

VIEWING NEW PRODUCT DEVELOPMENT THROUGH THE REAL OPTIONS
LENS: AN EMPIRICAL INVESTIGATION OF MARKET REACTION
AND THE ROLE OF CONTEXTUAL FACTORS

By

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Dedication

To my parents, Lakshmi and Sankara Iyer Natarajan,
for all their love and all their sacrifices for my success in life.

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An Indian proverb in the Sanskrit Language suggests that there are at least four individuals who are responsible for the success of a task and need to get equal credit. These four are the actual person who does the task, the initiator, the sponsor, and the cheerleader of the task. When seen in that light, there are several individuals who have helped me in this dissertation project, and in the bigger project of my earning a Ph.D successfully. It is my foremost duty and responsibility to acknowledge each of them individually. I would especially like to thank all my teachers, committee members, and my fellow doctoral students at UTA. It was a privilege to work with each one of them, and I will treasure my days at UTA for all times to come.

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ABSTRACT

VIEWING NEW PRODUCT DEVELOPMENT THROUGH THE REAL OPTIONS LENS: AN EMPIRICAL INVESTIGATION OF MARKET REACTION AND THE ROLE OF CONTEXTUAL FACTORS

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New product development is an important strategic decision for marketing managers. This study examined new product development related decisions by employing a real options framework. Specifically, new product development decisions are viewed as either an options creation or options exercise process. It evaluated the various types of new product decisions- development of new products, launching of new products, delaying launch of new products and exiting the market by using a real options lens. In doing so, the study sought to answer three research questions:

1. How does the market react to creation and exercise of real options?

2. How do contextual factors such as industry, firm and innovation factors impact the real option process?
3. How do the antecedent industry factors affect the choice of options?

The study examined the real options process beginning with the options creation to the subsequent exercise, along with the market reaction following the announcements of these events. The direct and moderating effects of industry and firm factors were tested.

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CHAPTER 1

INTRODUCTION

“Innovation is the central issue in economic prosperity”- Michael Porter

New product development is an important strategic activity for any business. It is the engine of growth and helps the firm to stay profitable, retain customers, and gain new ones. It also helps companies manage the environmental changes and insulate themselves from competition. Only organizations with a systematic policy of innovation will succeed in the era of “profound transition”(Drucker 1999).

New product development has thus been an important stream of research within marketing and also in other business disciplines like economics, strategic management, and management science. In fact, not long ago, the Journal of Marketing Research devoted a full special issue to this topic(Wind and Mahajan 1997). The literature on new products can be divided into two categories- antecedents and consequences of new product development. The antecedents’ research stream explores the role of different classes of factors like industry, firm and product factors in relation to some aspect of new product performance like success, failure, withdrawals of new products, delays in new products, and pioneering advantages. The literature on consequences of new products looks at different measures of financial performance like market value and profitability.

However, new product development decision making is fraught with uncertainties and high rates of failure. It is said that only three percent of new products developed ever succeed in the market place. The costs of new products have skyrocketed. Thus, newer decision making tools like real options methodology have been popularized by scholars to help managers make better decisions. It is a highly popular methodology owing to its advantages of bringing flexibility to decision making(Amram and Kulatilaka 1999; Dixit and Pindyck 1994; McGrath et al. 2004; McGrath and Nerkar 2004; Miller and Folta 2002; Miller and Park 2002; Miller and Park 2005).

The concept of real options was developed by Myers in 1977. He adapted the concept of financial options to cover real investments and thus helped bring the discipline of finance to strategy. A real option is similar to a financial option in the sense that it allows firms to make initial investments that allow room for future investments(Myers 1977). However, real options deals with real investments like plant, property, or patents instead of financial instruments like bonds or currencies. A small investment in a new product or market will allow the firm to create opportunities for future growth. This reasoning assumes great significance in the context of new product development as it is an inherently uncertain outcome oriented activity. There are cases of real options being used to guide new products in pharmaceutical firms like Merck (Bowman and Moskowitz 2001) and in technological firms like Philips and Intel(Lint et al. 2001; Miller and O'Leary 2005; Pennings and Lint 2000; Pennings and Lint 1997).

The options process has two stages: options creation and options exercise(Rittipant 2005). The creation stage involves making an initial investment that creates a foothold for the firm and gives room for future investments. Options exercise occurs when the firm actually makes the decision. Within the new product development context, option creation occurs when the firm makes an initial investment like research and development or does test marketing (before actual launch), and option exercise occurs when the firm actually decides to launch the product or abandon the product.

There are many types of options and they have been classified into six broad categories(Brach 2003). These are: the option to grow; option to delay; the option to abandon; the option to expand or contract; the option to switch; and the compound option- a combination of any of the above options. In this study, the focus is on growth options, and non-growth options- delay options and exit options. These are the options have been the more commonly studied in practice (Reuer and Tong 2005; Rittipant 2005).

1.1 Focus of Dissertation

The premise of this dissertation is that new product decisions are real options. They are “option-like investments” in the sense of the definition as given by Mcgrath et al (2004). Specifically, new product development decisions are viewed as either an options creation or options exercise process. This study evaluated the various types of new product decisions- development of new products, launching of new products, delaying launch of new products, and exiting the market by using the real options lens.

1.2 Research Questions

The study sought to answer the following research questions:

1. How does the market react to creation and exercise of real options?
2. How do contextual factors such as industry, firm and innovation factors impact the real option process?
3. How do the antecedent industry factors affect the choice of options?

The first research question focused on the consequences of creation and exercise of real options to the firm's market value. The second research question focused on the moderating effect of the contextual variables. The third research question attempted to develop and test the antecedents of choice of options.

The study developed and tested three models to answer these three research questions. The first was a direct model which looked at option value of the firm after it makes announcements regarding options creation and options exercise. The second model is a multi-level one that integrates contextual variables at two levels- industry and firm, and investigates their moderating effects on the relationship between type of option and option value. The third model sets up antecedent variables and identifies the factors that influence the choice of options. The market valuation was measured by the event study methodology (Brown and Warner 1980; Brown and Warner 1985; Fama et al. 1969) and by using the Tobin's Q measure. Previous studies in real options have used Tobin's Q to measure option value(Lee and Makhija 2003a; Lee and Makhija 2003b; Rittipant 2005).

1.3 Significance and Intended Contributions

The intended contribution of this study is manifold. They are:

- 1) It advances the research on new products by using the real options perspective. Real options are a relatively new perspective in the marketing literature and only a handful of studies have been documented (Adams 2004; Dias and Ryals 2002; Haenlin et al. 2006; Miller and Folta 2002; Richards and Patterson 2004). This study hopes to advance the application of the real options perspective to explain and empirically model marketing phenomena. It responded to the call for more empirical studies on real options by its application in a new context of product development decisions. By doing so, it attempts to link option creation, option exercise, contextual variables and market valuation of options.
- 2) In the new product literature, there has been a lot of research on the antecedents and consequences of new products. However, very few research studies have attempted to develop an integrated model. This research developed a multi-level research model and examined the moderating effects of contextual factors.
- 3) Marketing researchers have been urged to pay more attention to financial implications of marketing actions (Hyman and Mathur 2005; Pauwels et al. 2004; Srivastava et al. 1998; Srivastava et al. 1999; Zinkhan and Verbrugge 2000). Specifically, they have been asked to do research that is at the interface of finance and marketing. This research is in the spirit envisaged by these researchers.

1.4 Overview of the Dissertation

The dissertation is organized as follows. Chapter II reviews the literature on real options, the antecedents and consequences of new product development, event study methodology and the theories proposed to be used in the development of the research model. This will provide the background to understand the development of the research models and Hypotheses. Chapter III provides a discussion of the research models, their theoretical underpinnings, and the development of hypotheses. Chapter IV deals with the variables that were used in the study, the measurement issues related to these variables, and the methodologies used for testing the hypotheses.

CHAPTER 2

LITERATURE REVIEW

This chapter reviews the literature available regarding real options, new product development, event study methodology, and organization theory in order to develop the background for the study. The first section discusses the concept of real options, its applications, and its relevance to new product decision research. The second section reviews the literature on antecedents and the consequences of new products and innovation. The third section discusses the organizational theories being used in the development of the research model. The fourth section briefly discusses the interface between marketing and finance. The fifth section discusses the gaps in the literature.

2.1 Real Options

An option is defined as “Right, but not the obligation, to take an action in the future” (Amram and Kulatilaka 1999). A real option refers to options on real assets like physical and intellectual assets. It refers to a firm’s investment in real assets(physical or intellectual assets) which provide opportunity for future investments based on new events and information(Bowman and Moskowitz 2001; Kogut and Kulatilaka 2001). Myers coined the term” real options” in order to refer to applications of options dealing with real (non-financial) investments. He was the first to extend the options reasoning that was developed in the context of financial assets like bonds and currencies to real investments(Myers 1977).

This reasoning attempts to bring the logic of financial market discipline to strategic investment decisions. The advantage of real options is that it gives the right, but not the obligation to undertake future courses of action, thus reducing downside risk while preserving upside opportunities(Bowman and Hurry 1993; Kogut and Kulatilaka 2001). The reason there is a growing interest in this theory is the high level of uncertainty that is experienced by firms in decision making(Reuer and Tong 2005).

The most important criteria for investments to qualify as options is that they must have strict action mandates, sequential investments, and have a priori project abandonment rates(Adner and Levinthal 2004b). According to McGrath et al. , options encompass a variety of phenomenon and can classified under four broad categories. The first one is that of option value. This is encapsulated in the present value of the growth opportunities component of the market value of the firm. The second category refers to specific investments with option-like properties. This is the most widely used in the literature to study phenomenon like joint ventures (Kogut 1991), and governance choices (Folta and Miller 2002). The third category deals with proposals having multiple choices. The last category uses strategy as a heuristic in strategy decisions.

2.1.1 Types of Options

There are basically six broad categories of options(Brach 2003). These are: option to grow; option to delay; option to exit; option to switch scales- expand/ contract; option to switch; and compound option - a combination of any of the above options. The most commonly studied options are growth options. Delay option and exit options have also been studied in more detail(Reuer and Tong 2005; Rittipant 2005). One interesting study

is a dual options study that actually looks at growth options and delay options(Folta and O'Brien 2004).

2.1.2 Antecedents

The antecedents of options are uncertainty, irreversibility, asset value and competition(Dixit and Pindyck 1994; Rosenberger and Eisenhardt 2003). As investments become more uncertain and irreversible, firms need flexibility in investments. The major benefit of using a real options reasoning is flexibility in investments and the possibility of abandoning initiatives(Adner and Levinthal 2004a). Real options tend to be more beneficial in the face of competition and when asset value is high.

2.1.3 Real Options and Financial Options

There are many concepts in real options terminology that are analogous to concepts in financial options literature. A growth option or a delay option is similar to a call option- the option to purchase a product at a given price- whereas an exit option is analogous to a put option- an option to sell the asset at a predetermined price(Janney and Dess 2004).The major difference is that financial options have explicit expiration dates whereas real options rarely have an expiration dates(Adner and Levinthal 2004b; Janney and Dess 2004).

2.1.4 Extant Literature on Options

Table 2.1 provides a concise summary of several studies on real options. These are from different disciplines like marketing, international business, management, management science, and operations research. One can classify the studies into two broad categories: modeling and empirical. Modeling studies illustrate the application of the real

options methodology and demonstrate the mathematical modeling. Empirical studies test some phenomenon by using data. It is evident that many of the studies are of a modeling nature which attempt to explain and illustrate the concept. The number of empirical studies in the literature is small. Again, the number of studies that look at marketing related phenomenon is limited. The empirical studies focus on either performance or antecedents of options. Some of the key dependent variables under investigation include option value of international investments(Lee and Makhija 2003a; Lee and Makhija 2003b; Rittipant 2005), performance of firms with real options investments(Lee and Makhija 2003b), choice of option(Rittipant 2005), timing of options(Miller and Folta 2002), and motivation to invest in real options(Kogut 1991; McGrath and Nerkar 2004; O'Brien et al. 2003). Key independent variables include country, industry and political factors(Rittipant 2005), environmental uncertainty(Lee and Makhija 2003a), industry conditions and valuation of options(Kogut 1991; McGrath and Nerkar 2004), and opportunity and experience(McGrath and Nerkar 2004).

Table 2.1 Summary of Literature on Real Options

Study	Discipline / Type	Phenomenon Investigated
Haenlin et al. (2006)	Marketing / Modeling	Abandonment of Unprofitable Customer
Rittipant (2005)	International Business / Empirical	International Investments
Ford and Sobek (2005)	Engineering Management/ Modeling	New Product Development
Reuer and Tong (2005)	International Business / Empirical	International Investments
Santiago and Bifano (2005)	Engineering Management/ Modeling	Management of R&D Projects
Richards and Patterson (2004)	Economics/ Modeling	Slotting Allowances
Adams (2004)	Marketing	Purchasing and Selling Decisions
McGrath and Nerkar (2004)	Strategy/ Empirical	R&D Investments
Vassolo (2004)	Strategy/Empirical	Alliances
Hu (2004)	Management/Modeling	New Product Valuation
Lee and Makhija (2003a; 2003b)	International Business /Empirical	International nvestments
O'Brien et al. (2003)	Entrepreneurship /Modeling	Market Entry of Entrepreneurs
Dias and Ryals (2002)	Marketing/Modeling	Brand Investments and Brand Extensions
Benaroch (2002)	Information Systems	IT Investment Risk
Huchzermeier and Loch (2001)	Management Science/Modeling	Project Management under risk
Pennings and Lint (2000)	Operations Research/Modeling	Market Entry for New Products
Pennings and Lint (1997)	Operations Research/Modeling	R& D Investments
Bollen (1999)	Management Science/ Modeling	Product Life Cycles
Cortazar et al. (1998)	Management Science/Modeling	Environmental Investments
Kogut (1991)	Management Science/Empirical	Joint Ventures

2.1.5 New Product Development as Real Options

This study is based on the premise that new product decisions are real options created and exercised by firms. The reasons are as follows:

1) The high degree of uncertainty and irreversibility in decision making

Real options are well suited for decisions involving a high degree of uncertainty and irreversibility in decision making (Amram and Kulatilaka 1999; Bowman and Moskowitz 2001). New product development is an activity characterized by a lot of uncertainty. The investments in research and development and product development are irreversible. The scope of investment is fixed. Hence, the investments have to be done with a lot of planning and care. Real options thinking has been advanced to provide product development managers with a lot of flexibility in R&D investments (McGrath and Nerkar 2004; Schwartz 2004).

2) New Product Development follows a sequential pattern of decision making

Product development usually follows a sequential pattern of decision making. It starts with product concept testing and test marketing. This type of sequential decision making is well suited for approximating a real options approach. We can think of new product decision making as an “option like” investment as defined by McGrath et al (2004).

3) Prior Literature

There are prior studies in the literature that have looked at new product investments as a real options process. These include modeling studies, patents and R&D as real options (Pennings and Lint 1997; Schwartz 2004), product development

studies(Ford and Sobek 2005), and empirical studies on R&D investments(McGrath and Nerkar 2004). The real options reasoning has been extensively used to study international investments -market diversification. Hence, it is argued that this logic can be extended to new product development investments (product diversification). Apart from this, there are numerous examples of companies that use real options reasoning in their product development decisions. Examples include Merck(Bowman and Moskowitz 2001), Philips(Lint et al. 2001; Pennings and Lint 2000; Pennings and Lint 1997) and Intel(Miller and O'Leary 2005).

2.2 New Product Development

The research stream on new product development can be broadly classified into two categories. The first stream is focused on the antecedents of innovation/new product success. The second stream focuses on the consequences of innovation/new product development. Literature from both these streams is summarized and presented in the subsequent section.

2.2.1 Antecedents of New Product Development

Table 2.2 provides a synopsis of the antecedents of new product development process. These studies come from both marketing and management literature. Studies in marketing have basically looked at organization factors like the marketing orientation of the firm and innovation factors like product innovativeness as antecedents(Calantone and Cooper 1981; Calantone et al. 2003b; Calantone et al. 1997; Calantone et al. 1996; Calantone et al. 1995; Wu et al. 2004). The reason is that these organization and product factors are easier to control(Calantone et al. 1996). In the case of management literature,

the key antecedents seem to be industry factors like environment and competition and top management factors(Ancona and Caldwell 1992; Bantel and Jackson 1989; Camelo-Ordaz et al. 2004; Kessler and Chakrabarti 1996; Li and Kwaku 2001; Miller and Friesen 1983). The outcome variables that have been investigated include: new product success(Cooper 1994a; Cooper 1999; Di Benedetto 1999; Henard and Szymanski 2001; Sivadas and Dwyer 2000), new product performance(Calantone et al. 1997; Gatignon and Xuereb 1997), new product project outcomes(Dwyer and Mellor 1991), risks of survival, delays(Chrysochoidis and Wong 1998; Wu et al. 2004), innovation speed(Kessler and Chakrabarti 1996), organization innovation(Ozsomer et al. 1997; Weerawardena et al. 2006), new product failure(Redmond 1995), innovative capacity(Camelo-Ordaz et al. 2004), and product deletion(Hart 1988). A summary of this literature leads one to conclude that the following important set of factors are relevant antecedent variables that affect the outcome of new product development. These factors are environmental factors, competition, management factors, market orientation of the firm, order of entry, top management factors, and innovation factors.

Table 2.2 Summary of Representative studies on Antecedents of New Products

Study	Key Results
Min et al (2006)	Market pioneers have higher failure rates than early followers in really new product- markets. Market pioneers have lower survival risk than early followers in incrementally new product-markets.
Weerawardena (2006)	Organization learning mediates the industry structure-innovation link.
Pujari et al.(Pujari et al. 2004)	Functional interface, top management support, and environmental strategy are antecedents of environmental product policy.
Wu et al. (Wu et al. 2004)	Antecedents of delay of pre-announced products include: competition, cannibalization possibilities, market dominance, partner power, top management interest, innovativeness of product, and inter-functional co-ordination within departments.
Camelo-Ordaz et al.(2004)	Functional diversity is a major influence on innovation. Consensus on innovation within top management is an important moderating factor.
Calantone et al.(2003b)	Environmental turbulence had a direct and indirect antecedent role in new product development processes.
Henard and Szymanski(2001)	Meta analysis of new product performance. Key predictors of new product success include: product advantage, meeting customer needs, dedicated resources, and proficiencies in pre-development tasks.
Schatzel et al.(2001)	First mover predisposition, reputation building, information interactivity, buyer involvement, industry innovativeness ,and competitive hostility of a firm were predictors of its pre-announcing behavior.
Sivadas and Dwyer (2000)	Competency in co-operation is the major antecedent of new product success in alliances. Market characteristics were found to moderate this relationship.
Roberts (1999)	High innovative propensity leads to sustained profit persistence.
Bayus et al.(1997)	Study looks at the optimal time of entry into the market. Important antecedents of order of entry effects for a firm are its understanding of its market and its competitors.
Gatignon and Xuereb (1997)	Investigates the link between strategic orientation and new product performance.

