ANTECEDENTS, CONSEQUENCES, AND BOUNDARY CONDITIONS OF CUSTOMER PARTICIPATION IN THE NEW PRODUCT DEVELOPMENT PROCESS

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INTRODUCTION

*Today, no one needs to be convinced of the importance of innovation—intense competition, along with fast-changing markets and technologies, has made sure of that. How to innovate is the key question*—Peter F. Drucker

1.1 Customer Participation in the New Product Development Process

Marketing researchers conceptualize the innovation process as encompassing all stages from idea generation to commercialization and product adoption by consumers; new product development (NPD) is entrenched in the innovation process and is the prelaunch part of the innovation process (Yli-Renko and Janakiraman, 2008). NPD refers to all new offerings that a firm develops whether they are tangible goods, new technologies the firm can license out, or new services (Yli-Renko and Janakiraman, 2008). It is deemed the lifeblood of companies vying for competitive advantage to meet the demands of changing customer needs and adjust to changing technological uncertainty (Yli-Renko and Janakiraman, 2008; Atuahene-Gima and Ko, 2001).

Successful new products allow for competitive differentiation, the establishment of entry barriers, development of new markets, and an increase in revenue and profits (Sheng et al., 2012; Chandy and Tellis, 1998; Cooper, 1993; Wiklund and Shepherd, 2003; Chen, 2009). Research has shown that the impact of NPD on sales and profitability has been increasing over time and is ever important to a firm’s competitive position (e.g. Cooper, 2001, 2011; Zirger and Madique, 1990; Hamilton, 1968; Ayers et al., 1997; Chen et al., 2010). While NPD is advantageous to a firm’s competitive position, the failure rate of new products is between 40 to 75-percent (Joshi and Sharma, 2004; Stevens and Burley,
As such it is imperative that firms minimize failure rates and increase the output of new products to enhance competitive positions.

NPD is the prelaunch part of the innovation process (Yli-Renko and Janakiraman, 2008) and consists of idea generation, product concept development, and product testing prior to full commercialization and distribution. NPD performance depends on a deep understanding of customer needs and product development efforts that meet those needs (Hauser et al., 2006). The traditional view of NPD is internal development and production with minimal input from consumers (Prahalad and Ramaswamy, 2004; Bendapudi and Leone, 2003; Poetz and Schreier, 2012). With the growing transparency between customers and firms, more firms are utilizing customer participation in the NPD process. Customer participation is defined as a collaborative NPD activity in which customers actively contribute to idea generation, selecting various attributes of a new product offering, and acting as a codeveloper of new products and services (Hoyer et al., 2010; Prahalad and Ramaswamy, 2004; Fang, 2008). Essentially, it is the degree to which customers and firms create new knowledge and value through mutual, ongoing interactions (Blazevic and Lievens, 2008). While the traditional NPD approach was a problem solving effort solely by the firm, customer participation in the NPD process becomes a joint problem-solving approach (Gerwin, 2004; Coviello and Joseph, 2012). Due to NPD performance depending on the deep understanding of consumer needs and developing products that meet those needs, research suggests that ideas generated through customer participation will more closely mirror consumer needs (Hoyer et al., 2010) and lead to greater levels of adoption by customers (Gruner and Homburg, 2000).
Benefits of customer participation span across all three major functions of NPD; first, customers are an abundant source of new product ideas (Von Hippel, 1978) since they provide first hand solutions to the problems they face (Yli-Renko and Janakiraman, 2008). They provide the firm with ideas to enhance current products and potentially new products that are not available on the market. Previous research suggests that listening to customers for NPD ideas will lead to ‘me-too’ products that fail to establish competitive differentiation and barriers to entry (Berthon et al., 1999), but was based on arm’s length relational perspectives where customers were just an external asset that was an information source. The new approach to NPD differs from the traditional approach in that it integrates customers into firm processes and acts as a relational tool for co-development of new products. By developing the relational aspect of the firm – customer dyad, organizations are able to discover latent needs and utilize the external knowledge from customers and combine it with internal knowledge sources, thus potentially enhancing NPD ideas and processes (Cui and O’Connor, 2013).

