead to the conclusion that a market orientation is required. This would coincide with Narver and Slater's (1990) argument that some level of market orientation is required.

Innovation Management had no significant relationship with Supply Management Orientation or Manufacturing Orientation. Supply Management Orientation was somewhat significant, but not at a perceivable level. This might indicate that further research may bring out this relationship and more findings that are new to the world. Suppliers used as an extension of the organization would increase the capabilities concerning innovative new products. Manufacturing Orientation had a negative impact on Innovation Management indicating that too rigid of a position in manufacturing reduces the level of innovative product production. This again emphasizes the

requirement of balancing the structure of the organization according to the level of innovation pursued.

An organizational structure was significant in this study in terms of support for the organization's strategic orientations. Strategic Orientation had significant positive relationships with all of the organizational structure, Market Orientation, Supply Management Orientation and Manufacturing Orientation. This adds further support to Swink's (1999) study that some level of organizational structure is required. This research found both a proactive and aggressive approach to an innovative organization to be the strongest. Many authors (Griffin and Page, 1996; James and Hatten, 1995; Matsuno and Mentzer, 2000) support findings concerning prospectors being more innovative. In studies using Miles and Snow's (1978) typologies, findings for prospectors showed them performing the highest level of innovative new products (Griffin and Page, 1996). Earlier it was mentioned how Wernerfelt felt that an organization through acquisitions, mergers and diversification can gain a competitive advantage over other firms which would be representative of what aggressive and proactive organizations practice. Morgan and Strong (1998) found a significant positive relationship with market orientation and the dimension proactiveness.

Typically, Aggressiveness is not a producing strategic dimension (Morgan and Strong, 1998, 2003). Findings showed a negatively relationship between market orientation, competitive strategy, and Aggressiveness. Other authors had also found that aggressors are not innovative (Wong and Sanders, 1993). The findings of this study are counter to



previous findings in that Aggressors are a significant dimension in terms of innovative organizations.

More research will be necessary to validate further the new constructs created in this study. Researchers will now have new scales to use for Manufacturing Orientation, Strategic Alignment, and Innovation Management. These new scales built upon findings in past literature, established theories, a pilot study, and a large sample study. The data was analyzed both with exploratory and confirmatory factor analysis. The results of the findings for these new scales are all very strong statistically.

Revalidation occurred for the existing scales used, Market Orientation, Strategic Orientation, Supply Management Orientation, and Business Performance. Taken from previous studies and slightly modified to adjust to this research, all were again highly significant. This allows future researchers to have choices of appropriate scales to use in their studies that will connect better with their chosen concepts.

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## Appendix A

### Survey Instrument

#### *Strategic Alignment*

Please rank the following alignment issues as they pertain to your organization: (5 = strongly agree; 1 = strongly disagree)

1. We consider \_\_\_\_\_ our primary source of competitive advantage.
  - a) Marketing  
5      4      3      2      1
  - b) Manufacturing  
5      4      3      2      1
  - c) Supplier Management  
5      4      3      2      1
2. \_\_\_\_\_ determines our strategic priorities.
  - a) Marketing  
5      4      3      2      1
  - b) Manufacturing  
5      4      3      2      1
  - c) Supplier Management  
5      4      3      2      1
3. Our organization puts emphasis on the capabilities of:
  - a) Marketing  
5      4      3      2      1
  - b) Manufacturing  
5      4      3      2      1
  - c) Supplier Management  
5      4      3      2      1
4. We derive value from \_\_\_\_\_.
  - a) Marketing  
5      4      3      2      1
  - b) Manufacturing  
5      4      3      2      1
  - c) Supplier Management  
5      4      3      2      1
5. We make resource allocations to achieve a competitive advantage in \_\_\_\_\_.
  - a) Marketing  
5      4      3      2      1
  - b) Manufacturing  
5      4      3      2      1
  - c) Supplier Management  
5      4      3      2      1
6. Overall strategic decisions are primarily driven by \_\_\_\_\_.
  - a) Marketing  
5      4      3      2      1

- b) Manufacturing  
5      4      3      2      1
- c) Supplier Management  
5      4      3      2      1

7. Our organization continually builds capabilities in:

- a) Marketing  
5      4      3      2      1
- b) Manufacturing  
5      4      3      2      1
- c) Supplier Management  
5      4      3      2      1

#### *Manufacturing Orientation*

When considering decisions that affect manufacturing, we focus on: (5 = to a great extent; 1 = to a very small extent)