Table 2.2: Continued

Calantone et al. (1997)	Environmental hostility was found to moderate the new product activity- performance link.
Ozsomer et al. (1997)	Organization structure, firm strategic posture, environmental hostility and environmental uncertainty affect firm innovation.
Calantone et al. (1996)	Cross- national study. New product resources, proficiency in marketing and technical activities, and understanding of market and competition leads to new product success.
Mishra et al. (1996)	Antecedent of new product success in South Korean firms was found to be market intelligence, nature of new product idea, product innovativeness, and launch effort.
Kessler and Chakrabarti (1996)	Antecedents of speed of innovation are environmental factors, and competition.
Redmond (1995)	Environmental factors, specifically overcrowding, was found to explain product failure rates.
Cooper (1994b)	Factors affecting new product success were a strong cross-functional team, strong market orientation, product definition, and product superiority.
Cooper and Kleinschmidt (1993)	Important predictors of new product success were product innovativeness, order of entry, stage of product lifecycle and competition.
Ancona and Caldwell (1992)	Functional diversity in new product teams led to good communication across departments, which in turn led to good innovation ratings.
Zirger and Maidique (1990)	Key factors affecting new product outcomes are R&D organizational quality, technical performance of the product, product's value to customer, synergy of new product with existing competencies, and management support.
Bantel and Jackson (1989)	Top management composition is a major influence on innovations in banking.
Hart (1988)	Causes of product deletion include external factors (environment, government policies), performance, logistics, resources, competition and image/quality issues.
Miller and Friesen (1983)	Environment influences the innovation process.

2.2.3 Consequences of New Product Development

There have been numerous studies of the consequences of new products and product innovation. They have been summarized in Table 2.3. The key consequences of innovation are financial. The most important outcome variable is market value of the firm. The event study methodology has been the most widely used choice of analytical technique. The general conclusion that can be drawn from this literature is that announcements of new products lead to a positive valuation(Chaney and Devinney 1991; Hu 2004; Koku et al. 1997; Sharma and Lacey 2004). Delays in new products lead to a negative valuation(Hendricks and Singhal 1997). Product recalls and exits also have a similar impact on the stock prices(Ahmed et al. 2002; Davidson III and Worrell 1992). Only one study has focused on the impact of new products on the profitability and persistence of profits(Bayus et al. 2003). The important industry contexts that have been chosen are pharmaceuticals(Ahmed et al. 2002; Sharma and Lacey 2004) and automobiles(Pauwels et al. 2004).

Table 2.3 Summary of Studies on Consequences of New Products / Innovation

Study	Key Research Questions Methodology/ Dependent Variable	Key Results
Chaney and Devinney (1991)	<ul style="list-style-type: none"> • Seminal work. • Investigates the impact of new product introduction on the stock prices of the firm • Event Study 	<p>New Product announcements have a positive impact on firm's value.</p> <p>Valuation varies across industry and is more pronounced in technology intensive industries.</p> <p>Announcements of new products have a larger impact than announcements of repositioned products.</p>
Davidson III and Worrell(1992)	<p>Investigates the effect of product withdrawals on the shareholder wealth</p> <ul style="list-style-type: none"> • Event study 	<p>Product withdrawal had a negative effect on shareholder wealth.</p>
Roberts (1999)	<p>Explores the relation between competition, innovation, and persistence of profits.</p>	<p>High innovative propensity leads to superior profits, but not profit persistence.</p>
Hendricks and Singhal (1997)	<ul style="list-style-type: none"> • Study looks at the impact of delay in introduction of new products. • Event Study 	<p>Delays in introduction lead to a decrease in market value.</p> <p>Predictors of the market reaction include: Diversification of the firm. Competitiveness of the firm.</p>

Table 2.3: Continued

Koku et al.(1997)	<ul style="list-style-type: none"> • Investigates the impact of new product announcements and pre - announcements on the firm's value. • Event Study 	Only preannouncements had an impact on the stock prices.
Lee et al.(2000)	<ul style="list-style-type: none"> • Investigates the effects of order of entry and timing on durability of new product valuation. • Event Study 	Timing and order of entry were useful predictors of durability of new product advantages
Ahmed et al. (2002)	<ul style="list-style-type: none"> • Study of the effect of drug withdrawals on market value of the firms. • Event Study 	Drug withdrawals had a negative impact on the market value of a firm
Bayus et al.(2003)	<ul style="list-style-type: none"> • Econometric Modeling 	New products have a positive effect on profit rate. No effect on profit persistence.
Pauwels et al. (2004)	<ul style="list-style-type: none"> • Investigates the impact of new product introductions on : top-line performance (revenue), bottom-line performance(Profits) and investor performance in the automobile industry. • Time Series Analysis • Vector Auto Regressions • Event Study 	<p>New product introductions have a positive impact on top-line performance, bottom- line performance as well investor performance.</p> <p>Impacts of new products on each of the performance measures was persistent over time Investors reward innovative firms with a premium in valuation of the firms.</p>

Table 2.3: Continued

<p>Hu (2004)</p>	<ul style="list-style-type: none"> • Investigates the wealth impact of new product announcements • Investigates the factors that influence the valuation of firms. • Event Study 	<p>New product introductions have significant wealth impact.</p> <p>The valuation varies across stock exchanges.</p> <p>Introduction impact also varies by market conditions. In weaker market, they are received less favorably as compared to stronger markets.</p> <p>Volatilities embedded in the innovations are favorably received by investors.</p>
<p>Sharma and Lacey (2004)</p>	<ul style="list-style-type: none"> • Links the outcomes of product development to market valuation. • Event Study 	<p>Success results in a positive valuation.</p> <p>Failure results in negative valuation.</p>

2.3 Marketing –Finance Interface

Researchers in the recent past have taken a lot of interest in research that is at the interface of finance and marketing(Srivastava et al. 1998; Srivastava et al. 1999) Two of premier journals namely Journal of the Academy of Marketing Science and Journal of Business Research had special issues on this issue in the recent past(Hyman and Mathur 2005; Zinkhan and Verbrugge 2000). The rationale underlying this is that marketing thoughts need to get institutionalized in organizations. The route to such institutionalization lies in convincing and energizing managers about actions(Srivastava et al. 1998).The link between marketing and finance become critical as firms need to demonstrate stakeholder value(Srivastava et al. 1999; Zinkhan and Verbrugge 2000). Pauwels et. al. (2004) call for more research oriented towards understanding the consequences of marketing actions.

2.4 Theories employed in the study

This section reviews the theories that will be employed to develop the hypotheses. All of the theories are from the organization theory literature. The theories proposed for use are population ecology, resource dependence, resource based view and upper echelons theory.

2.4.1 Population Ecology

Population ecology theory is focused on explaining the resources available to organizations, and the emergence and decline of populations of organizations(Aldrich 1979; Hannan and Freeman 1977; McKelvey and Aldrich 1983). It offers an adoptive

ecological perspective. The unit of analysis is population of organizations. The theory predicts that organizations that adapt to their environment will survive and those that do not will perish. It has been used to explain phenomenon like the expansion of educational organizations(Nielson and Hannan 1977) and the evolution of products and markets(Lambkin and Day 1989).

2.4.2 Resource Dependence Theory

Resource dependence theory posits that organizations depend upon each other for their resources and survival(Mindlin and Aldrich 1975; Pfeffer 1972a; Pfeffer 1972b). Thus, organizations need to be studied in the context of the population in which they exist, and share resources. Organization behavior can be understood in terms of the motivation of an organization to either avoid dependence on others or to make others dependent on itself(Mindlin and Aldrich 1975). It has been used in numerous studies like size, composition and function of board of directors(Pfeffer 1972b; Pfeffer 1973); mergers(Pfeffer 1972a); subsidiary politics in multinationals(Blumentritt and Nigh 2002); governance in marketing channels(Heide 1994); export channels(Raven et al. 1994; Tesfom et al. 2004); joint ventures(Pfeffer and Nowak 1976); manufacturer supplier relationships(Joshi and Campbell 2003),and alliance-based outsourcing(Murray et al. 2005).

2.4.3 Resource Based View of the firm

The focus of the resource based view is to explain how firms can earn sustainable rents. Firm level determinants, especially resources are a major determinant of

sustainable competitive advantage(Barney 1991; Penrose 1959; Wernerfelt 1984). Resources can be used to earn competitive advantage if they are valuable, rare, imperfectly imitable , and non-substitutable(Barney 1991). This theory has been used in numerous studies like corporate incubators(Gassmann and Becker 2006), impact of dynamic capabilities on new product project performance(Ho and Tsai 2006), innovations in information, and supply chain management(Kim et al. 2006); dynamic capability and market orientation(Menguc and Auh 2006); information system and customer service process(Ray et al. 2005);market valuation of joint ventures sell offs(Meschi 2005),export performance(La et al. 2005); market based assets(Srivastava et al. 2001), privatization(Makhija 2003) , and strategic change and performance(Kraatz and Zajac 2001).

2.5 Event Study Methodology

Event study methodology is a highly popular methodology and it originated from the seminal paper by Fama, Fisher, Jensen and Roll in 1969. They examined the effect of the announcement of a stock split on stock prices. After this paper, this methodology was used extensively in finance in the seventies and afterwards; in management, starting from the eighties ;and percolated into the disciplines of marketing, international business, and information systems in the nineties. The basic idea inherent in the methodology is to capture the effect of an event- a public announcement of a corporate action. The methodology is essentially an econometric mechanism for isolating the impact of an event on security prices(MacKinlay 1997). Figure 2.1 provides a visual representation of the methodology.

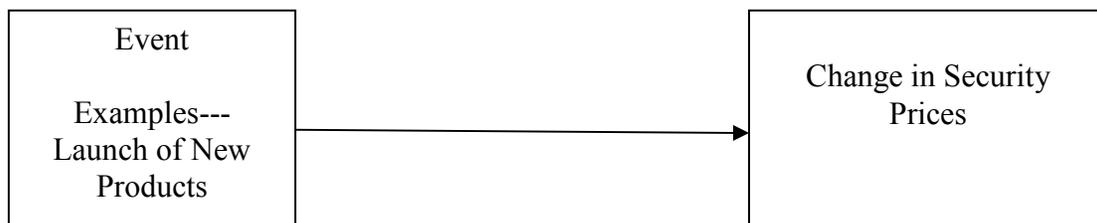


Figure 2.1 Basic idea of Event Study Methodology (Fama, Fisher, Jensen and Roll; 1969)

2.5.1 Efficiency of Capital Markets

The methodology is based on the premise of efficiency of capital markets which was propounded by Fama. The basic idea inherent in this principle is that markets are efficient- prices reflect all available information (Fama 1970). Thus, any additional changes in price levels in the market after an intervening event are owing to the event itself. This is because the market will adjust to the additional information. Hence, a study of changes in price levels after an event will help in providing an understanding of the market reaction to the event. This methodology has found numerous applications in diverse disciplines like economics, finance, accounting, human resources management, strategic management, international business, information systems, and marketing. Table 2.4 provides a concise summary of a few representative studies employing the event study methodology.

2.5.2 Advantages of Event Studies

The advantages of event studies as a methodology are:

1. The data comes from markets. It is based on real world data. Thus, it is more reliable(McWilliams and Siegel 1997).
2. Owing to ready availability of data, it is simple to implement.

2.5.3 Key Assumptions of Event Study Methodology

There are three assumptions in event studies (McWilliams and Siegel; 1997). These are:

1. Efficiency of Markets:

The efficiency of markets is a fundamental premise of the methodology as explained already. The basic idea is that markets absorb all information that is available to them and utilize it (Fama 1969, Fama 1970). Thus, any new information creates changes in the market's equilibrium as the markets adjust to the new information.

2. Unanticipated Events:

The methodology treats any new announcement as a shock to the system-meaning that there is no anticipation about the event. If there is leakage of information about the event prior to the event, then markets being efficient, would have already absorbed the same. Any measured changes in a stock price after an event would be a discounted measure owing to the prior leakage of information and prior adjustments by the markets.

3. Absence of Confounding Events:

Researchers are examining the isolated impact of a distinct event on the market by studying changes in price levels. They assume that there are no other events in the

intervening time period. Thus any changes in the price levels are owing to the event under study.

2.5.4 Extant Literature on Event Studies

Table 2.4 provides a representative sample of event studies in the literature. This methodology has been employed in multiple disciplines like economics, finance, and strategy, as well as marketing. It is popular in researching topics that lend themselves to public announcements like stock splits, dividends, litigation, brand extension, international investments, and new products.

Table 2.4 Event Studies: A Representative sample

Study	Event under Consideration	Discipline
Fama et al.(1969)	Announcement of stock splits	Finance
Binder (1985)	Announcement of Regulations	Economics / Law
Horsky and Swyngedouw (1987)	Changes in Company Name	Marketing
Eliashberg and Robertson (1988)	Announcements of Key Executive Sucession	Marketing
Davidson III et al. (1990)	Announcement of Layoff	Strategic Management
Worrell et al. (1991)	Announcements of Key Executive Sucession in Bankrupt Firms	Strategic Management
Davidson III et al.(1993)	Announcement of Celebrity Endorsers	Strategic Management
Agrawal and Kamakura (1995)	Announcement of Capacity Expansion	Marketing
Hendricks et al.(1995)	Announcement of Brand Extensions	Operations / Management Science
Lane and Jacobson (1995a)	Announcement of Corporate Social Investments	Marketing
McMillan (1996)	Announcement of Dividend Increases	Business Ethics
Impson (1997)	Announcement of Strategic Alliances	Finance
Das et al (1998)	Passage of Industry related regulation	Strategic Management
Ghani and Childs (1999)	Announcement of Corporate Environmental Initiatives	Marketing
Gilley et al. (2000)	Termination of Advertising Agencies	Strategic Management
Hozier, Jr and Schatzberg (2000)	International Join Venture announcements	Marketing / Advertising

Table 2.4 Continued

Hanvanich and Cavusgil (2001)	Announcement of E- commerce Initiatives	International Business
Subramani and Walden (2001)	Announcement of Information Technology Investments	Information Systems
Chatterjee et al.(2002)	Announcement of Internet Marketing Channel Additions	Information Systems
Geyskens et al (2002)	Announcement relating to Internet Security Breach	Marketing
Cavusoglu et al.(2004)	Announcement of ISO-9001 quality certification	E-Commerce
Corbett et al.(2005)	Litigation related to tobacco companies	Management Science

2.6 Key Gaps in the literature

Based on the review of literature, the following are the key gaps:

1. Lack of empirical studies in real options

Researchers have called for more empirical research in real options. This would enable more theoretical relationships to be tested and validated. Such studies will also increase the understanding of real options. The impact of real options on firm performance and firm flexibility is one particular area where more studies are needed.

2. New product development and real options

Most empirical research in real options has been done in the context of new markets-international diversification. Only one empirical study has looked at new product development. Hence, research on new products as real options is needed.

3. Market valuation of new product development- role of contextual factors

In the past, empirical studies on the market valuation of new products have focused on the direct effects of new products. The role of contextual factors has not been explored in the past. Hence, this is fertile ground for research and for contributing to the literature.

4. Finance and Marketing- Interface

Marketing researchers have been urged to demonstrate the financial implications of marketing activities(Pauwels et al. 2004; Srivastava et al. 1998; Srivastava et al. 1999). Such research would help in convincing top managers and finance personnel about the benefits of marketing actions to the firm value. It will help in getting more support and cooperation for marketing activities.

CHAPTER 3

RESEARCH MODEL AND HYPOTHESES DEVELOPMENT

This chapter discusses the research model. The first section discusses the direct effects of the options creation and the options exercise processes. The second section discusses the moderating effects of industry and firm factors on the new product option valuation process. The third section discusses the antecedent model and develops the hypotheses that relate the predictor variables to the likelihood of the type of option being exercised.

3.1. Direct Model of Options Valuation

This model deals with the direct reaction to options creation and options exercise. It is summarized in figure 3.1.

3.1.1 Market Reaction to Option creation:

Real options provide the firm flexibility in investment, while allowing it protection against risk. Thus, the announcement of an initial new product investment will be viewed positively by the market. Creation of options enables the firm to maintain operational flexibility. If a firm announces a huge investment in new products at one time, it will increase the risk and decrease the flexibility of the firm. Real options allow firms to leverage the second mover advantage (Cottrell and Sick 2002). A firm can wait

and watch and thus learn from the first mover. Hence there are benefits in creating options and holding onto them. Hence, we have this hypothesis:

H₁: Options creation leads to positive market reaction.

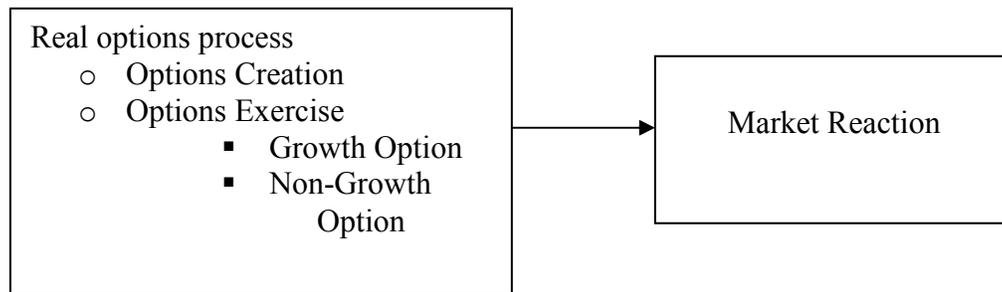


Figure 3.1 Direct Model of Options Valuation

3.1.2 Options Exercise

A review of the literature suggests that different types of options exercise evoke different reactions(Adner and Levinthal 2004b). Growth options have a positive connotation whereas delay and exit options have a negative connotation. Exercise of a growth option suggests that the firm is on its way to successfully leveraging the option created. On the other hand, non-growth (delay and exit) options seem to suggest a lack of success in the initial investment. Prior event studies also suggest that announcement of new products is received favorably by the market(Chaney and Devinney 1991; Sharma and Lacey 2004). On the contrary, delays and exits (product withdrawals, product recalls) have been received with a negative market reaction(Ahmed et al. 2002; Davidson III and Worrell 1992; Hendricks and Singhal 1997; Sharma and Lacey 2004). Thus, based on the above perspectives, the following set of hypotheses is derived:

H₂: Options exercise by employing growth options leads to positive market reaction.