Second, in the product concept development stage, NPD is typically conducted as a collaborative activity among the firm and organizational stakeholders such as customers and suppliers (Chesbrough, 2003; Von Hippel, 1988; Yli-Renko and Janakiraman, 2008). Coviello and Joseph (2012) showed that in a B2B context, customers bring in complementary knowledge sources, technologies and capital investment when developing a prototype for product testing. Customers may help decrease development time and costs (Lettl et al., 2006), improve efficiency (Griffin and Hauser, 1993), and reduce management uncertainty (Yli-Renko and Janakiraman, 2008). The first two stages, typically coined as the ‘fuzzy front end’, or pre-construction and development,
NPD are the most time consuming and costly for managers and organizations. Firms must decide whether to continue investing resources into ideas and concepts to develop prototypes and further product testing (Kim and Wilemon, 2002). By integrating customers into these first two stages, firms can reduce the costs, time commitment and fuzziness that may plague firms in continually changing environments.

Third, in the product testing stage, customers may play a primary role with testing prototypes and test the potential acceptance of new technologies and products. Customers essentially provide important input into the market research process used to evaluate and refine new product ideas (Griffin and Hauser, 1993). This may help the firm avoid potential market failure of new products and correct any faults before incurring greater costs of market rollout. Moreover, with the greater transparency between firms and customers, more firms are developing the capabilities to test products and services in virtual environments (Bagozzi and Dholakia, 2006; Jeppesen and Fredriksen, 2006; Blazevic and Lievens, 2008). Essentially, customer participation in the product testing stage allows refinement of the product, testing among different user groups, ensuring the proper product support is in place before full rollout and may assist in speeding up the product testing stage (Nambisan, 2002).

Substantively, extant research has uncovered a plethora of benefits regarding integrating customers into the NPD process; studies have shown that customer participation can improve the effectiveness of NPD (Cooper and Kleinschmidt, 1987; Griffin and Hauser, 1996), new product value (Coviello and Joseph, 2012), information sharing and collaboration (Fang et al., 2008), customer empowerment and engagement (Fuchs and Schreier, 2011; Schreier et al., 2012; Prahalad and Ramaswamy, 2004; Hoyer
et al., 2010), customer loyalty (Auh et al., 2007) and the innovativeness of new ideas (Von Hippel, 1978). While the implications of previous research seem promising, much work on the construct remains. Extant research has been grounded in case studies (e.g. Ramaswamy, 2008), specific channel types (i.e. B2B) (e.g. Coviello and Joseph, 2012) and has focused on specific user groups as co-creators such as lead users (e.g. Prahalad and Ramaswamy, 2004; Prahalad and Hamel, 1990; Von Hippel, 1978, 1986). As such, there has been a severe lack of generalization within the research stream, antecedents have been largely unexplored (see Bagozzi and Dholakia, 2006 for exception) and there has been a dearth of research on potential problems of integrating customers into NPD. As such, this dissertation seeks to build upon previous studies and expand the nomological network of customer participation in NPD by examining antecedents (Essay 1), consequences (Essays 2 and 3), potential mediating processes (Essay 2), and potential moderators impacting customer participation’s antecedents and consequences (Essays 1, 2 and 3).

1.2 The Difference between Customer Participation and Open Innovation

Customer participation and open innovation are conceptually distinct from one another. While firms that utilize customer participation focus on using customers as an information resource, codeveloper, or product tester (Fang, 2008), open innovation concerns outsourcing NPD to user communities on a permanent basis (Schreier et al., 2012). It has been conceptualized as the demand side innovation for new products and services (Prahalad and Ramaswamy, 2004). Essentially, open innovation is a permanent and exclusive empowerment of a firm’s user community to generate promising ideas and
potentially full scale development for new products (Lichtenthaler, 2008; Ulrich, 2007); it is opposite to the traditional NPD view of exclusive internal development of new products—it is the exclusive external development of new products.

Examples of open innovation are Threadless.com and Linux software. Threadless.com lets users create and submit t-shirt designs and then the remainder of the brand community can vote on the best designs. Threadless.com receives approximately 500 submissions per week and the people that create the designs are allowed to retain rights to the design (Schreier et al., 2012). The CEO of Threadless.com states that the company does not perform any NPD activities internally (Bogers et al., 2010; Schreier et al., 2012) and relies exclusively on customer design for new products. Linux software system gives users a toolbox (i.e. platform) in which the user community can build upon the base technology and share developer code with other users. At any given time, there may be thousands of decentralized programmers working on the platform and sharing new and improved code with each other (Gassmann, 2006) without input from Linux. As such, customer participation can be viewed as a hybrid NPD perspective in which firms utilize both internal and external knowledge resources to develop new products whereas open innovation is the permanent and exclusive empowerment of the user community for NPD.