1. Reducing inventory  
5      4      3      2      1
2. Reducing production costs  
5      4      3      2      1
3. Increasing capacity utilization  
5      4      3      2      1
4. Offering consistent, reliable quality  
5      4      3      2      1
5. Improving conformance to quality  
5      4      3      2      1
6. Providing fast deliveries  
5      4      3      2      1
7. Meeting delivery promises  
5      4      3      2      1
8. Reducing production lead time  
5      4      3      2      1
9. Ability to make rapid design changes  
5      4      3      2      1
10. Make adjustments to capacity quickly  
5      4      3      2      1
11. Offering a large degree of product variety  
5      4      3      2      1
12. Adjusting product mix  
5      4      3      2      1

### ***Strategic Orientation***

Please rank your organization according to the strategic decisions made concerning the following: (5 = strongly agree; 1 = strongly disagree)

1. We develop strong relationships with our suppliers.  
5      4      3      2      1
2. We develop strong relationships with our customers.  
5      4      3      2      1
3. We optimize coordination across our departments and/or product lines.  
5      4      3      2      1
4. There is a constant drive to improve efficiency.  
5      4      3      2      1
5. We tend to be number orientated and analytical in our operations.  
5      4      3      2      1
6. We require detailed factual information to support our day-to-day decision making.  
5      4      3      2      1
7. We develop comprehensive analyses of each business opportunity or challenge we face.  
5      4      3      2      1
8. Our business decisions generally follow tried and true paths.  
5      4      3      2      1
9. We adopt a rather conservative view when making major decisions.  
5      4      3      2      1
10. In general, our mode of operations is less risky than that of our competitors.  
5      4      3      2      1
11. We generally increase capacity (i.e., prepare to handle a greater volume of business) before our competitors do the same.  
5      4      3      2      1
12. We are usually the first ones to introduce various products and/or services in the market.  
5      4      3      2      1
13. We adopt innovations early.  
1      5      4      3      2
14. The performance measures reviewed by the senior management team emphasize long-term business effectiveness.  
5      4      3      2      1
15. Our criteria for budget considerations generally reflect long-term considerations.  
5      4      3      2      1
16. We sacrifice current profitability to gain market share.  
5      4      3      2      1

17. Gaining market share is more important than cash flow.  
5      4      3      2      1

18. We frequently use price-cutting to increase market share.  
5      4      3      2      1

### ***Supplier Orientation***

In the following section please indicate the best response to your firm's interaction with suppliers. (5 = strongly agree; 1 = strongly disagree)

1. We strive to establish long-term relationship with suppliers.  
5      4      3      2      1
2. We actively try to reduce the number of suppliers.  
5      4      3      2      1
3. We consider supplier contributions when making technology decisions for new products.  
5      4      3      2      1
4. NPD projects are selected based on the flexibility of our suppliers.  
5      4      3      2      1
5. We develop new products that can be produced with current suppliers.  
5      4      3      2      1
6. We develop new innovative products that require new suppliers.  
5      4      3      2      1
7. Suppliers are involved in NPD projects as a partner  
4      3      2      1      5
8. Suppliers are involved in NPD projects from the very inception  
4      3      2      1      5

Please rank how your organization focuses on market orientation:

(5 = strongly agree; 1 = strongly disagree)

### ***Responsive Market Orientation***

1. We measure customer satisfaction systematically and frequently.  
5      4      3      2      1
2. Our strategy for competitive advantage is based on our understanding of customers' needs.  
5      4      3      2      1
3. We are more customer focused than our competitors.  
5      4      3      2      1
4. We strive to keep a steady market share.  
5      4      3      2      1
5. We respond to customer feedback concerning improvements in our products.  
5      4      3      2      1

### ***Proactive Market Orientation***

1. We help our customers anticipate developments in their markets.  
5    4    3    2    1
2. We continuously try to discover additional needs of our customers of which they are unaware.  
5    4    3    2    1
3. We incorporate solutions of perceived customer needs into our new products.  
5    4    3    2    1
4. We are constantly researching how to improve our products.  
5    4    3    2    1
5. We innovate to create a new generation of products for tomorrow.  
5    4    3    2    1

### ***Futuristic Market Orientation***

1. Our product innovations require educating our customers.  
5    4    3    2    1
2. Customer visions are translated into revolutionary product innovations.  
5    4    3    2    1
3. The innovations we develop today create tomorrow's markets.  
5    4    3    2    1
4. We invest heavily into products that show strong future worth to create new product categories.  
5    4    3    2    1
5. We extrapolate key trends to gain insight into what users in a current market will need in the future.  
5    4    3    2    1
6. We innovate to make today's products obsolete in the future.  
5    4    3    2    1

Please indicate how you perceive your organization's market conditions:

(5 = strongly agree; 1 = strongly disagree)

### ***Technological Turbulence***

1. The technology in our market changes rapidly.  
5    4    3    2    1
2. Technological changes provide big opportunities in our industry.  
5    4    3    2    1
3. A large number of new products in this market have been made possible through technological breakthroughs.  
5    4    3    2    1

### ***Market Turbulence***

1. In this market, customers' preferences change quite a bit over time.  
5    4    3    2    1
2. Customers in this market are very receptive to new product ideas.  
5    4    3    2    1
3. New customers tend to have product-related needs that are different from those of existing customers.  
5    4    3    2    1

### ***Innovations***

Using a total of 100 points, rate the following five product innovation types according to their use in your organization.