H₃: Options exercise by employing non-growth options leads to negative market reaction.

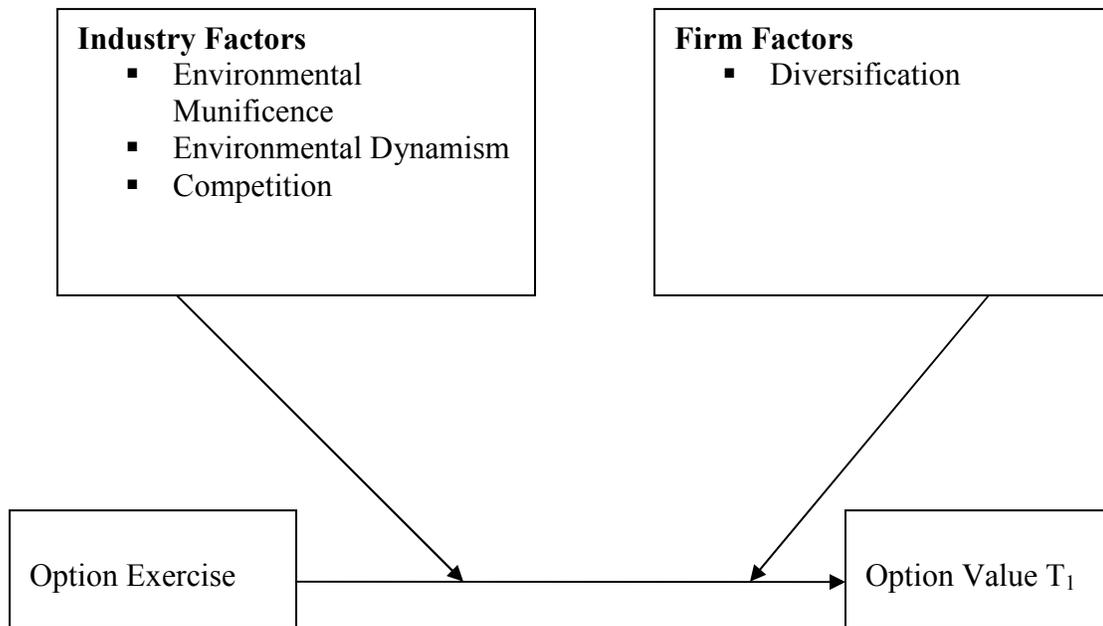


Figure 3.2 Moderating Effects Model

3.2 Moderating Model

3.2.1 Rationale for the model

The moderating and antecedent models have been developed by a review of literature from economics, management, organization theory, marketing, product development and real options literature. There are two classes of moderating factors and two classes of

antecedent factors that are sought to be investigated. The rationale for choosing each of the factors is explained below.

1. Industry Factors

There have been numerous studies in the literature that have looked at the industry level determinants of innovation. Population ecology theory (Hannan and Freeman 1977) and the resource dependence view suggest that environment is a significant determinant of firms' structure and performance. There is a lot of empirical evidence that documents the strong effect of environment on innovation and performance (Calantone et al. 2003a; Calantone et al. 1997; Danneels and Sethi 2003; Droge and Calantone 1996; Goll and Rasheed 2005; Goll and Rasheed 1997; Kessler and Chakrabarti 1996; Miller and Friesen 1983; Ozsomer et al. 1997; Redmond 1995). The relationships that have been investigated include both direct and indirect (moderating) types. Competition has been analyzed as an exogenous factor in several studies in economics and strategy on innovation, and hence, is included in the model (Afuah 2000; Ahmed et al. 2002; Athreye 2001; Bayus et al. 1997; De Figueiredo and Kyle 2006; Gatignon and Xuereb 1997; Roberts 1999).

2. Firm Factors

Firm factors have been viewed as more important determinants of organizational strategies and outcomes according to the resource-based view. The resource-based view suggests that firm factors and resources are also important determinants of a firm's competitive advantage and performance (Barney 1991). Hence, the important firm level

determinants are included in the model. There is evidence that diversification of the firm is an important determinant of the financial consequences of its new product development(Hendricks and Singhal 1997).

Hypotheses Development

3.2.2 Environmental Munificence

Firms operate in an ecological system and are dependent on the environment for resources like labor, material, and capital(Aldrich 1979; Aldrich 1976; Hannan and Freeman 1977). Munificence is a measure of resources available in the environment and the ability to sustain the growth of an organization(Aldrich 1979; Dess and Beard 1984). In environments with higher levels of munificence, more resources are available to sustain the growth. Hence, the consequences of innovations are more positive. Thus, one can argue:

H_{4A}: The market reaction to the exercised growth options will be higher in a more munificent industry as compared to a less munificent industry.

H_{4B}: The market reaction to the exercised non-growth options will be lower¹ in a less munificent industry as compared to a more munificent industry.

3.2.3 Environmental Dynamism

Environmental dynamism measures the rate of change, unpredictability ,and chaos embedded in the environment(Dess and Beard 1984). The sources of dynamism

¹ In case of non- growth options, the reaction is negative and hence lower market reaction implies that it is less negative.

include changes in customer preferences and in customers, changes in technologies ,and change in competition(Miller 1988). These changes would mean that some of the existing products would become obsolete and there would be a need for new products. The changes would actually be a catalyst for new products and need for innovation. Dynamism also increases the risk-taking by top managers, leading to higher innovation speed and , consequently, higher performance(Calantone et al. 2003b). Hence:

H_{5A}: The market reaction to the exercised growth options will be higher in a more dynamic industry as compared to a less dynamic industry.

H_{5B}: The market reaction to the exercised non-growth options will be lower in a less dynamic industry as compared to a more dynamic industry.

3.2.4 Competition

As competition increases, firms would need to develop sources of competitive advantage. New products are a source of competitive advantage and can help in contributing to the bottom-line of the firm. New products rank higher on the dimensions of competitive advantage as they are more valuable, rare, and less likely to be imitated and substituted(Barney 1991). The market would place a higher premium on innovation. Hence, in a competitive environment, the market valuation of new products would increase.

H_{6A}: The market reaction to the exercised growth options will be higher in a more competitive industry as compared to a less competitive industry.

H_{6B}: The market reaction to the exercised non-growth options will be lower in a less competitive industry as compared to a more competitive industry.

3.2.5 Diversification

A diversified firm operates in many different industry segments. Consequently, the risk is well spread out and the firm obtains market power (Datta et al. 1991; Montgomery 1982; Montgomery and Wernerfelt 1988; Palepu 1985). Hence, the effect of exercise of an option will be dependent on the level of diversification. As the level increases, the market will be less sensitive to individual product announcement. (Hendricks and Singhal 1997) did an event study on the impact of delays in new products. They found that firms that had a higher level of diversification experienced smaller loss in market value as compared to firms with a lower level of diversification. Consequently,

H_{7A}: The market reaction to the exercised growth options will be lower for a more diversified firm as compared to a less diversified firm.

H_{7B}: The market reaction to the exercised non-growth options will be lower for a less diversified firm than for a more diversified firm.

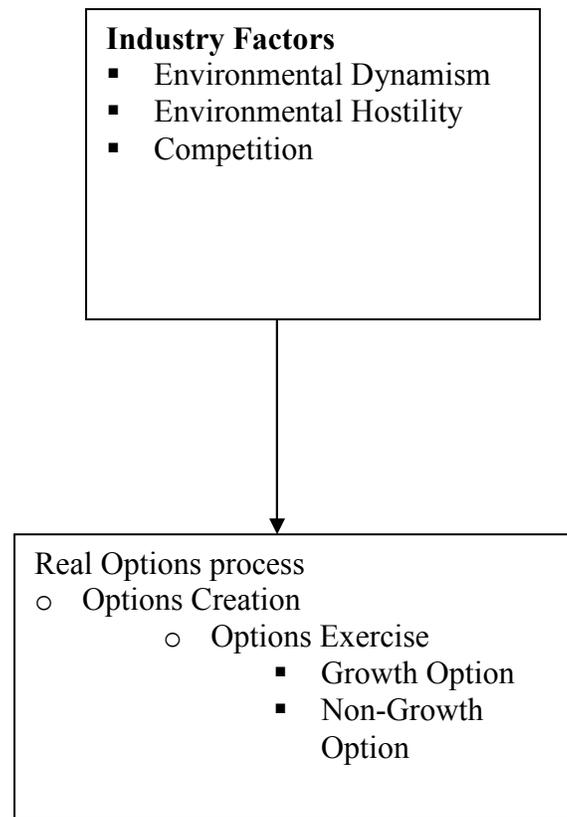


Figure 3.3 Antecedents of the Real Option Process

3.3 Antecedent Model

The above model is again developed by drawing upon the prior literature on antecedents of innovation. The focus is on identification of a parsimonious set of predictors that can yield good insights into the new product decision process. In this model, only industry and firm factors are considered. Innovation factors, though relevant, are not included owing to operational and methodological considerations.

3.3.1 Environmental Munificence

A munificent environment abounds in opportunities for growth(Castrogiovanni 1991). There are more resources and slack available in the system. Investors and board of directors are more likely to support investment. Firms would also be buoyant and be willing to invest without risks. Hence, we derive the hypothesis,

H_{8A}: Higher levels of environmental munificence would result in higher likelihood of growth options as compared to delay/exit options.

3.3.2 Environmental Dynamism

Under conditions of high environmental dynamism, firms would like to maintain operational flexibility by creation and exercise of options. Firms would have to wait and watch before making cautious investments. The need for risk-taking behavior by top management increases(Calantone et al. 2003b). Product development time becomes faster(Kessler and Chakrabarti 1996) and the willingness of the firm to cannibalize would increase. But at the same, the risk of failure would also increase. Hence we have:

H_{8B}: Higher levels of environmental dynamism would result in higher likelihood of delay/exit options as compared to growth options.

3.3.3 Competition

Competition is an important determinant of success of new products. In the absence of competition, firms would have monopolistic advantages and would not need to invest in innovation. In a highly competitive industry, there would be higher pressures and challenges to innovate and grow. Competitive pressure would force firms to

aggressively pursue growth strategies. If companies pursue growth strategies and launch new products, they will have pioneering advantage(Kalyanaram et al. 1995; Kalyanaram and Urban 1992) and consequently will gain market share(Agarwal and Gort 2001).

Hence, in highly competitive industries, the likelihood of a firm employing a new product strategy is higher. Therefore:

H_{8C}: Higher levels of competition would result in higher likelihood of growth options as compared to delay/exit options.

CHAPTER 4

RESEARCH METHODOLOGY

This chapter discusses the sources of data, the sample, measurement of variables, and the techniques of data analysis that will be employed for the proposed study. It has been divided into three subsections. The first section describes the design of study and the sample. The second section provides an explanation of the independent, dependent and control variables. The third section discusses the statistical techniques that were employed to test the hypotheses.

4.1 Data Collection

4.1.1 Data Sources

Archival data were employed for the testing of hypotheses. The data for this study was obtained from multiple archival data sources. The announcements relating to new product development will be obtained from the Lexis-Nexis database. The data relating to the stock prices was obtained from the CRSP (Center for Research in Security Prices) database maintained by the University of Chicago. This organization maintains a comprehensive collection of security price, return, and volume data for the NYSE, AMEX, and NASDAQ stock markets. The industry-level data was obtained from the Survey of Manufacturing and Census of Manufactures and the firm-level data was obtained from the Compustat database. This database from Standard & Poor's provides data relating to annual and quarterly Statement, Balance Sheet, Cash Flows, and

supplemental data items on a large group of publicly held companies. The interface developed by WRDS (Wharton Research Data Services) will be employed as the common interface to access CRSP and Compustat databases. This simplified the matching of companies between these two databases. The ticker symbol of the company served as the common identifier. Using the ticker symbol, the information on the PERM number and NAICS (North American Industrial Classification System) code was obtained from Compustat database. Each announcement was given a case number based on the date of occurrence. The earliest announcement was coded as 1. Table 4.1 provides a summary of the variables and their data sources.

Table 4.1: Summary of the Variables

SUMMARY OF THE MODEL	TYPE	MEASURE	SOURCE
Independent Variables			
Industry factors			
Environmental Munificence	Continuous	Sales Growth Rate	Survey Of Manufactures
Environmental Dynamism	Continuous	Variance of Sales Growth Rate	Survey Of Manufactures
Competition	Continuous	Herfindalls Index	Compustat
Firm Factors			
Diversification	Categorical	Entropy Measure	Compustat
Dependent Variables	Categorical	Content Analysis and Coding	
Type of Option Exercised			
Growth	Categorical	Content Analysis and Coding	Announcements (Lexis) and company website
Non Growth	Categorical	Content Analysis and Coding	Announcements (Lexis) and company website
Option Creation Value			
Return on Stock following option creation announcement	Continuous	Abnormal Returns	CRSP
Tobin's Q	Continuous	Standard Measure	Compustat
Option Exercise Value			
Return on Stock following option exercise announcement	Continuous	Abnormal Returns	CRSP
Tobin's Q	Continuous	Standard Measure	Compustat

4.1.2 Sample

The population for the study included all publicly listed firms on the database and a sample of these firms was chosen for the study. The time period for the study was from the year 1998 to 2005. The year 1998 was chosen as the start as that was the year in which the NAICS system was adopted. Prior to this, the SIC system was in vogue. This eight year time frame enabled the study to look at a good sample of announcements and also guarded against the confounding effects of political events, which increased the validity of the study.

4.1.3 Sample Size

The sample size was calculated by employing a power analysis for multiple regressions. The minimum sample needed for regression analysis with p predictor variables should exceed eight times the number of predictor variables plus 50(Green 1991).

$$N > 50 + 8(P).$$

In, this study, the number of predictor variables is 4.

$$N > 82$$

Thus, a sample size of 135 announcements was chosen. Only 78 of these were used owing to missing data considerations. The final set of announcements is summarized in Appendix C.

4.2 Definition and Measurement of Key Variables

4.2.1 Independent Variables

This section provides a discussion of definition and operationalization of key variables used in the study.

1) Industry factors

i) Environmental Munificence

Munificence is a measure of the ability of the environment to sustain the growth of the organization (Aldrich 1979; Dess and Beard 1984). It is measured as the growth rate in the value of sales in a given time period (Dess and Beard 1984; Goll and Rasheed 2004; Goll and Rasheed 1997; Rasheed and Prescott 1992; Wiersema 1992). An eight year time period (1998-2004) was chosen. A regression using the dollar value of sales for the industry as the independent variable and time as the dependent variable was performed. Industry sales data was obtained from the Survey of Manufactures for the four digit NAICS level of aggregation. The beta-coefficient (slope) that is obtained is the measure of the environmental munificence for the industry.

ii) Environmental Dynamism

Dynamism is a measure of rate of change, unpredictability, and chaos embedded in the environment (Dess and Beard 1984). Industry sales data was obtained from the Survey of Manufactures for the four digit NAICS level of aggregation. It is measured by the variance in the sales of the industry in a given time period following Goll and Rasheed (1997). The sales data was obtained from the Survey of Manufactures for the four digit

NAICS level of aggregation. The standard error of the regression of sales over time is used as the measure of dynamism of the industry.

iii) Competition

Competition refers to the industry rate of competition. It is measured by using the Herfindahl's index. This is the sum of the squared market shares of the firms in the industry (Schmalensee 1977). In this measure, firms with higher market shares get more relative weight as they are squared. The formula for computation of H is as follows:

- $H = \sum (S_i)^2, i = 1, n$
- H: Herfindahl Index
- S_i : Market Share of i^{th} firm
- n: the number of firms in the industry

Higher values of H indicate greater concentration. This measure is employed by the Department of Justice in cases concerning monopoly and antitrust regulations. It has been popular in the marketing literature (Anderson et al. 2004; Rao et al. 2004; Simon and Sullivan 1993). Herfindahl's indices were obtained from the Census of Manufactures for the four-digit SIC level of aggregation.

2) Firm Factors

i. Diversification

The degree of diversification is measured by the popular entropy measure (Jacquemin and Berry 1979; Palepu 1985). This is based on the Standard Industrial Classification (SIC) scheme. It assumes that the segments within a group (two digit SIC code) are more related to one another than segments across industry groups (Palepu 1985). Thus, it

captures diversification across and between groups(Sambharya 2000). Based on empirical analysis, Sambharya (2000) recommends the entropy measure for research on account of its rigor and theoretical base, coupled with a lack of subjectivity. There is also evidence suggesting that this measure has construct validity(Hoskisson et al. 1993). Empirical applications of this measure include Hendricks and Singhal (1997a) and Hitt et al. (1997).

The measure is computed as follows:

- Related diversification is calculated by the weighted addition of each product segment 's' in the firm's sales in that industry.
- Unrelated diversification is the weighted sum of shares of each industry in the total sales of the group.
- Total Diversification is the sum of unrelated and related diversification.

4.2.2 Dependent Variables

The following are the dependent variables that were employed in this study. In the first model (comprehensive model), the proxy measures for option value will be the market value of the stock following the creation / exercise of the option and Tobin's Q. The market value is the cumulative abnormal return (CAR) on the common stock of the firm. It is calculated by using the standard event study methodology procedure(Binder 1985; Brown and Warner 1980; Brown and Warner 1985; Fama et al. 1969). The procedure is explained in detail in the next section. This measure is in accordance with past research in real options (Rittipant 2005). Following Lee and Makhija (2003a); Lee and Makhija (2003b); Rittipant(2005), Tobin's Q was employed as a second measure of option value.

Tobin's Q

This is a forward-looking, capital-based measure of the value of the firm. It is defined as the ratio of the market value of the firm to its book value- current replacement costs(Tobin 1969). The denominator measures the market value and thus is a measure of the alternative uses of the firms assets. A firm whose Tobin's Q value exceeds unity suggests that it is doing a better job of managing its assets(Anderson et al. 2004). The chief advantages of Tobin's Q (Anderson et al. 2004) are:

1. It is a forward-looking measure as it looks towards the expected future revenue stream.
2. It is adjusted for expected market risk and it is more robust against variation in accounting standards.