A concept that is embedded in the open innovation paradigm is that of crowdsourcing, outsourcing idea generation to a “crowd” of users (Poetz and Schreier, 2012). Crowdsourcing lacks the collaborative aspect of customer participation, as it is a complete outsourcing of an NPD step, thus it is the front end of open innovation. Examples of crowdsourcing include Frito Lay’s ‘Do us a Flavor’ contest where users
submit ideas for chip flavors and the user community selects the flavors of chips that are produced. Flavor outcomes include Kettle Cooked Wasabi Ginger, Cappuccino, and Chicken and Waffles. As another exemplar, Vitamin Water created an app called ‘Flavor Creator’ where users similarly submitted and chose new flavors that the company will subsequently produce.

1.3 The Difference between Customer Participation and Mass Customization

Mass customization is a process by which firms apply management and technology methods to provide product variety and customization through flexibility and responsiveness (Kotha, 1995). It sanctions the firm with capabilities to provide variety in products and services so that the firm can provide unique offerings to individual customers (Pine, 1993). Essentially, the variety of products attributes has already been commercialized so customers can plug in the specific attributes of their choosing. While it is possible that customers are involved in selecting the various product attributes the firm will produce, the focus of mass customization research is that it involves pre-commercialization specialty and capabilities of the firm to enhance product value and offerings to customers (Gilmore and Pine, 1997). As such, it is not focused on the collaborative nature of integrating customers into NPD processes.

Examples of mass customization include Build-a-Bear Workshop and Porsche Car Configurator. Build-a-Bear allows customers to build a stuffed animal to their liking. Various components of the stuffed animals include colors (e.g. camouflage or rainbow), type of animal (e.g. monkey or dog), shoes (e.g. Mary Jane’s or athletic shoes), outfits (e.g. tuxedo or ballerina outfit), etc. The components that make up the final product have
already been produced and the customer has a greater number of options as to how they wish to build their animal when in the store. Another example is Porsche Car Configurator. Porsche’s website allows potential customers to build their own vehicle and choose multiple attributes that makes their vehicle unique (e.g. wheels, color, tint, brake pad color). Given the cost of manufacturing all combinations of colors pre-order, Porsche has instead developed the manufacturing capabilities to provide mass customization to its customers while not incurring large up front single automobile manufacturing costs.

1.4 Summary of Essays

This dissertation is comprised of three essays, each focusing on a specific aspect of the customer participation nomological network. Essay 1 focuses on the organizational antecedents of customer participation. This essay delves into resource deployments and capabilities of the firm and how organizational or environmental aspects may enhance or deter customer participation in the NPD process, as it may not align with a firm’s inherent characteristics based on its strategic philosophy. More specifically, the strategic orientation of the firm is examined.

Market orientation (MO) and entrepreneurial orientation (EO) are two dimensions of a firm’s strategic orientation that firms may rely on to gain competitive advantage. A primary focus of MO is on external information (i.e. customers and competitors) to develop ideas for NPD whereas the focus of EO firms is on internal idea development in order to be more innovative and proactive than competitors. Research has suggested that both MO and EO can impact a firm’s ability to develop new products successfully, but
each may only provide partial capabilities and success for NPD performance (e.g. Boso et al., 2013; Han et al., 1998; Hurley and Hult, 1998; Zahra et al., 2005). Essay 1 suggests that both strategic orientations are concerned with knowledge in the external environment (e.g. customers), but under certain circumstances the inherent differences between the orientations will come to light. More specifically, when environmental turbulence is examined this research suggests that MO firms will have a greater focus on integrating customers into NPD whereas it will become a deterrent for EO firms. Given that MO firms place customers at the top of the organizational depth chart (e.g. Zhou et al., 2005), MO firms will become more reliant on customers to deal with turbulent environments. In contrast, EO firms will focus on shaping the competitive landscape by deploying resources and utilizing capabilities that focus on being proactive to develop new markets and develop innovations that displace current technologies and products.

A second contingency factor examined in Essay 1 is that of firm age. As firms become older, their resource deployments become more stabilized (Chandy and Tellis, 2000) and they develop the necessary capabilities that align with their strategic philosophy (Day, 1994). Market oriented firms may become better able to integrate external knowledge sources into firm processes and develop the Interfunctional coordination, key aspects of MO, that provides greater relational building capabilities with core constituents. As such, it is suggested that the relationship between MO and customer participation will be strengthened as MO firms become older. Alternatively, high EO firms may have greater concern with autonomy and flexibility if relational embeddedness becomes an issue that is misaligned with their core philosophy. Moreover, EO firms may have developed greater capabilities to focus on internal NPD
processes and utilize technology push strategies to disrupt competitive positions. As such, it is suggested that firm age will negatively impact the relationship between EO and customer participation.