- A) \_\_\_\_\_ Cost reduction: slight improvement to reduce cost
- B) \_\_\_\_\_ Minor modification: minor change for improvement
- C) \_\_\_\_\_ Significant upgrade: major change for improvement
- D) \_\_\_\_\_ New-to-industry: exists, new to your company
- E) \_\_\_\_\_ New-to-world: does not exist, totally new 100%

### ***Innovation Issues***

Please indicate your organization's position on the following innovation issues:

(5 = strongly agree; 1 = strongly disagree)

#### ***Customer driven:***

1. Customer input dictates new directions for innovative new products.  
5    4    3    2    1
2. Efforts are made to understand the real future desires of our customers.  
5    4    3    2    1
3. Customer feedback creates new innovative products.  
5    4    3    2    1

#### ***Market driven:***

1. Our organization has a reputation for being highly innovative in the marketplace.  
5    4    3    2    1
2. Our organization studies market trends to determine innovative new products.  
5    4    3    2    1
3. Being first to the market with new innovative products are a driving force for our organization.  
5    4    3    2    1
4. The overall purpose of our innovative new products are to set new markets trends.  
5    4    3    2    1

**Industry driven:**

- 1. In our industry, it is essential to develop innovative new products to survive.  
5      4      3      2      1
- 2. In our industry sector, aging products require new innovative features to maintain market share.  
5      4      3      2      1
- 3. Our industry is well established and highly innovative new products are rare.  
5      4      3      2      1
- 4. Our industry typically follows innovations that other industries develop first.  
5      4      3      2      1

**Competition driven:**

- 1. Competition in our market demands highly innovative new products.  
5      4      3      2      1
- 2. We develop new products to create competitive barriers.  
5      4      3      2      1
- 3. Our organization cooperates with competitors to create innovative new products.  
5      4      3      2      1

**Organizational driven:**

- 1. The culture within our organization enables innovation.  
5      4      3      2      1
- 2. The structure of our organization enables the creation of highly innovative products.  
5      4      3      2      1
- 3. Being innovative in product design is discouraged within our organization.  
5      4      3      2      1

**Business Performance**

Considering your business unit, please rank the following business performance indicators relative to your primary competition: (5 = to a great extent; 1 = to a very little extent)

- 1. Sales growth  
5      4      3      2      1
- 2. Satisfaction with sales growth  
5      4      3      2      1
- 3. Market share gain  
5      4      3      2      1
- 4. Return on corporate investment  
5      4      3      2      1

- 5. Net profit position  
5      4      3      2      1
- 6. ROI position  
5      4      3      2      1
- 7. Customer retention rate  
5      4      3      2      1
- 8. Product quality  
5      4      3      2      1
- 9. New product success rate  
5      4      3      2      1
- 10. Satisfaction with return on sales  
5      4      3      2      1
- 11. Overall position  
5      4      3      2      1

Please respond to the following questions as they apply to you in your organization:

- 1. What is your job title?  
 Business Unit Manager     Program Manager  
 Project Manager             Team Leader  
 Launch Manager             Marketing Manager  
 Other
- 2. How long have you been in this position? (years)  
 Less than 2     11 – 15     26 - 30  
 2 - 5             16 – 20     31 - more  
 6 - 10            21 – 25
- 3. What is your gender? Male \_\_\_\_\_ Female \_\_\_\_\_
- 4. What is your main business?  
 Automotive             Government  
 Manufacturing         Technology  
 Research               Services/Labor  
 Transportation        Communications  
 Utilities                 Other
- 5. How many employees work at your location?  
 Less than 10     101 – 500     5001 – 10,000  
 10-50             501 – 1000    Above 10,000  
 51-100           1001 – 5000
- 6. How long has your organization been in business? (years)  
 Less than 2     11 – 15     26 - 30  
 2 - 5             16 – 20     31 – more  
 6 - 10            21 – 25
- 7. What is the breadth of the operations for your organization?  
 Domestic  
 National  
 Multinational  
 Global