Tobin's Q has been used in numerous studies in marketing and non-marketing literature. Some examples include responses to new technologies and firms performance(Lee and Grewal 2004); the linkage between brand equity and firm value(Lee and Grewal 2004; Rao et al. 2004); the relationship between customer satisfaction and shareholder value(Anderson et al.2004); measurement of brand equity(Simon and Sullivan 1993); the evaluation of marketing decisions of shareholders(Day and Fahey 1988). Other studies include structure and performance relationship(Smirlock et al. 1984); diversification and performance(Lang and Stulz 1994; Montgomery and Wernerfelt 1988), and effects of information technology ((Bharadwaj et al. 1999).

The following formula was used for computing Tobin's Q (Chung and Pruitt 1994)

$Q = \text{Market Value of Assets} / \text{Book Value}$

$= (\text{Market Value of Common Stock} + \text{Book Value of Preferential Stock} + \text{Book Value of Debt}) / \text{Book Value of Total Assets}$.

In order to calculate the market value of common stock, the year-end share price is multiplied by the number of outstanding shares. All of these variables were obtained from the Compustat database for each firm in the sample.

Type of Option

In the second model (predictor model), the dependent variable is the nature of the option exercised. The announcements were content analyzed using a coding sheet in order to categorize the action as growth or non-growth. These were coded as growth options (1) and non-growth (0). The coding sheet and the steps used in coding are presented in Appendix A. Sample announcements are presented in Appendix B.

4.2.3 Control Variables

Control variables were employed in order to minimize the confounding effect of other influential factors, thereby increasing the validity of the findings. Control variables employed in previous studies included firm size, past financial performance and firm's age (Rittipant 2005). Log of total assets was employed as a proxy variable for size of the firm. The sales figure for the previous year was used as the proxy variable for performance.

4.3 Models and Method(s)

The following research methods were employed to test the hypotheses. These include event studies, logistic regressions, and hierarchical regressions.

4.3.1 Event studies

The event study Methodology was employed to calculate the market value of the firm following the announcement of options creation / options exercise. Figure 4.1 provides a flowchart that summarizes the sequence of steps involved in the event study. Each of the steps is briefly explained below.

1. **Identification of Events of Interest**

The event of interest in this study is defined as a new product-related announcement. The announcements were categorized into three categories – option creation, option exercise (growth), and options exercise (non growth). Option creation related announcements included announcements of products during tradeshows, announcements related to test marketing of new products, press stories relating to the next generation of technology products, and announcements of new product related investments. Growth options announcements included the launch of new products and extending a newly - launched product into new markets. Non-growth options announcements included delays in launching new products, cutback in investment, and product abandonment announcements. In order to avoid the confounding of product abandonment due to product life cycle issues, only those abandonment decisions that took place within a short time (less than a year) of being launched were included in the study. These announcements were collected by using the Lexis / Nexis databases.

2. Definition of Event Window

The next most important step is the definition of event window. A precise definition of the event window is essential in order to get good results from the event study methodology (Brown and Warner, Fornell et al 2006). Shorter windows would yield a more precise estimate as they minimize the possibility of confounding events. The choice of an event window depends upon the phenomenon under investigation. The recommended window sizes are small as information regarding new products would be absorbed very fast by the market(Chaney and Devinney 1991; McWilliams and Siegel 1997). The windows chosen were a three day window(-1 to + 1) following prior studies in literature (Gilley et al. 2000; Hendricks and Singhal 1997; Lane and Jacobson 1995b). A five day window as in Chaney and Devinney (1991); Sabherwal and Sabherwal (2005);Fornell et al.(2006) , and seven day and nine day event windows were used. The longer event windows helped in assessing the robustness of results as they would help in accounting for the leakage of information to the market.

3. Selection of Firms

All the announcements regarding new products were examined. In order to prevent confounding, one needs to employ controls(MacKinlay 1997). Thus, the firm related announcements were examined in order to remove all announcements that are not related to new products. These announcements were obtained from the Company website. The window chosen was five days before and after the event following (Fornell et al. 2006). Any new product related announcement that has a confounding event in this ten day window was eliminated from the sample.

4. Prediction of Normal Returns

In order to predict the normal returns, the standard normal model was employed. The calculation of the normal model is explained in the following steps.

- The market rate of return is estimated by employing the market model (Brown and Warner 1985). The market model is a linear relationship between the return on a stock and the return on the market portfolio over a given period of time. The market model is of the form:

$$R_{i_t} = \alpha_i + \beta_i R_{m_t} + \epsilon_{i_t} \text{ where}$$

R_{i_t} == Rate of Return on the common stock of the i th firm on day t

α_i == Intercept

β_i == Slope Parameters

ϵ_{i_t} == Disturbance Term

- The estimation period is 255 days with a noise period of 10 days prior to the event.
- The market rate of return R_{i_t} for firm i for day t was calculated as:

$$R_{i_t} = \alpha_t + \beta_i R_{m_t} + \epsilon_{i_t}$$

5. Computing Abnormal Returns

- The abnormal return for the common stock of the firm i for day t is calculated as
- $ARI_t = R_{i_t} - (\alpha_t + \beta_i R_{m_t})$.
- The Cumulative Abnormal Returns over a sample of N firms are computed as follows:

- $CAR_{T1, T2} = \sum_{t=T1, T2} AR_{it}$

6. Statistical Significance of Abnormal Returns

T-statistics were used to test the significance of the cumulative abnormal returns. Following Sabherwal and Sabherwal (2005), the variance of the cumulative abnormal returns is calculated as:

1. Compute Mean of CAR using the formula: $Mean\ CAR = 1/N \sum_{t=T1, T2} AR_{it}$

2. Compute Variance of CAR using the formula :

$Variance\ (CAR_{T1, T2}) = 1/N^2 \sum_{t=T1, T2} \sigma_{et}^2$ where N is the sample size and σ_{et} is the variance of the Mean CAR.

3. A one-tailed t-test was used to test for the significance of the cumulative

abnormal returns, $t = Mean\ of\ CAR_{T1, T2} / Square\ Root\ (Variance\ (CAR_{T1, T2}))$

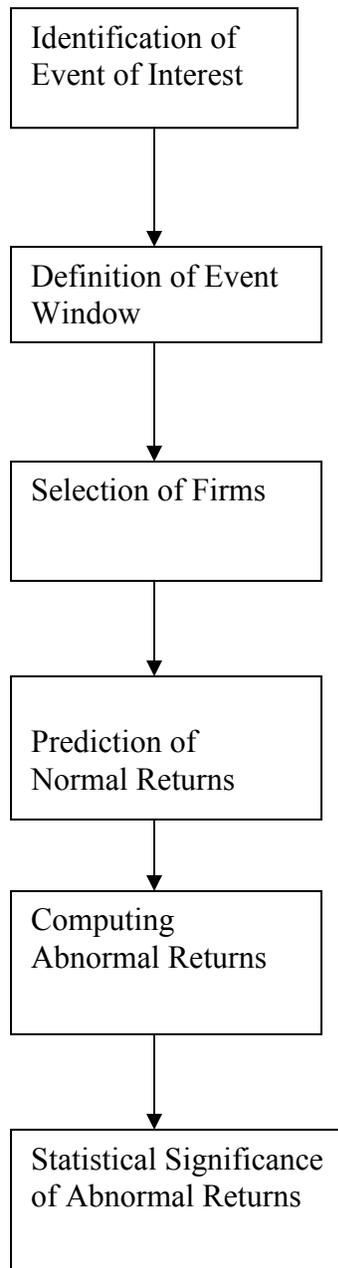


Figure 4.1 Flowchart of Steps involved in an Event Study
Source:(Brown and Warner 1980; Brown and Warner 1985; Fama et al. 1969; MacKinlay 1997; McWilliams and Siegel 1997)

4.3.2 Logistic Regression

In the predictor model the dependent variable was categorical, whereas the predictor variables were continuous. Hence, a logistic regression was employed in order to empirically test and validate the predictor model. The binomial logistic regression was employed in order to compare the growth options with non-growth options (delay/ exit).

4.3.3 Sub-group Analysis

In order to test for moderating effect of the industry, firm and innovation factor, a sub-group analysis was conducted. The predictors were regressed on the market value of option exercise (Tobin's Q) in both growth and non-growth groups. The beta weights were examined for significance and sign in order to test the influence of the predictors in each of the option exercise conditions.

4.3.4 Hierarchical Regression

In order to test for the hypotheses of moderation for the overall sample, hierarchical regression was employed. The industry-level/ firm-level predictor variables were entered sequentially in the model. Option choice was coded as a dummy variable. The coding scheme followed the same as explained in section 4.2. The dependent variable was the market value of the firm following the option creation /option exercise process. The moderation effects were demonstrated by testing the significance of the interaction terms (Barron and Kenney 1986). The following terms were examined in order to test the model: model significance, amount of variance explained, and significance of each individual beta weight.

CHAPTER 5

RESULTS

This chapter will discuss the results of the analysis. The first section will discuss the results of each of the models. The next section will discuss the testing of individual hypotheses. The final section will deal with the supplemental analysis and summary of results.

5.1 Research Models

5.1.1 Direct Effects Model

There were three groups of announcements, namely: options creation, growth options exercise, and non growth options exercise. Only a subsample of announcements was used in each of the cases in order to maintain methodological restrictions. If there were other confounding announcements within a 100-day time period, such an announcement was excluded. Announcements that had missing returns data were also excluded. Thus the number of usable announcements was reduced in each case. The number of actual announcements used was 37 in the case of options creation, 51 in the case of growth options, and 19 in the case of non-growth options. An estimation period of 250 days and a noise period of 15 days were employed. Cumulative abnormal returns over different event windows were examined and analyzed for the statistical significance of results. A one-tailed test was employed for testing the hypotheses.

The results are summarized in Table 5.5. A summary of market reactions to both the options creation and options exercises for a one day (Day Zero), three day, and five day window is provided. In the case of options creation, there is moderate support for Hypothesis 1. The cumulative abnormal returns for all the event windows were positive. The results were statistically significant in a three day window. The analysis of the market reactions for the growth options exercise also suggests moderate support for Hypotheses 2. The cumulative abnormal returns in a one day window were positive and statistically significant. However, the returns in a three day window and five day window were not positive. This leads to a possibility that not all growth options exercise are viewed positively. Then, the returns for negative options exercise condition were analyzed. The returns for all the three event windows were negative and statistically significant. All of the results were in accordance with the hypotheses as well as with findings of past studies(Chaney and Devinney 1991; Hendricks and Singhal 1997b; Koku et al. 1997; Rittipant 2005; Sharma and Lacey 2004)

5.1.2 Moderating Model

The moderating effects were examined by running regressions for both growth option and non-growth option exercise conditions. The dependent variable was market valuation (Tobin's Q) and the independent variables were the industry and firm level contextual factors. In each of the cases, market valuation was regressed on the industry-level and firm-level contextual factors. A hierarchical approach was adopted when entering the variables. In the first step, the control variables were entered. Then industry-level variables were entered, and finally firm-level variables were entered into the model.

Though the effects of the control variables were not part of the hypotheses, it was necessary to control for them to rule out alternative explanations. The model significance and the significance of the regression terms were examined. The results are summarized in Tables 5.8 and 5.9.

Table 5.8 provides a summary of the regression model for the growth condition. The model is statistically significant. An examination of the beta terms reveals that log of assets, munificence and H- Index (Competition) were statistically significant in terms of main effects. In the case of the non-growth condition, the model was not statistically significant. Table 5.9 summarizes the results of the regression model for the non-growth condition.

None of the hypotheses were supported in this model.

5.1.3 Antecedents Model

The antecedent's model was tested using a binomial logit model. In the first model, only the control variables were entered. In the second model, the control variables and the industry predictor variables were entered into the model. The chi-square increased from 1.92 to 9.78 and the pseudo R-Square increased from 0.02 to 0.12. Thus the second model exhibited a better fit and explains more variance. The beta terms for two of the three industry-level predictor variables were significant. Two of the three hypotheses were supported.

5.2 Hypotheses Testing

5.2.1 Hypotheses 1, 2, 3

These hypotheses predicted the market reaction in option exercise and option creation cases. Table 5.5 provides the summary of the event study. In the case of options creation, the cumulative abnormal returns are positive for all three event windows. The results were statistically significant for the three day event window. Hence, Hypothesis 1 was moderately supported. In case of growth options, the returns were positive and statistically significant. In the other time periods, the returns are negative. Therefore, Hypothesis 2 is partially supported. In the last case of non-growth options, the returns were negative and statistically significant. The sample had one outlying announcement. The sample was analyzed without the outlying announcement. The results of the t-test and non-parametric analysis suggested the cumulative abnormal returns were still negative and statistically significant. Hence, Hypothesis 3 is supported.

5.2.2 Hypotheses 4_A to 7_B

This set of hypotheses predicted the relationship between market valuation (Tobin's Q), type of option and contextual factors. Hypotheses 4_A and H5_A predicted that in the case of growth options, the market valuation would increase with an increase in munificence and an increase in dynamism. A positive relationship between competition and option value was predicted in Hypothesis 6_A. Lastly Hypothesis 7_A predicted a positive relationship between level of diversification and market value. Table 5.6 provides a summary of regression results for the growth condition. Only the effect of H-Index (Competition) is significant. H-index is a measure of concentration and thus the

reciprocal of competition. Hence a negative sign. However, the sign was in the opposite direction. Hypothesis 6_A was not supported. Hence, none of the hypotheses were supported.

In the case of the non-growth options sample; the hypotheses were in the opposite direction of the growth sample. Hypotheses 4_B and H5_B predicted that in the case of non-growth options, the market valuation would decrease with an increase in munificence and an increase in dynamism. A negative relationship between competition and option value was predicted in Hypotheses 6_b. Lastly Hypothesis 7₈ predicted a negative relationship between the level of diversification and market value. However, in the case of the non-growth sample, the regression model was not statistically significant. Hence, none of the hypotheses were supported.

5.2.3 Hypotheses 8_A, 8_B and 8_C

In this set of hypotheses, the effect of industry variables as predictors of the choice of option was predicted. Hypotheses 8_A predicted that an increase in munificence will increase the likelihood of growth options. Hypotheses 8_B predicted that an increase in dynamism will decrease the likelihood of growth options. Hypotheses 8_c predicted that an increase in competition will increase the likelihood of growth options. From Table 5.6, both munificence (Log of Munificence) and Dynamism (Reciprocal of Dynamism) are significant predictors. The response variable is directly proportional to likelihood of growth option (1) and indirectly proportional to the likelihood of non-growth option (0). The signs of the beta terms are also in the direction of the hypotheses. In the case of munificence, the likelihood of a growth option increases with increase in munificence. In

the case of dynamism (reciprocal of dynamism), the sign of regression beta term is negative. Hence, as level of dynamism increases, likelihood of growth options will decrease. Thus, Hypotheses H_{8A} and H_{8B} are supported. Hypothesis H_{8C} was not supported.

5.2.4 Supplemental Analysis

A supplemental analysis to enhance the results was performed. In the case of direct effects model, the non-growth sample had one outlying observation. The sample was assessed for significance after removing the observation. No changes were observed in the sign of the mean or in the statistical significance. Thus, the robustness of the results was demonstrated.

In case of the moderating model, the hypotheses were not supported in either the growth or the non-growth conditions. An analysis of variance was performed on the market valuation (Tobin's Q) with type of option as the factor. The results are summarized in Table 5.7. There was no significant difference between the two groups.

In the antecedents' model, the percentage of cases classified was 82%, which was not very good. Hence, the cutoff point was varied to reflect the unequal group sizes in the sample. There was no marked improvement in the results. Multicollinearity diagnostics were examined for the logistic regression model. The variance inflation factors for Sales and Competition (H- Index) were 3.41 and 3.83 respectively. This was evidence of multicollinearity in the model. This might be a possible reason for non support of H_{8C} .

5.3. Summary

The results of the Hypotheses testing exercise are summarized in Table 5.10. In summary, 5 out of the total 14 Hypotheses tested were supported. All the hypotheses

were supported in the Direct Effects model. In the case of the moderating model, none of the hypotheses were supported. Two out of three Hypotheses were supported in the antecedents' model. In case of the two hypotheses, namely H4_A and H6_A, the relationships were in direction opposition to the hypotheses.

Table 5.1 Descriptive Statistics - Growth Condition

Variable	Mean	Standard Deviation
Environmental Munificence	0.62	.02
Environmental Dynamism	0.54	0.005
Competition(H- Index)	746.77	644.11
Diversification(Entropy Measure)	0.26	0.24
Firm Size(Assets)	41625.63	78885.08
Performance(Sales)	30513.21	4106.08
Tobin's Q	3.66	4.14

N= 65

Table 5.2 Descriptive Statistics - Non- Growth Condition

Variable	Mean	Standard Deviation
Environmental Munificence	-2.71E-02	8.60E-02
Environmental Dynamism	-1.25E-02	1.113
Competition(H-Index)	1119.785	815.68
Diversification(Entropy Measure)	0.21	0.23
Firm Size(Assets)	130644.7	61954.37
Performance(Sales)	41053.57	61071.46
Tobin's Q	2.26	1.40

N= 13

Table 5.3 Correlation Matrix - Growth Condition

	Assets	Sales	Munificence	Dynamism	H-Index	Entropy
Assets	1.00	0.95	-0.16	-0.02	0.71	0.30
Sales	0.95	1.00	-0.20	0.03	0.80	0.36
Munificence	-0.16	-0.20	1.00	0.13	-0.36	0.02
Dynamism	-0.02	0.03	0.13	1.00	0.05	0.23
H-Index	0.71	0.80	-0.36	0.05	1.00	0.37
Entropy	0.30	0.36	0.02	0.23	0.37	1.00
Tobins'Q	-0.21	-0.24	-0.09	-0.56	-0.29	-0.26

Table 5.4 Correlation Matrix – Non-Growth Condition

	Assets	Sales	Munificence	Dynamism	H-Index	Entropy
Assets	1	0.64	0.24	-0.07	0.30	0.07
Sales	0.64	1	0.12	-0.13	0.61	0.45
Munificence	0.24	0.13	1	0.11	-0.62	0.07
Dynamism	-0.07	-0.14	0.11	1	0.02	-0.23
H-Index	0.30	0.61	-0.62	0.01	1	0.13
Entropy	0.07	0.45	0.07	-0.22	0.13	1
Tobins'Q	-0.36	-0.49	-0.24	0.17	-0.03	-0.31

Table 5.5 Summary of Results of Event Study

Option Exercise	CAR	T-statistic	n(N)
Time window			
Window 1 (Day 0 Event Date)	0.001	0.32	37/80
Window 2 (-1,+1)	0.0068463(37)	0.64	37/80
Window 3 (-2,+2)	0.0154869(37)	1.31*	37/80
Option Exercise(Growth)			
Time window			
Window 1 (Day 0 Event Date)	0.0021	1.36*	51/73
Window 2 (-1,+1)	-1.72	-0.9	51/73
Window 3 (-2,+2)	-1.28	-0.9	51/73
Option Exercise(Non- Growth)			
Time window			
Window 1 (Day 0 Event Date)	-7.9	-1.84**	19/19
Window 2 (-1,+1)	-13.903	-1.84**	19/19
Window 3 (-2,+2)	-27.8	-1.83**	19/19

*Significance at $p < 0.10$

** Significance at $p < 0.05$

One tailed test

n=Actual Announcements Used

N=Total number of Announcements

+ In view of the low sample size, a signs (non-parametric) test was performed for non growth sample. The results were significant at 10% level of significance.

Table 5.6 Binary Logistic Regression Results

Variables	Model 1	Model 2
Predictor Variables	Beta Values (Standard Error)	
Constant	2.077(1.48)	-3.50(4.37)
Log Assets	-6.618E-06(6.82E-06)	2.21E-04(1.51E-03)
Sales	-2.23E-02(0.16)	-1.89E-05(1.81E-05)
Log(Environmental Munificence)		32.77(20.02)*
Reciprocal(Environmental Dynamism)		-0.29(0.15)*
Competition(H-Index)		4.89E-04(1.50E-03)
Chi- Square(Overall Model)	1.92	9.78
Nagelkerke(Pseudo) R-Square	0.02	0.12

- Significance at $p < 0.10$

Table 5.7 Analysis of Variance

Group Factor--- Type of Option
Growth – Non Growth

Response Variable --- Market Valuation (Tobin's Q)

F Ratio	P- Value
1.73	0.192

We *cannot* reject the hypotheses of equal means.

Table 5.8 Regression Results Growth Condition

Regression(Growth)			
	Model 1	Model 2	Model 3
	β	β	β
Step 1			
Firm Size(Log Assets)	-0.71**		
Firm Performance(Sales)	0.161		
Step2			
Firm Size(Log Assets)		-0.99**	
Firm Performance(Sales)		0.52	
Munificence		-3.84**	
Dynamism		0.223	
Competition		-2.21**	
Step 3			
Firm Size(Log Assets)			-1.04**
Firm Performance(Sales)			0.56
Munificence			-3.84**
Dynamism			0.28
Competition(H-index)			0.34**
Diversification			0.30
Total R ²	0.41	0.51	0.52
Adjusted R ²	0.39	0.47	0.47
Model F Ratio	21.82**	12.54**	10.63**

** Significance at p<0.05

Table 5.9 Regression Results Non Growth Condition

Regression(Non-Growth)			
	Model 1	Model 2	Model 3
	β	β	β
Step 1			
Firm Size(Log Assets)	-0.438		
Firm Performance(Sales)	-0.156		
Step2			
Firm Size(Log Assets)		-0.40	
Firm Performance(Sales)		-0.94	
Log(Munificence)		0.97	
Dynamism		-0.17	
Competition		1.137	
Step 3			
Firm Size(Log Assets)			-0.39
Firm Performance(Sales)			-1.05
Log(Munificence)			1.04
Dynamism			-0.17
Competition(H-index)			1.24
Diversification			0.258
Total R ²	0.30	0.44	0.45
Adjusted R ²	0.17	0.05	-0.96
Model F Ratio	2.20	1.12	0.825

Table 5.10 Summary of Results

Hypotheses Number	IV	DV	Method	Support
1	Option Creation-Announcement	Cumulative Abnormal Returns	Event Study, T-test	Yes
2	Growth Option-Announcement	Cumulative Abnormal Returns	Event Study, T-test	Yes
3	Non Growth Option-Announcement	Cumulative Abnormal Returns	Event Study, T-test	Yes
4a	Environmental Munificence	Tobins'Q	Hierarchical Regression	No
4b	Environmental Munificence	Tobins'Q	Hierarchical Regression	No
5a	Environmental Dynamism	Tobins'Q	Hierarchical Regression	No
5b	Environmental Dynamism	Tobins'Q	Hierarchical Regression	No
6a	Competition	Tobins'Q	Hierarchical Regression	No
6b	Competition	Tobins'Q	Hierarchical Regression	No
7a	Diversification	Tobins'Q	Hierarchical Regression	No
7b	Diversification	Tobins'Q	Hierarchical Regression	No
8a	Environmental Munificence	Tobins'Q	Logistic Regression	Yes
8b	Environmental Dynamism	Tobins'Q	Logistic Regression	Yes
8c	Competition	Tobins'Q	Logistic Regression	No

CHAPTER 6

DISCUSSION

This chapter discusses the results, implications, contributions, limitations, and future research opportunities. The first section discusses the results. The second section delineates the implications and contributions of the study. The third section provides a discussion of the limitations and directions for future research. The fourth section concludes the study.

6.1 Key Results

6.1.1 Options Process and Market Reaction

In this age of technological advancement, shortening product life-cycles, increasing competition, and changing consumer preferences, firms are forced to develop new products to insulate themselves. There is uncertainty involved in the new product process. Hence, a sequential approach of spreading out the risks is beneficial. In that spirit, firms create new product real options through initial investments like R&D investment or by a launch in test market, etc. These decisions should be rewarded by the market. According to the results, options creation was seen as beneficial by the market. The options creation process resulted in gains in the market valuation. Once an option has been created and the market has been analyzed, then firms move on to the next stage of options exercise. If the initial results of the option creation are positive, then the firm will go ahead and make more investments, leading to capacity

expansion or product launch in newer and larger markets. This type of option exercise is referred to as growth option and a positive reaction is expected in such a scenario. The results provided a modest evidence of support. The firms that made these announcements received a positive market reaction, albeit for only a short time interval. The findings provide some evidence of convergence with the hypothesis as well as with results from past literature.

It may not always be the case that the initial results of the option creation would be positive. In such a scenario, a firm can exercise a delay option (delay planned investments) or an exit option (abandon the new product). These options are collectively referred to as non-growth options. These decisions would be suggestive of a mistake or a failure by managers. In such a scenario, a negative market reaction is expected. The results provided a robust and conclusive evidence of a negative market reaction to exercise of non-growth options. They are in line with findings of previous studies.

6.1.2 Moderating Model

In the valuation process, the effect of industry and firm factors are to be expected. Differences in industry and firm conditions lead to varying levels of uncertainty and consequently, varying probabilities of success/failure of the new product. The effect of the industry and firm factors were tested for the both the growth and non-growth conditions by running regressions. In the case of the growth condition, competition was found to be influential in explaining the variance. As competition increases, the extent of market valuation decreases. This result was not in line with the predicted hypothesis. However, there could be a potential explanation. A major reason why new products

would drive the market value is that they have significant rent generating potential. That cannot be easily imitated. However, as competition increases, the extent to which the new product can be imitated will increase and therefore, the rent generating potential is more vulnerable. None of the other variables in the model were significant. These results have to be interpreted with the caveat of evidence of multicollinearity problems. Size (Log Assets), Sales, Dynamism and Competition (H-Index) exhibited variance inflation factors of 8.4, 5.4, 6.03, and 3.3 respectively. This indicated some multicollinearity problems as these values exceeded 2.5(Allison 1999). This might explain the non-significance of the hypotheses.

In the case of non-growth options, the model was not statistically significant. The reasons could be twofold. It could be the case that the measure Tobin's Q was not adequately capturing the value of the option owing to the new product option exercise. The other possibility is that the model was not significant owing to a rather small sample size. Use of archival data could also have been a cause of this problem. In summary, notwithstanding the lack of support for the hypotheses, there is a reason to believe that contextual factors do play a role in influencing the market value of the option.

6.1.3 Antecedents Model

New product development is always fraught with uncertain outcomes. Therefore, it makes sense to invest in a sequential manner. There are numerous models to guide such sequential decisions. Hence, firms make sequential investments like an initial test market and a subsequent product launch. Then after learning more about the market for the new product, the firm can make further subsequent investments. Hence, new product

investments are option-like in their properties. The learning period between options creation and options exercise is the time that management will attempt to predict the likelihood of success. Knowledge of the significant predictors will help managers in the new product risk assessment process. In this study, industry factors- environmental munificence and environmental dynamism- were identified as good predictors. In the industries with higher levels of environmental munificence, the likelihood of growth options increases. Industries with higher levels of environmental munificence have more resources and opportunities for growth. Consequently, the possibility of growth options increases. On the other hand, the effect of environmental dynamism is in a direction opposite to the one expected in the hypothesis. A possible explanation is that in industries with higher levels of environmental dynamism, the rate of change is high. Hence, there is a greater need for new products. Managers need to launch new products in order to be successful. The room for error would be smaller. Hence, the attention to the success of new products would be higher. Consequently, the likelihood of growth options would increase. Both of these factors can be used by managers, as well as analysts, when they predict likelihood of success of new products. Competition was a significant predictor in the model. There was evidence of some multicollinearity issues in the model. Competition(H-Index) and Sales had variance inflation factors of 3.41 and 3.83 that suggest some evidence of multicollinearity(Allison 1999). This may be reason for the non-significance of Hypotheses 8_C.

6.2 Contributions and Implications

6.2.1 Academic Contributions

1. Empirical Work On Real Options

The literature on real options is scarce in empirical studies. This study is a step in mitigating that problem. Further, it employed the real options lens in the context of new product development. The previous empirical work has been in the context of international diversifications. This is the first real options based empirical study in the context of new product development.

2. Application Of New Theoretical Perspective- Real Options

This study contributes to the new product literature by bringing a new theoretical lens to view new product investments. Further, it also provides an empirical assessment of the new product real options valuation. As predicted by theory, options creation in general are viewed positively and rewarded by the market. Similarly, growth options are also perceived as beneficial and valued positively, albeit for a small time interval. Non-growth options, on the other hand lead to a negative market reaction.

3. Role of Industry and Firm Factors in the options valuation and choice process

Though much of the studies in literature have focused on the direct market valuation of new products and real options, this study has examined the role of contextual factors. In the case of growth options, Industry and Firm factors were found to be significant in influencing the extent of positive valuation. Competition was found to influence the

extent of valuation in the growth condition. Though none of the hypotheses were supported, there were some significant results.

4. Marketing- Finance Interface

This research is an interdisciplinary work and it is at the interface of marketing and finance. It brings in concepts like real options and event-study methodology to study one of the core marketing concept- new product development.

6.2.2 Managerial Implications

1) Test marketing and launches in limited sense lead to positive reaction in stock valuation. Any initial sequential new-product foray into a market is viewed positively.

This suggests that such calculated risk taking is rewarded.

2) Managers need to be careful in announcement of delays and abandonment.

Delays and abandonment have a more pronounced and sustained impact. This may also be a reason why there are fewer numbers of product delay and product abandonment announcements.

6.3 Limitations and Directions for Future Research

6.3.1 Limitations of the Study

1. Small Sample Size:

A major limitation is the rather small size of the sample, especially in the non-growth sample. This is owing to the fact that a lot of product delays or abandonment decisions are not explicitly announced. Apart from this, a lot of new product decisions are announced simultaneously in one public announcement or in announcements within a

short time interval. Hence, these announcements cannot be used for analysis owing to the methodological considerations of the event-study methodology.

2. Presence of Outliers

In spite of all the methodological considerations that were followed in the event study methodology, there were some outlying observations in the sample. Hence, the results have to be interpreted with caution.

3. Negative Returns In Stock In The Growth Condition

Though the overall returns were positive for the growth condition, there were some observations that were negative. This was against the expected results and theory. These cases need to be investigated.

4. Lumping Delay And Exit Options In The Same Sample

In this study, delay and exit options were lumped together as non-growth options. Although this allows for more parsimony, a lot of information regarding effect of each of these options is lost.

5. Tobin's Q

Previous studies in the literature have used Tobin's Q as a good measure for option value (Lee and Makhija 2003a; Lee and Makhija 2003b; Rittipant 2005). However, in this study, an analysis of variance exercise did not find a significant difference in Tobin's Q between non growth firms and growth firms. This reason could be a plausible one. A firm typically announces a lot of new product related decisions in a time interval of one year. Tobin's Q is an annualized measure. Hence, the Tobin's Q calculated at the end of one year would be the result of several such announcements. Hence, a measure that is

measured over a smaller time interval could capture the market value of the option exercise in a better manner.

6. Limited To Mostly Consumer Oriented Industries

Most of the firms in this sample were from consumer-oriented industries. Hence, the overall returns were smaller. This is owing to the fact that most of the firms make these announcements on a very regular basis. Hence, the surprise factor may not be present.

7. Lack Of Information On Managerial Motivations

The announcements of new product decisions were coded as options creations and options exercise. However, there was no information on the actual motivations for managers who make those decisions. An understanding of the managerial motivations would help in better understanding the factors influencing the options creation and exercise options in new products.

8. Lack of Focus on Product level factors

The model that investigated the effects of firm and industry factors did not focus on firm level factors like top management teams and product level factors like type of innovation. These factors have been found to be influential and important antecedents of new product development.

9. Logistic Regression

In the antecedents' model, a binomial logistic regression was employed. In the model, the percentage of cases that were classified was moderately good at 80 percent. Though the default setting of having equal groups was varied to reflect the unequal group sizes,

the percentage of cases correctly classified did not improve. This is a limitation of the study.

10. Multi-Collinearity Problems: In both the logistic regression as well as the regression model, there was evidence of multi-collinearity problems. This may be one of the plausible reasons for non-support for the hypotheses.

11. Secondary Archival Sources of Data: The data used in the sample comes from several archival data sources. In some of the industries, like automobile or tobacco, the H-index of concentration was not explicitly available for the four-digit SIC code owing to data restrictions. Hence, approximations had to be made in order to impute missing data.

6.3.2 Directions for Future Research

This section summarizes the recommendations for future studies in this line.

1. Survey Oriented Research

As suggested in the previous sections, there was information on the managerial motivation for the option creation and option exercise decisions. A survey-oriented research coupled with in-depth interviews or focus groups of new product managers can yield rich insights into the determinants of the real options process. This approach can also help in yielding more accurate information about the exact date of option creation and option exercise.

2. Focus on Specific Industries

Industry specific studies would help in controlling for industry factors and in focusing on more firm specific and product specific factors. This would allow the researcher to investigate factors like top management teams and type of innovation.

3. Taxonomy of Option Creation and Option Exercise

In this study, a number of new product decisions were lumped together into one group of options creation. There are several types of option creation announcements. These include test markets, launch in limited geographical areas, and R&D investments. Similarly, there are different types of growth options exercise like a nationwide launch after a successful test market, launching the new product in newer markets, and new extensions and flavors. Each of these announcements could have different reactions in terms of the magnitude and the persistence of the results. A product extension may not have the same impact as like that of a new patent. Hence, future research can look at effects across each of the type of growth options.

6.4 Conclusions

This research viewed the new product investments as a real options process. Options exercise and growth options exercise are perceived as good by the market. The firms are rewarded favorably. However, non-growth options exercise like product abandonment and product delays are viewed negatively. Hence, firms must exercise caution about decisions on creating new products as the market would penalize them for new product investments that result in a non-growth option exercise. Contextual factors were not found to be influential in the option valuation process. Industry factors were found to be useful in predicting the likelihood of growth and non-growth options. Hence,

firms can use these factors in evaluating the likelihood of success of their new product development projects.

APPENDIX A

CODING SHEET FOR OPTIONS

Dependent Variables:

Option Creation

Announcements? Pre announcements :

New product investments,
Research / development investments, joint ventures,
Test marketing

Type of Option Exercised
Growth

Announcement of:

Product launches
Capacity expansion
New markets

Non-Growth

Announcement of:

Delays(Exclude vaporware)
Cutting back on investments

Announcement of:

Product abandonment (Within a year of launch)
Withdrawal from the market

APPENDIX B

FLOWCHART OF CODING PROCESS

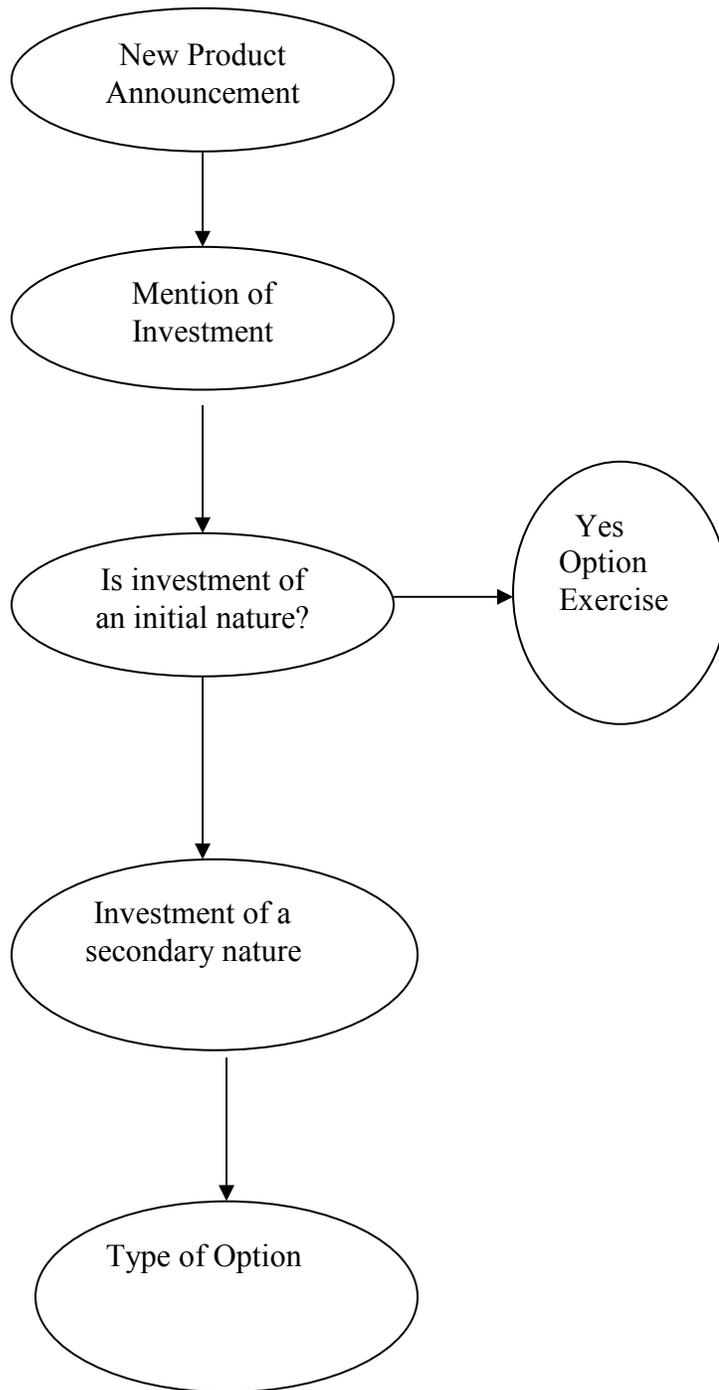


FIGURE B1 FLOWCHART OF CODING PROCESS

APPENDIX C
SAMPLE ANNOUNCEMENTS

Option Creation

SECTION: Financial News

DISTRIBUTION: TO BUSINESS AND FOOD EDITORS

LENGTH: 397 words

HEADLINE: Campbell Launches New Line of 'Supper Soups' in Test Markets New Soups Are A Dinner Alternative **LEXIS-NEXIS Related Topicsno targeted Topics.**

DATELINE: CAMDEN, N.J., Nov. 18

BODY:

Campbell Soup Company (**NYSE:** CPB) today unveiled another line of innovative soups as it continues to expand the convenience and usage of soup. "Supper Soups" in glass jars provide a quick and satisfying dinner option. Inspired by family dinner favorites, the new ready-to-serve soups come in four varieties -- Pasta Primavera With White Meat Chicken, Pot Roast With Vegetables, Vegetable Lasagna and Oriental-Style Chicken & Vegetables. The new soups are in test markets in the U.S.

"When time is tight, 'Supper Soups' are a quick, wholesome and satisfying dinner alternative," said Mark Leckie, President, U.S. Grocery, Campbell Soup Company. "Just add bread for a great complete meal!"

The new line expands the notion of soup beyond a sandwich accompaniment or a cooking ingredient -- soup becomes the centerpiece of the meal. "Supper Soups" are loaded with satisfying ingredients, such as chunks of vegetables, tender meats, and firm pasta and savory cheese. Each variety contains 3 grams or less of fat per serving.

The demand for quick and easy meal solutions is increasing. A recent Restaurants and Institutions survey shows that about 70 percent of Americans don't decide what they are serving for dinner until that evening. Campbell's "Supper Soups" help put a warm, satisfying dinner on the table in just 2-1/2 minutes.

Said Leckie, "We are bringing new soup products to market that appeal to consumers whose busy lifestyles demand increased convenience without sacrificig strong early acceptance. "Supper Soups" continue to expand the relevance of soup, extending usage to the dinner occasion with a high quality line of entree soups."

Campbell Soup Company is the world's largest maker and marketer of soup with fiscal 1998 sales of \$6.7 billion. The company's soups are sold under the global "Campbell's" brand, "Swanson" broths in the U.S., "Erasco" in Germany and "Liebig" in France. Among its other strong food brands are "Pepperidge Farm" cookies and crackers, "V8"

and "V8 Splash" juices, "Pace" Mexican sauces, "Prego" pasta sauces, "Homepride" sauces in the United Kingdom, "Arnott's" biscuits in Australia, and "Godiva" chocolates around the world.

First Ready-To-Serve Tomato Soup, Single Serve Soup to Go and Swanson Seasoned Broths Lead Innovative New Products;
Partnership with Nickelodeon Highlights Major Kids Marketing Effort
LEXIS-NEXIS Related Topics
no targeted Topics.

Option Exercise ---Growth Option

SECTION: Vol. 16, No. 9; Pg. 24; ISSN: 0743-5258

RDS-ACC-NO: 1887514

LENGTH: 507 words

HEADLINE: P&G's Febreze Finds A Niche All Its Own

HIGHLIGHT:

Procter & Gamble introduced Febreze, which promises to remove odors from fabrics

BODY:

CINCINNATI -- Procter & Gamble Co. (P&G) has continued to emphasize a new cleaning product designed to freshen people's homes while creating incremental sales opportunities for mass retailers.

Called Febreze, the product is billed as using a unique technology to remove odors from fabrics. It was officially launched nationwide last summer, although the product has been tested in a number of markets since May 1996.

According to company officials, in fact, it was the consumer response in the test markets (Boise, Idaho Salt Lake City, and Phoenix) that shaped the way Febreze was ultimately presented and marketed. The product was originally marketed as a way to remove cigarette smoke odors from dry clean-only fabrics. But consumers in the test markets began using the product in other ways.

"People are really impressed with the product's versatility," says P&G director of research and development Mike Jensen. "We have found that once people use Febreze, they find more and more uses for it. We've heard of people using it on a wide range of fabrics including everything from sofas and carpets to the inside of sneakers."

Consumer enthusiasm for the product was so great, according to P&G's promotional materials, that thousands of people who came in contact with the product through friends or family members in the test market have called the company to request the product.

Company officials say the product is safe for nearly all types of fabrics, from upholstery to clothing, and is designed to handle odors resulting from such causes as smoking, cooking and household pets.

Instead of simply covering up odors with a fragrance of its own, Febreze is designed to eliminate odors entirely. The product chemically bonds with odor-causing molecules when it is sprayed on, breaking them down as it dries. In its wake Febreze leaves a light fragrance that last from a few hours to an entire day.

P&G officials contend that as an entirely new product, Febreze will create incremental sales opportunities at mass retail stores by adding a new item to consumers' cleaning arsenals. Because Febreze does not fit into an established product segment, they argue, it won't cannibalize sales of other cleaning products.

The company's web site and other promotional materials, in fact, point out that the product is not meant to serve as a substitute for washing the fabrics on which it is used. Rather, it is designed for fabrics that are clean but do not smell clean. Such items once would have been aired out to remove odors, but such treatment is not always practical or effective.

Febreze is sold in two different formulations -- regular strength for clothing and lightweight fabrics, and extra strength for such heavier household fabrics as draperies, upholstery and carpets.

P&G officials note that 75% of the household surfaces that must be cleaned routinely are made of fabric, which means that the product's potential sales could be substantial.

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PR Newswire

November 18, 1998, Wednesday

DATELINE: CAMDEN, N.J., May 19

BODY:

Campbell Soup Company (**NYSE:** CPB) today unveiled a line-up of innovative new soups, including a Ready-To-Serve version of Campbell's signature Red & White tomato soup, the first Ready-To-Serve variety since Campbell's Condensed Tomato Soup was developed more than 100 years ago. It will initially be in test market in 20 percent of the U.S. Campbell also announced the introduction of "Soup to Go," a microwavable single-serving bowl for workplace and school lunches, and Swanson seasoned chicken broth --

an entirely new concept in the broth category designed to build on Swanson's growing usage as a recipe ingredient.

In addition, Campbell announced a strategic partnership with Nickelodeon, the number one rated television network for kids, linking Campbell's flagship Red & White brand to two leading Nickelodeon properties -- "Blue's Clues," the top-rated pre-school show on television and the Emmy Award-winning "Rugrats," the number one rated television show for kids. This initiative includes a new soup featuring pasta shaped like the Rugrats characters and two fully integrated promotions.

"We are moving our innovation engine into high gear," said Mark Leckie, President of Campbell's U.S. Grocery Division. "These new products will broaden our consumer base by appealing to consumers whose busy lifestyles demand increased convenience without sacrificing quality. They build on the success of our core business and take advantage of new packaging formats such as plastic and glass that complement our great strength in canned soups."

Leckie added, "We are also significantly increasing our kids marketing efforts by putting greater support behind existing kids favorites such as Campbell's Alphabet Soups and through our marketing partnership with Nickelodeon, another icon for kids. Nickelodeon is a wonderful partner to help us deliver high impact promotions for our consumers."

All of the new products will be supported by massive consumer communications, including print and television advertising; promotions; in- store sampling; recipe offers and more. The products will be available in stores beginning in the late summer, with consumer support beginning in the fall.

Additional details on the new product introductions include:

- Campbell's Ready-To-Serve Tomato Soup: Campbell's has captured the rich tomato soup experience that people know and love in a Ready-To-Serve version -- to enjoy as a snack, as part of a quick meal or as a hot beverage. Packaged in a 32-ounce plastic container, the innovative package features a re-sealable, screw-top lid and a molded hand-grip design to make pouring easier. Once opened, the soup can be stored in its container in the refrigerator. Available in two varieties -- Tomato and Creamy Tomato -- to reflect the two methods used to reconstitute the traditional condensed version-water and milk.
- Campbell's Soup to Go: Packaged in a microwavable single-serving bowl, consumers on the go can enjoy a hot, delicious bowl of soup anywhere at anytime. This high-quality soup, made with ingredients like garden fresh vegetables, tender white meat chicken and spoonfuls of pasta, is available in four varieties: Hearty Chicken Noodle, Garden Vegetable, Minestrone and Vegetable Beef with Pasta.
- Swanson Seasoned Chicken Broth: Two seasoned Chicken Broth varieties, Swanson Chicken Broth with Roasted Garlic and Swanson Chicken Broth with Italian Herbs, make it easier than ever before to add flavor to

favorite dishes, while reducing the fat. Designed to appeal to both experienced and novice cooks, these new varieties available in 14.5-ounce cans, have herbs and spices simmered right into the broth. Swanson is the market leader in broth and its strong growth has been fueled in part by resealable, aseptic packaging introduced in 1997.

- Campbell's CHUNKY Soups: A new line consisting of three baked potato varieties: Baked Potato with Cheddar & Bacon Bits, Baked Potato with Steak & Cheese and Baked Potato with Bacon Bits & Chives. This new line enables consumers to enjoy -- in their own homes -- a soup that is currently a hot restaurant trend.
- Campbell's Simply Home: Building on last year's (1997) launch of Joseph A. Campbell Soup In Glass Jars, Campbell's is introducing a new variety -- Chicken with White and Wild Rice -- and re-naming the brand to reflect the homemade touch that people associate with the product: Campbell's Simply Home. Other varieties include: Hearty Chicken Noodle with White Meat, Chicken & Pasta with Garden Vegetables, Vegetable Beef with Pasta, Garden Vegetables with Pasta and Minestrone.
- Campbell's Rugrats Pasta with Chicken and Broth: The partnership between Campbell's signature Red & White brand and Nickelodeon, the number one rated television network for kids, features the introduction of a new soup based on the Emmy award winning Nickelodeon show Rugrats: Campbell's Rugrats Pasta with Chicken and Broth. The new soup will feature pasta shaped like the Rugrats characters.

In addition, the first joint promotion features Campbell's Alphabet Soups and Nick Jr.'s Blues Clues. Beginning in August of 1998, more than 18 million cans of Campbell's Alphabet Soup will feature the popular animated Nickelodeon character -- Blue -- on the front of the label. Under the label there will be a fun, interactive Blue's Clues game that uses invisible ink technology.

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PR Newswire

November 6, 2003 Thursday

Exercise----- Non Growth

SECTION: COMPANY NEWS

LENGTH: 158 words

HEADLINE: GM delays launch of hybrid vehicles until 2007 - report

DATELINE: DETROIT

BODY:

General Motors has delayed plans to sell a fuel-saving hybrid vehicle by two years, until

2007, according to people close to the company's product development strategy, the New York Times reported.

That means that Ford Motor Co, which plans to sell a hybrid version of its Escape sport utility vehicle next year, will put a light-duty hybrid on the road about three years before GM.

GM has previously laid out plans to offer fuel-saving electric technologies as options on as many as a dozen models this decade, if the demand for such vehicles materializes.

Most of the vehicles would reduce gasoline consumption by 10-15 pct. Hybrid vehicles save gasoline by supplementing internal combustion with electrical power, with an electric motor taking over from the gasoline engine at low speeds.

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ISIN-NO: US3704421052

September 23, 2002

SECTION: 10

LENGTH: 270 words

HEADLINE: AMD DELAYS 64BIT DEBUT.

BODY:

AMD has postponed the **launch** of its first 64bit processors, which will not be available in systems until March at the earliest. Plans to release systems based on a processor codenamed Clawhammer, which will take some form of the Athlon brand, have been pushed back two to three months until early in 2003.

A new version of the Athlon processor, codenamed Barton, with 512kB level two cache, has also been postponed from this year until early next year.

Although the delays are relatively minor, they could have two drawbacks for AMD. First, they are likely to damage AMD's improving reputation for manufacturing products on schedule, just as it attempts to make inroads into business PCs. Second, it is likely to reduce some of the performance advantage AMD anticipated it would have over Intel on Clawhammer's release.

The two firms have been competing to ship the fastest PC processors for several years and Clawhammer's ability to run 32bit software as well as 64bit software was seen as a key differentiator; Intel's Itanium is only optimised for 64bit software.

Intel will attempt to cash in on any AMD missteps with a 3GHz Pentium 4 due in the

next two months.

AMD said Opteron, a 64bit processor that is aimed at servers, is still scheduled for release in the first half of 2003.

- Itanium uptake, Comment, p29.

MORE BREATHING SPACE FOR INTEL

- AMD has delayed the launch of two of its forthcoming 64bit processors.

- The delay could hurt AMD in its battle for supremacy with Intel.

- Opteron, a 64bit chip aimed at servers, is still planned to ship in the first half of 2003.

JOURNAL-CODE: WVNU

LOAD-DATE: September 20, 2002

APPENDIX D
TABLE OF ANNOUNCEMENTS

Case Number	Product	Date	Year	Company
Case 1	Crest Multicare	14-Apr-97	1997	P & G
Case 2	Cherry Coke(Canada)	16-Mar-98	1998	Coca Cola
Case 3	Hybrid Buses	29-Dec-98	1998	GM
Case 4	Tequiza	5-Feb-99	1999	Anheuser Busch
Case 5	Dasani Water	19-Feb-99	1999	Coca Cola
Case 6	Hybrid Vehicles	12-Jan-00	2000	Honda Motor Company
Case 7	Boston Market Home Style Meals	20-Mar-00	2000	Heinz
Case 8	Screamin' Chicken Strips(TM)	26-May-00	2000	Checkers Drive-in Restaurants, Inc.
Case 9	Merit cigarettes	12-Jul-00	2000	Altria
Case 10	Swiffer WetJet	13-Jul-00	2000	P & G
Case 11	Purrfectly Fresh	8-Aug-00	2000	Calgon Carbon Corp
Case 12	Frozen Foods- Pizza	2-May-01	2001	Heinz
Case 13	Crest White Strips	5-May-01	2001	P & G
Case 14	Reducol	24-Jul-01	2001	Forbes Meditech
Case 15	Omni LowTobacco Cigarette	28-Sep-01	2001	Vector Tobacco
Case 16	Bacardi Silver	21-Dec-01	2001	Anheuser Busch
Case 17	Vanilla Coke	15-Apr-02	2002	Coca Cola
Case 18	PreZerve	17-May-02	2002	Calgon Carbon Corp
Case 19	64 Bit Processor	7/23/2002	2002	AMD
Case 20	Michelob Ultra	30-Sep-02	2002	Anheuser Busch
Case 21	FlatScreen Monitor	10-Oct-02	2002	Microsoft
Case 22	Vanilla Coke Canada	15-Oct-02	2002	Coca Cola
Case 23	Sierra Mist	4-Nov-02	2002	Pepsi
Case 24	Battery Operated Car	20-Dec-02	2002	FORD
Case 25	New Sprite Ice	9-Apr-03	2003	Coca Cola
Case 26	StarKist Tuna Creations™	14-Jul-03	2003	Del Monte Corporation
Case 27	Quest Now Low Nicotine Cigarette	20-Aug-03	2003	Vector Tobacco
Case 28	Bacardi Silver	26-Aug-03	2003	Anheuser Busch

Case 29	Real Life Choices	6-Jan-04	2004	McDonalds
Case 30	Pepsi Edge	10-Mar-04	2004	Pepsi
Case 31	Honda FCX(Fuel Cell)	7-Apr-04	2004	Honda Motor Company
Case 32	Hybrid Pick Ups	5-May-04	2004	GM
Case 33	Happy Meals	5-May-04	2004	McDonalds
Case 34	Bacardi Silver	9-Jun-04	2004	Anheuser Busch
Case 35	Diner Restaurants	2-Jul-04	2004	McDonalds
Case 36	Coca Cola C2	28-Jul-04	2004	Coca Cola
Case 37	Escape Hybrid SUV	3-Dec-04	2004	FORD
Case 38	Stonewall	20-Dec-04	2004	Star Scientific Inc
Case 39	BtotheE	25-Jan-05	2005	Anheuser Busch
Case 40	Pantene Pro-V(R) Expressions	7-Feb-05	2005	P & G
Case 41	Pepsi Lime	7-Feb-05	2005	Pepsi
Case 42	Diet Coke	8-Feb-05	2005	Coca Cola
Case 43	Budweiser Select	21-Feb-05	2005	Anheuser Busch
Case 44	Bacardi Silver	7-Apr-05	2005	Anheuser Busch
Case 45	Crest White Strips Premium Plus	11-Apr-05	2005	P & G
Case 46	Bertolli	2-May-05	2005	Unilever
Case 47	Pepsi Edge	14-May-05	2005	Pepsi
Case 48	Nestea Ice	18-May-05	2005	Coca Cola
Case 49	Honda FCX(Fuel Cell)	29-Jun-05	2005	Honda Motor Company
Case 50	Hybrid Vehicles	11-Jul-05	2005	FORD
Case 51	Remineralized Water - raspberry and lemon	3-Aug-05	2005	Coca Cola
Case 52	Tilt	8-Aug-05	2005	Anheuser Busch
Case 53	Dasani Flavors	5-Oct-05	2005	Coca Cola
Case 54	Deli Sandwiches	17-Nov-05	2005	McDonalds
Case 55	Fruit Salad	24-Nov-05	2005	Wendy's
Case 56	Fruit and Walnut Salad	May 4, 2005	2005	McDonalds
Case 57	Lime Coke	March 16, 2005	2005	Coca Cola
Case 58	Chicken Selects	March 27, 2002	2002	McDonalds
Case 59	Febreze(Canada)	April 6 1999	1999	P & G
Case 60	Canela New dairy Coffee Creamer(Hispanic market)	Aug 6 2002	2002	Dean Foods Company

Case 61	GelStat(TM) Migraine	Dec 3 2003	2003	GelStat Corporation
Case 62	Olestra based Chips	Feb 11 1998	1998	P & G
Case 63	Lime Coke	Jan. 7, 2004	2004	Coca Cola
Case 64	PSX DVD Game Machines	July 12 2004	2004	Sony
Case 65	Campbell Intelligent Quisine	June 1 1998	1998	Campbell Soups
Case 66	GelStat(TM) Migraine	June 10 2005	2005	GelStat Corporation
Case 67	Milk Chug	March 20 2000	2000	Dean Foods Company
Case 68	GelStat(TM) Migraine	March 20 2004	2004	GelStat Corporation
Case 69	Febreze	March 31 1998	1998	P & G
Case 70	Dryel	May 17 1999	1999	P & G
Case 71	Premium Salads	May 5 2003	2003	McDonalds
Case 72	Campbell Ready to Serve Microwoaveable	May 6 2003	2003	Campbell Soups
Case 73	Dips for One	May 7 2000	2000	Dean Foods Company
Case 74	Ensemble	Nov 19 1999	1999	Kelloggs
Case 75	Hybrid Vehicles	November 6 2003	2003	GM
Case 76	Diabetes Drug	Oct 27 2005	2005	Bristol-Myers
Case 77	Campbell Ready to Serve	Oct 6 1999	1999	Campbell Soups
Case 78	HD DVD players	Sep 1 2005	2005	Toshiba Corp

REFERENCES

- Adams, Mike (2004), "Real options and customer management in the financial services sector," *Journal of Strategic Marketing*, 12 (1), 3-11.
- Adner, Ron and Daniel A. Levinthal (2004a), "Real Options and Real Tradeoffs," *Academy of Management Review*, 29 (1), 120-26.
- (2004b), "What is Not a Real Option: Considering Boundaries for the Application of Real Options to Business Strategy," *Academy of Management Review*, 29 (1), 74-85.
- Afuah, Allan (2000), "How Much do Your Co-Opetitors' Capabilities Matter in the Face of Technological Change?," *Strategic Management Journal*, 21 (3), 387.
- Agarwal, Rajshree and Michael Gort (2001), "First-Mover Advantage And The Speed Of Competitive Entry, 1887-1986," *Journal of Law & Economics*, 44 (1), 161-77.
- Agrawal, Jagdish and Wagner A. Kamakura (1995), "The economic worth of celebrity endorsers: An event study analysis," *Journal of Marketing*, 59 (3), 56.
- Ahmed, Parvez, John Gardella, and Sudhir Nanda (2002), "Wealth Effect of Drug Withdrawals on Firms and Their Competitors," *Financial Management (Financial Management Association)*, 31 (3), 21.
- Aldrich, Howard (1979), *Organizations and environments*. Englewood Cliffs, N.J: Prentice-Hall.
- (1976), "Resource Dependence and Interorganizational Relations," *Administration & Society*, 7 (4), 419.
- Amram, Martha and Nalin Kulatilaka (1999.), *Real options : managing strategic investment in an uncertain world*. Boston, Mass: Harvard Business School Press.
- Ancona, Deborah Gladstein and David F. Caldwell (1992), "Demography and Design: Predictors of New Product Team Performance," *Organization Science: A Journal of the Institute of Management Sciences*, 3 (3), 321-41.
- Anderson, Eugene W., Claes Fornell, and Sanal K. Mazvancheryl (2004), "Customer Satisfaction and Shareholder Value," *Journal of Marketing*, 68 (4), 172-85.

- Athreya, Suma S. (2001), "Competition , Rivalry And Innovative Behaviour. (Cover Story)," *Economics of Innovation & New Technology*, 10 (1), 1.
- Bantel, Karen A. and Susan E. Jackson (1989), "Top Management and Innovations in Banking: Does the Composition of the Top Team Make a Difference?" *Strategic Management Journal*, 10, (Summer, Special Issue: Strategic Leaders and Leadership), 107-24.
- Barney, Jay (1991), "Firm Resources and Sustained Competitive Advantage," *Journal of Management*, 17 (1), 99.
- Bayus, Barry L., Gary Erickson, and Robert Jacobson (2003), "The Financial Rewards of New Product Introductions in the Personal Computer Industry," *Management Science*, 49 (2), 197-210.
- Bayus, Barry L., Sanjay Jain, and Ambar G. Rao (1997), "Too little, too early: Introduction timing and new product performance in the personal digital," *Journal of Marketing Research (JMR)*, 34 (1), 50-63.
- Benaroch, Michel (2002), "Managing Information Technology Investment Risk: A Real Options Perspective," *Journal of Management Information Systems*, 19 (2), 43-84.
- Bharadwaj, Anandhi S., Sundar C. Bharadwaj, and Benn R. Konsynski (1999), "Information Technology Effects on Firm Performance as Measured by Tobin's q," *Management Science*, 45 (7), 1008.
- Binder, John J. (1985), "Measuring the effects of regulation with stock price data," *RAND Journal of Economics*, 16 (2), 167-83.
- Blumentritt, Timothy P. and Douglas Nigh (2002), "The Integration of Subsidiary Political Activities in Multinational Corporations," *Journal of International Business Studies*, 33 (1), 57-77.
- Bollen, Nicolas P. B. (1999), "Real Options and Product Life Cycles," *Management Science*, 45 (5), 670.
- Bowman, Edward H. and Dileep Hurry (1993), "Strategy through the option lens: An integrated view of resource investments and the," *Academy of Management Review*, 18 (4), 760.
- Bowman, Edward H. and Gary T. Moskowitz (2001), "Real Options Analysis and Strategic Decision Making," *Organization Science: A Journal of the Institute of Management Sciences*, 12 (6), 772.

- Brach, Marion A (2003), *Real options in practice* Hoboken, NJ John Wiley & Sons.
- Brown, Stephen J. and Jerold B. Warner (1980), "Measuring Security Price Performance," *Journal of Financial Economics*, 8 (3), 205-58.
- (1985), "Using Daily Stock Returns: The Case of Event Studies," *Journal of Financial Economics*, 14 (1), 3-31.
- Calantone, Roger and Robert G. Cooper (1981), "New Product Scenarios: Prospects for Success," *Journal of Marketing*, 45 (2).
- Calantone, Roger, Rosanna Garcia, and Cornelia DrÄ¶ge (2003a), "The Effects of Environmental Turbulence on New Product Development Strategy Planning," *Journal of Product Innovation Management*, 20 (2), 90-103.
- Calantone, Roger, Rosanna Garcia, and Cornelia Droge (2003b), "The Effects of Environmental Turbulence on New Product Development Strategy Planning," *Journal of Product Innovation Management*, 20 (2), 90-103.
- Calantone, Roger J., Jeffrey B. Schmidt, and C. Anthony Di Benedetto (1997), "New Product Activities and Performance: The Moderating Role of Environmental Hostility," *Journal of Product Innovation Management*, 14 (3), 179-89.
- Calantone, Roger J., Jeffrey B. Schmidt, and X. Michael Song (1996), "Controllable factors of new product success: A cross-national comparison," *Marketing Science*, 15 (4), 341.
- Calantone, Roger J., Shawnee K. Vickery, and Cornelia Droge (1995), "Business Performance and Strategic New Product Development Activities: An Empirical Investigation," *Journal of Product Innovation Management*, 12 (3), 214-23.
- Camelo-Ordaz, Carmen, Ana Beatriz Hernandez-Lara, and Raman Valle-Cabrera (2004), "The relationship between top management teams and innovative capacity in companies," *Journal of Management Development*, 24 (8), 683-705.
- Castrogiovanni, Gary J. (1991), "Environmental Munificence: A Theoretical Assessment," *Academy of Management Review*, 16 (3), 542.
- Cavusoglu, Huseyin, Birendra Mishra, and Srinivasan Raghunathan (2004), "The Effect of Internet Security Breach Announcements on Market Value: Capital Market Reactions for Breached Firms and Internet Security Developers," *International Journal of Electronic Commerce*, 9 (1), 69-104.

- Chaney, P. K. and T. M. Devinney (1991), "The impact of new product introductions on the market value of firms," *Journal of Business*, 64 (4), 573.
- Chatterjee, Debabroto, Carl Pacini, and V. Sambamurthy (2002), "The Shareholder-Wealth and Trading-Volume Effects of Information-Technology Infrastructure Investments," *Journal of Management Information Systems*, 19 (2), 7-42.
- Chrysochoidis, George M. and Veronica Wong (1998), "Rolling Out New Products Across Country Markets: An Empirical Study of Causes of Delays," *Journal of Product Innovation Management*, 15 (1), 16-41.
- Chung, Kee H. and Stephen W. Pruitt (1994), "A Simple Approximation of Tobin's q," *Financial Management (Financial Management Association)*, 23 (3), 70-74.
- Cooper, R. G. and E. J. Kleinschmidt (1993), "Major New Products: What Distinguishes the Winners in the Chemical Industry?," *Journal of Product Innovation Management*, 10 (2), 90-111.
- Cooper, Robert G. (1994a), "Debunking the myths of new product development," *Research Technology Management*, 37 (4), 40.
- (1999), "FROM EXPERIENCE: The Invisible Success Factors in Product Innovation," *Journal of Product Innovation Management*, 16 (2), 115-33.
- (1994b), "New Products," *International Marketing Review*, 11 (1), 60.
- Corbett, Charles J., María J. Montes-Sancho, and David A. Kirsch (2005), "The Financial Impact of ISO 9000 Certification in the United States: An Empirical Analysis," *Management Science*, 51 (7), 1046-59.
- Cortazar, Gonzalo, Eduardo S. Schwartz, and Marcelo Salinas (1998), "Evaluating environmental investments: A real options approach," *Management Science*, 44 (8), 1059.
- Cottrell, Tom and Gordon Sick (2002), "Real Options and Follower Strategies: the Loss of Real Option Value to First-Mover Advantage," *Engineering Economist*, 47 (3), 232.
- Danneels, Erwin and Rajesh Sethi (2003), "Antecedents Of New Product Program Creativity: The Moderating Role Of Environmental Turbulence," *Academy of Management Proceedings*, A1-A6.
- Das, Somnath, Pradyot K. Sen, and Sanjit Sengupta (1998), "Impact of strategic alliances on firm valuation," *Academy of Management Journal*, 41 (1), 27.

- Datta, Deepak K., Nandini Rajagopalan, and Abdul M. A. Rasheed (1991), "Diversification And Performance: Critical Review And Future Directions," *Journal of Management Studies*, 28 (5), 529-58.
- Davidson III, Wallace N. and Dan L. Worrell (1992), "Research Notes and Communications: the Effect of Product Recall Announcements on Shareholder Wealth," *Strategic Management Journal*, 13 (6), 467-73.
- Davidson III, Wallace N., Dan L. Worrell, and Louis Cheng (1990), "Key Executive Succession and Stockholder Wealth: The Influence of Successor's Origin, Position, and Age," *Journal of Management*, 16 (3), 647.
- Davidson III, Wallace N., Dan L. Worrell, and Dipa Dutia (1993), "The Stock Market Effects of CEO Succession in Bankrupt Firms," *Journal of Management*, 19 (3), 517.
- Day, George and Liam Fahey (1988), "Valuing Market Strategies," *Journal of Marketing*, 52 (3), 45.
- De Figueiredo, John M. and Margaret K. Kyle (2006), "Surviving the gales of creative destruction: the determinants of product turnover," *Strategic Management Journal*, 27 (3), 241-64.
- Dess, Gregory G. and Donald W. Beard (1984), "Dimensions of Organizational Task Environments," *Administrative Science Quarterly*, 29 (1), 52.
- Di Benedetto, C. Anthony (1999), "Identifying the Key Success Factors in New Product Launch," *Journal of Product Innovation Management*, 16 (6), 530-44.
- Dias, Sam and Lynette Ryals (2002), "Options theory and options thinking in valuing returns on brand investments and brand extensions," *Journal of Product & Brand Management*, 11 (2), 115.
- Dixit, Avinash K. and Robert S. Pindyck (1994), *Investment under uncertainty* Princeton, N.J.: Princeton University Press.
- Droge, Cornelia and Roger Calantone (1996), "New Product Strategy, Structure, and Performance in Two Environments," *Industrial Marketing Management*, 25 (6), 555-66.
- Drucker, Peter (1999), *Management Challenges for the 21st Century* New York: HarperBusiness, c1999.

- Dwyer, Larry and Robert Mellor (1991), "Organizational Environment, New Product Process Activities, and Project Outcomes," *Journal of Product Innovation Management*, 8 (1), 39-48.
- Eliashberg, Jehoshua and Thomas S. Robertson (1988), "New Production Preannouncing Behavior: A Market Signaling Study," *Journal of Marketing Research (JMR)*, 25 (3), 282.
- Fama, Eugene F., Lawrence Fisher, Michael C. Jensen, and Richard Roll (1969), "The Adjustment of Stock Prices to New Information," *International Economic Review*, 10 (1), 1.
- Folta, Timothy B. and Kent D. Miller (2002), "Real Options in Equity Partnerships," *Strategic Management Journal*, 23 (1), 77.
- Folta, Timothy B. and Jonathan P. O'Brien (2004), "Entry In The Presence Of Dueling Options," *Strategic Management Journal*, 25 (2), 121-38.
- Ford, David N. and I. I. Durward K. Sobek (2005), "Adapting Real Options to New Product Development by Modeling the Second Toyota Paradox," *IEEE Transactions on Engineering Management*, 52 (2), 175-85.
- Fornell, Claes, Sunil Mithas, Forrest V. Morgeson, and M. S. Krishnan (2006), "Customer Satisfaction and Stock Prices: High Returns, Low Risk," *Journal of Marketing*, 70 (1), 3-14.
- Gassmann, Oliver and Barbara Becker (2006), "TOWARDS A RESOURCE-BASED VIEW OF CORPORATE INCUBATORS," *International Journal Of Innovation Management*, 10 (1), 19-45.
- Gatignon, Hubert and Jean-Marc Xuereb (1997), "Strategic orientation of the firm and new product performance," *Journal of Marketing Research (JMR)*, 34 (1), 77-90.
- Geyskens, Inge, Katrijn Gielens, and Marnik G. Dekimpe (2002), "The Market Valuation of Internet Channel Additions," *Journal of Marketing*, 66 (2), 102.
- Ghani, WaQar I. and Nancy M. Childs (1999), "Wealth Effects of the Passage of the Nutrition Labeling and Education Act of 1990 for Large U.S. Multinational Food Corporations," *Journal of Public Policy & Marketing*, 18 (2), 147-58.
- Gilley, K. Matthew, Dan L. Worrell, Wallace N. Davidson Iii, and Abuzar El-Jelly (2000), "Corporate Environmental Initiatives and Anticipated Firm Performance: The Differential Effects of Process-Driven Versus Product-Driven Greening Initiatives," *Journal of Management*, 26 (6), 1199.

- Goll, Irene and Abdul A. Rasheed (2004), "The Moderating Effect of Environmental Munificence and Dynamism on the Relationship Between Discretionary Social Responsibility and Firm Performance," *Journal of Business Ethics*, 49 (1), 41-54.
- (2005), "The Relationships between Top Management Demographic Characteristics, Rational Decision Making, Environmental Munificence, and Firm Performance," *Organization Studies* (Sage Publications Inc.), 26 (7), 999-1023.
- Goll, Irene and Abdul M. A. Rasheed (1997), "Rational Decision-Making And Firm Performance: The Moderating Role Of Environment," *Strategic Management Journal*, 18 (7), 583-91.
- Green, Samuel B. (1991), "How Many Subjects Does It Take To Do A Regression Analysis," *Multivariate Behavioral Research*, 26 (3), 499.
- Haenlin, Michael, Andreas M. Kaplan, and Detlef Schoder (2006), "Valuing the real option of abandoning unprofitable customers when calculating customer lifetime value," *Journal of Marketing*, 70 (July(Forthcoming)).
- Hannan, Michael, T and John Freeman (1977), "The Population Ecology of Organizations," *Administration Science Quarterly*, 82 (5), 929-64.
- Hanvanich, Sangplet and S. Tamer Cavusgil (2001), "Stock market reactions to international joint venture announcement: an event analysis," *International Business Review*, 10 (2), 139.
- Hart, Susan J. (1988), "The Causes of Production Deletion in British Manufacturing Companies," *Journal of Marketing Management*, 3 (3), 328-43.
- Heide, Jan B. (1994), "Interorganizational governance in marketing channels," *Journal of Marketing*, 58 (1), 71.
- Henard, David H. and David M. Szymanski (2001), "Why Some New Products Are More Successful Than Others," *Journal of Marketing Research* (JMR), 38 (3), 362.
- Hendricks, Kevin B. and Vinod R. Singhal (1997), "Delays in new product introductions and the market value of the firm: The consequences of being," *Management Science*, 43 (4), 422.
- Hendricks, Kevin B., Vinod R. Singhal, and Christine I. Wiedman (1995), "The impact of capacity expansion on the market value of the firm," *Journal of Operations Management*, 12 (3/4), 259-72.

- Hitt, Michael A., Robert E. Hoskisson, and Hicheon Kim (1997), "International diversification: Effects on innovation and firm performance in product-diversified," *Academy of Management Journal*, 40 (4), 767.
- Ho, Yung-Ching and Tsui-Hsu Tsai (2006), "The Impact of Dynamic Capabilities With Market Orientation and Resource-Based Approaches on NPD Project Performance," *Journal of American Academy of Business, Cambridge*, 8 (1), 215-29.
- Horsky, Dan and Patrick Swyngedouw (1987), "Does it Pay to Change Your Company's Name? a Stock Market Perspective," *Marketing Science*, 6 (4), 320.
- Hoskisson, Robert E., Michael A. Hitt, Richard A. Johnson, and Douglas D. Moesel (1993), "Construct Validity Of An Objective (Entropy) Categorical Measure Of Diversification Strategy," *Strategic Management Journal*, 14 (3), 215-35.
- Hozier Jr, George C. and John D. Schatzberg (2000), "Advertising Agency Terminations and Reviews: Stock Returns and Firm Performance," *Journal of Business Research*, 50 (2), 169-76.
- Hu, Chengru (2004), "The Evaluation of New Products: An Event Study And Real Option Approach," Rutgers- State University of New Jersey.
- Huchzermeier, Arnd and Christoph H. Loch (2001), "Project Management Under Risk: Using the Real Options Approach to Evaluate Flexibility in R&D," *Management Science*, 47 (1), 85.
- Hyman, Michael R. and Ike Mathur (2005), "Retrospective and Prospective Views on the Marketing/Finance Interface," *Journal of the Academy of Marketing Science*, 33 (4), 390-400.
- Impson, Michael (1997), "Market Reaction to Dividend-Decrease Announcements: Public Utilities Vs. Unregulated Industrial Firms," *Journal of Financial Research*, 20 (3), 407.
- Jacquemin, Alexis P. and Charles H. Berry (1979), "ENTROPY MEASURE OF DIVERSIFICATION AND CORPORATE GROWTH," *Journal of Industrial Economics*, 27 (4), 359-69.
- Janney, Jay J. and Gregory G. Dess (2004), "Can real-options analysis improve decision-making? Promises and pitfalls," *Academy of Management Executive*, 18 (4), 60-75.

- Joshi, Ashwin W. and Alexandra J. Campbell (2003), "Effect of Environmental Dynamism on Relational Governance in Manufacturer-Supplier Relationships: A Contingency Framework and an Empirical Test," *Journal of the Academy of Marketing Science*, 31 (2), 176.
- Kalyanaram, Gurumurthy, William T. Robinson, and Glen L. Urban (1995), "Order of Market Entry: Established Empirical Generalizations, Emerging Empirical Generalizations, and Future Research," *Marketing Science*, 14 (3), G212.
- Kalyanaram, Gurumurthy And Glen L. Urban (1992), "Dynamic Effects Of The Order Of Entry On Market Share, Trial Penetration, And Repeat Purchases For Frequently Purchased Consumer Goods," *Marketing Science*, 11 (3), 235.
- Kessler, Eric H. and Alok K. Chakrabarti (1996), "Innovation Speed: a Conceptual Model of Context, Antecedents, and Outcomes," *Academy of Management Review*, 21 (4), 1143-91.
- Kim, Daekwan, S. Tamer Cavusgil, and Roger J. Calantone (2006), "Information System Innovations and Supply Chain Management: Channel Relationships and Firm Performance," *Journal of the Academy of Marketing Science*, 34 (1), 40-54.
- Kogut, Bruce (1991), "Joint Ventures and the Option to Expand and Acquire," *Management Science*, 37 (1), 19-33.
- Kogut, Bruce and Nalin Kulatilaka (2001), "Capabilities as Real Options," *Organization Science: A Journal of the Institute of Management Sciences*, 12 (6), 744.
- Koku, P. S. , H. S. Jagpal, and P. V. Viswanath (1997), "The Effect of New Product Announcements and Preannouncements on Stock Price," *Journal Of Market Focused Management* 2(2), 183-99
- Kraatz, Matthew S. and Edward J. Zajac (2001), "How Organizational Resources Affect Strategic Change and Performance in Turbulent Environments: Theory and Evidence," *Organization Science: A Journal of the Institute of Management Sciences*, 12 (5), 632.
- La, Vinh Q., Paul G. Patterson, and Chris W. Styles (2005), "Determinants of export performance across service types: a conceptual model," *Journal of Services Marketing*, 19 (6), 379-91.
- Lambkin, Mary and George S. Day (1989), "Evolutionary Processes in Competitive Markets: Beyond the Product Life Cycle," *Journal of Marketing*, 53 (3).
- Lane, Vicki and Robert Jacobson (1995a), "Stock market reactions to brand extension announcements: The effects of brand attitude and," *Journal of Marketing*, 59 (1), 63.

- (1995b), "Stock market reactions to brand extension announcements: The effects of brand attitude and familiarity," *Journal of Marketing*, 59 (1), 63.
- Lang, Larry H. P. and Rena M. Stulz (1994), "Tobin's q, corporate diversification, and firm performance," *Journal of Political Economy*, 102 (6), 1248.
- Lee, Hun, Ken G. Smith, Curtis M. Grimm, and August Schomburg (2000), "Timing, order and durability of new product advantages with imitation," *Strategic Management Journal*, 21 (1), 23.
- Lee, Ruby P. and Rajdeep Grewal (2004), "Strategic Responses to New Technologies and Their Impact on Firm Performance," *Journal of Marketing*, 68 (4), 157-71.
- Lee, Seong Chul and Mona Makhija (2003a), "Environmental Uncertainty And The Real Options Value Of Korean Firms' International Investments " *Strategic Management Journal*(Under Review).
- (2003b), "THE REAL OPTIONS VALUE OF INTERNATIONAL INVESTMENTS: EVIDENCE FROM KOREAN FIRMS " *Academy of Management Journal*(Forthcoming).
- Li, Haiyang and Atuahene-Gima Kwaku (2001), "Product Innovation Strategy And The Performance Of New Technology Ventures In China," *Academy of Management Journal*, 44 (6), 1123-34.
- Lint, Onno, Onno Lint, and Enrico Pennings (2001), "An option approach to the new product development process: a case study at Philips Electronics," *R & D Management*, 31 (2).
- MacKinlay, A. Craig (1997), "Event studies in economics and finance," *Journal of Economic Literature*, 35 (1), 13.
- Makhija, Mona (2003), "Comparing The Resource-Based And Market-Based Views Of The Firm: Empirical Evidence From Czech Privatization," *Strategic Management Journal*, 24 (5), 433.
- McGrath, Rita Gunther, Walter J. Ferrier, and Aubrey L. Mendelow (2004), "Real Options as Engines of Choice and Heterogeneity," *Academy of Management Review*, 29 (1), 86-101.
- McGrath, Rita Gunther and Atul Nerkar (2004), "Real Options Reasoning and a New Look at the R&D Investment Strategies of Pharmaceutical Firms," *Strategic Management Journal*, 25 (1), 1-21.

- McKelvey, Bill and Howard Aldrich (1983), "Populations, Natural Selection, and Applied Organizational Science," *Administrative Science Quarterly*, 28 (1), 101.
- McMillan, G. Steven (1996), "Corporate Social Investments: Do They Pay?," *Journal of Business Ethics*, 15 (3), 309-14.
- McWilliams, Abigail and Donald Siegel (1997), "Event studies in management research: Theoretical and empirical issues," *Academy of Management Journal*, 40 (3), 626.
- Menguc, Bulent and Seigyoung Auh (2006), "Creating a Firm-level Dynamic Capability through Capitalizing on Market Orientation and Innovativeness," *Journal of the Academy of Marketing Science*, 34 (1), 63-73.
- Meschi, Pierre-Xavier (2005), "Stock market valuation of joint venture sell-offs," *Journal of International Business Studies*, 36 (6), 688-70.
- Miller, Danny (1988), "Relating Porter's Business Strategies To Environment And Structure: Analysis And Performance Implications," *Academy of Management Journal*, 31 (2), 280.
- Miller, Danny and Peter H. Friesen (1983), "Strategy-Making and Environment: The Third Link," *Strategic Management Journal*, 4 (3), 221-35.
- Miller, Kent D. and Timothy B. Folta (2002), "Option Value and Entry Timing," *Strategic Management Journal*, 23 (7), 655.
- Miller, Luke T. and Chan S. Park (2002), "Decision Making Under Uncertainty-Real Options to the Rescue?," *Engineering Economist*, 47 (2), 105.
- (2005), "A Learning Real Options Framework with Application to Process Design and Capacity Planning," *Production & Operations Management*, 14 (1), 5-20.
- Miller, Peter and Ted O'Leary (2005), "Managing Operational Flexibility in Investment Decisions: The Case of Intel," *Journal of Applied Corporate Finance*, 17 (2), 87-93.
- Min, Sungwook, Manohar U. Kalwani, and William T. Robinson (2006), "Market Pioneer and Early Follower Survival Risks: A Contingency Analysis of Really New Versus Incrementally New Product-Markets," *Journal of Marketing*, 70 (1), 15-33.
- Mindlin, Sergio E. and Howard Aldrich (1975), "Interorganizational Dependence: A Review of the Concept and a Reexamination of the Findings of the Aston Group," *Administrative Science Quarterly*, 20 (3), 382.

- Mishra, Sanjay, Dongwook Kim, and Lee Dae Hoon (1996), "Factors Affecting New Product Success: Cross-Country Comparisons," *Journal of Product Innovation Management*, 13 (6), 530-50.
- Montgomery, Cynthia A. (1982), "The Measurement of Firm Diversification: Some New Empirical Evidence," *Academy of Management Journal*, 25 (2), 299.
- Montgomery, Cynthia A. and Birger Wernerfelt (1988), "Diversification, Richardian rents, and Tobin's q," *RAND Journal of Economics*, 19 (4), 623-32.
- Murray, Janet Y., Masaaki Kotabe, and Zhou Joe Nan (2005), "Strategic alliance-based sourcing and market performance: evidence from foreign firms operating in China," *Journal of International Business Studies*, 36 (2), 187-208.
- Myers, Stewart C. (1977), "determinants of corporate borrowing," *Journal of Financial Economics*, 5 (2), 147-75.
- Nielson, Francois and Michael Hannan, T (1977), "The Expansion of National Educational Systems: Tests of a Population Ecology Model," *American Sociological Review*, 42 (3), 479-90.
- O'Brien, Jonathan P., Timothy B. Folta, and Timothy B. Douglas R. Johnson (2003), "A Real Options Perspective on Entrepreneurial Entry in the Face of Uncertainty," *Managerial & Decision Economics*, 24 (8), 515-33.
- Ozsomer, Aysegul, Roger J. Calantone, and Anthony Di Benedetto (1997), "What makes firms more innovative? A look at organizational and environmental factors," *Journal of Business & Industrial Marketing*, 12 (6), 400.
- Palepu, Krishna (1985), "Diversification Strategy, Profit Performance and the Entropy Measure," *Strategic Management Journal*, 6 (3), 239-55.
- Pauwels, Koen, Jorge Silva-Risso, Shuba Srinivasan, and Dominique M. Hanssens (2004), "New Products, Sales Promotions, and Firm Value: The Case of the Automobile Industry," *Journal of Marketing*, 68 (4), 142-56.
- Pennings, Enrico and Onno Lint (2000), "Market entry, phased rollout or abandonment? A real option approach," *European Journal of Operational Research*, 124 (1), 125-38.
- (1997), "The option value of advanced R & D," *European Journal of Operational Research*, 103 (1), 83-94.
- Penrose, Edith (1959), *The Theory of the Growth of the Firm*. Oxford: Oxford University Press.

- Pfeffer, Jeffrey (1972a), "Merger as a Response to Organizational Interdependence," *Administrative Science Quarterly*, 17 (3), 382.
- (1972b), "Size and Composition of Corporate Boards of Directors: The Organization and its Environment," *Administrative Science Quarterly*, 17 (2), 218.
- (1973), "Size, Composition, and Function of Hospital Boards of Directors: A Study of Organization-Environment Linkage," *Administrative Science Quarterly*, 18 (3), 349.
- Pfeffer, Jeffrey and Phillip Nowak (1976), "Joint Ventures and Interorganizational Interdependence," *Administrative Science Quarterly*, 21 (3), 398.
- Pujari, Devashish, Ken Peattie, and Gillian Wright (2004), "Organizational antecedents of environmental responsiveness in industrial new product development," *Industrial Marketing Management*, 33 (5), 381-91.
- Rao, Vithala R., Manoj K. Agarwal, and Denise Dahlhoff (2004), "How Is Manifest Branding Strategy Related to the Intangible Value of a Corporation?," *Journal of Marketing*, 68 (4), 126-41.
- Rasheed, Abdul M. A. and John E. Prescott (1992), "Towards an Objective Classification Scheme for Organizational Task Environments," *British Journal of Management*, 3 (4), 197.
- Raven, Peter V., Jim M. McCullough, and Patriya S. Tansuhaj (1994), "Environmental Influences and Decision-Making Uncertainty in Export Channels: Effects on Satisfactory and Performance," *Journal of International Marketing*, 2 (3), 37.
- Ray, Gautam, Waleed A. Muhanna, and Jay B. Barney (2005), "Information Technology And The Performance Of The Customer Service Process: A Resource-Based Analysis," *MIS Quarterly*, 29 (4), 625-51.
- Redmond, William H. (1995), "An Ecological Perspective on New Product Failure: The Effects of Competitive Overcrowding," *Journal of Product Innovation Management*, 12 (3), 200-13.
- Reuer, Jeffrey J. and Tony W. Tong (2005), "Real Options in International Joint Ventures," *Journal of Management*, 31 (3), 403-23.
- Richards, Timothy J. and Paul M. Patterson (2004), "Slotting Allowances as Real Options: An Alternative Explanation," *Journal of Business*, 77 (4), 675-96.

- Rittipant, Natharika (2005), "Multinational Strategies as Options Creation: An Analysis of Country, Industry and Firm Characteristics," Unpublished Doctoral Dissertation, University of Texas, Arlington.
- Roberts, Peter W. (1999), "Product innovation, product-market competition and persistent profitability in the U.S," *Strategic Management Journal*, 20 (7), 655-70.
- Rosenberger, J and Kathleen M. Eisenhardt (2003), "What are Real Options: A Review of Empirical Research?," *Academy of Management Meetings*, Seattle.
- Sabherwal, Rajiv and Sanjiv Sabherwal (2005), "Knowledge Management Using Information Technology: Determinants of Short-Term Impact on Firm Value," *Decision Sciences*, 36 (4), 531-67.
- Sambharya, Rakesh B. (2000), "Assessing the Construct Validity of Strategic and SIC-Based Measures of Corporate Diversification," *British Journal of Management*, 11 (2), 163-73.
- Santiago, Leonardo P. and Thomas G. Bifano (2005), "Management of R&D Projects Under Uncertainty: A Multidimensional Approach to Managerial Flexibility," *IEEE Transactions on Engineering Management*, 52 (2), 269-80.
- Schatzel, Kim E., Roger J. Calantone, and Cornelia Droge (2001), "Beyond the firm's initial declaration: Are preannouncements of new product introductions and withdrawals alike?," *Journal of Product Innovation Management*, 18 (2), 82-95.
- Schmalensee, Richard (1977), "Using the H-index of concentration with published data," *Review of Economics & Statistics*, 59 (2), 186.
- Schwartz, Eduardo S. (2004), "Patents and R&D as Real Options," *Economic Notes*, 33 (1), 23-54.
- Sharma, Anurag and Nelson Lacey (2004), "Linking Product Development Outcomes to Market Valuation of the Firm: The Case of the U.S. Pharmaceutical Industry," *Journal of Product Innovation Management*, 21 (5), 297-308.
- Simon, Carol J. and Mary W. Sullivan (1993), "The Measurement and Determinants of Brand Equity: a Financial Approach," *Marketing Science*, 12 (1), 28.
- Sivadas, Eugene and F. Robert Dwyer (2000), "An Examination of Organizational Factors Influencing New Product Success in Internal and Alliance-Based Processes," *Journal of Marketing*, 64 (1), 31-49.

- Smirlock, Michael, Thomas Gilligan, and William Marshall (1984), "Tobin's q and the Structure-Performance Relationship," *American Economic Review*, 74 (5), 1051.
- Srivastava, Rajendra K., Tasadduq A. Shervani, and Liam Fahey (1998), "Market-Based Assets and Shareholder Value: A Framework for Analysis," *Journal of Marketing*, 62 (1), 2-18.
- Srivastava, Rajendra K., Liam Fahey, and H. Kurt Christensen (2001), "The resource-based view and marketing: The role of market-based assets in gaining competitive advantage," *Journal of Management*, 27 (6), 777.
- Srivastava, Rajendra K., Tasadduq A. Shervani, and Liam Fahey (1999), "Marketing, Business Processes, and Shareholder Value: An Organizationally Embedded View of Marketing Activities and the Discipline of Marketing," *Journal of Marketing*, 63 (4), 168-79.
- Subramani, Mani and Eric Walden (2001), "The Impact of E-Commerce Announcements on the Market Value of Firms," *Information Systems Research*, 12 (2), 135.
- Tesfom, Goitom, Clemens Lutz, and Pervez Ghauri (2004), "Comparing export marketing channels: developed versus developing countries," *International Marketing Review*, 21 (4/5), 409-22.
- Tobin, James (1969), "A General Equilibrium Approach To Monetary Theory," *Journal of Money, Credit & Banking*, 1 (1), 15-29.
- Vassolo, Roberto S., Jaideep Anand, and Timothy B. Folta (2004), "Non-Additivity in Portfolios of Exploration Activities: a Real Options-Based Analysis of Equity Alliances in Biotechnology," *Strategic Management Journal*, 25 (11), 1045-61.
- Weerawardena, Jay, Aron O'Cass, and Craig Julian (2006), "Does industry matter? Examining the role of industry structure and organizational learning in innovation and brand performance," *Journal of Business Research*, 59 (1), 37-45.
- Wernerfelt, Birger (1984), "A Resource-based View of the Firm," *Strategic Management Journal*, 5 (2), 171-80.
- Wiersema, Margarethe F. (1992), "Top Management Team Demography And Corporate Strategic Change," *Academy of Management Journal*, 35 (1), 91.
- Wind, Jerry and Vijay Mahajan (1997), "Issues and Opportunities in New Product Development: An Introduction to the Special Issue," in *Journal of Marketing Research (JMR)*. 34 ed.

- Worrell, Dan L., Wallace N. Davidson III, and Varinder M. Sharma (1991), "Layoff Announcements and Stockholder Wealth," *Academy of Management Journal*, 34 (3), 662.
- Wu, Yuhong, Sridhar Balasubramanian, and Vijay Mahajan (2004), "When Is a Preannounced New Product Likely to Be Delayed?," *Journal of Marketing*, 68 (2), 101-13.
- Zinkhan, George M. and James A. Verbrugge (2000), "The Marketing/Finance Interface: Two Divergent and Complementary Views of the Firm," *Journal of Business Research*, 50 (2), 143-48.
- Zirger, Billie Jo and Modesto A. Maidique (1990), "A Model of New Product Development: An Empirical Test," *Management Science*, 36 (7), 867-83.

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