The results in this essay support the notion that EO firms are concerned with external knowledge sources (Keh et al., 2007) and integrate customers into NPD activities. Moreover, as EO firms operate in turbulent environments or become older they are less reliant on customers as co-innovators as both environmental turbulence and firm age negatively impact EO’s relationship with customer participation. Alternatively, the main effect of MO positively impacting customer participation is not supported. The results also show that environmental turbulence does not affect the relationship between MO and customer participation although as MO firms become older, they become more likely to integrate customers into NPD activities. The results bring to light similarities between the strategic orientations with MO being conceptually linked to customer information and the results showing the EO firms integrate customers into NPD, but as turbulence and age increase, EO firms become more dissimilar to MO firms.

Essay 2 focuses on the firm level outcomes of customer participation. It is suggested in this essay that there may be a customer participation paradox that firms need to effectively manage. While research has uncovered a plethora of positive outcomes of customer participation (e.g. Auh et al., 2007; Schreier et al., 2012; Fang et al., 2008), recent research has suggested that there may be a dark side to customer participation (e.g. Chan et al., 2012; Noordhoff et al., 2012). Here is it suggested that customer participation will positively impact NPD performance, but may have an indirect negative impact by way of the degree of product newness, which negatively impacts performance.
Recent research suggests that customers may be a source of radical new product ideas (Lettl, 2007) and implemented customer ideas may be associated with a higher degree of learning for the customer portfolio. When products are too new or radical, additional market segments may forego initial trial and adoption due to perceived risk (Lawton and Parasuraman, 1980), thus impacting performance adversely. This essay focuses on managing the paradox with absorptive capacity (ACAP). ACAP is defined as a firm’s dynamic capability that helps firms utilize their knowledge structures to acquire, transform, assimilate and exploit external knowledge and apply it to commercial ends (Zahra and George, 2002; Cohen and Levinthal, 1990). ACAP. It is suggested that ACAP may enhance the relationship between customer participation and performance due to its ability to enhance information utilization and mitigate NPD costs by greater ease of acquiring knowledge, perceiving meaningful patterns to help transform and assimilate into the firm’s knowledge structure, and exploit it effectively. Meanwhile, it may help decrease the perceived degree of product newness due to redefining and reclassifying problems, and using domain specific knowledge to implement new product solutions (Chandy et al., 2006). ACAP may assist firms in transforming radical ideas into more usable form that is more marketable and potentially more useful to the market.

The results of Essay 2 show that customer participation does indeed impact NPD performance and the degree of product newness positively. Furthermore, the degree of product newness impacts NPD performance negatively suggesting a customer participation paradox. Although the essay suggests that ACAP solves the paradox,

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1 Although the main effects relationships are significant and the signs are as expected, the Preacher & Hayes bootstrapping procedure was conducted to test for the significance of the mediation. The results show that degree of product newness does not mediate the relationship between customer participation and NPD performance.
neither of the moderating hypotheses was supported at statistically significant levels. As such, I hope to explore potential organizational capabilities in the future to help solve the paradox.

Given that more firms are beginning to integrate customers into NPD activities and customers wish to have greater involvement and engagement with firms (Hoyer et al., 2010), Essay 3 examines how undergoing strategic change may affect consumer attitudes toward the firm. Here it is suggested that by opening up the innovation process (e.g. from closed innovation strategy to customer participation innovation strategy), firms can enhance attitudes toward the brand. Moreover, a firm’s innovation reputation is examined to determine how it impacts strategic change. It is suggested that if a firm has a low reputation, any change should be beneficial while seeking to enhance consumer attitudes. In contrast, if firms possess a high reputation it is suggested that staying the course with their current innovation strategy may provide the best course of action, with retaining the ability to moderately change how customers are used in the innovation process. Customers come to expect certain offerings from the firm and when the firm deviates too far from how they built their innovation reputation, it may have adverse effects.

The results for Essay 3 show that opening up the innovation process is beneficial to enhancing consumer attitudes. Moreover, the results support the notion that when firms are lowly reputable, strategic change is embraced by consumers whereas with highly reputable firms, status quo or moderately opening up the innovation process is the best strategy for the firm. One aspect of Essay 3 worth noting is that consumer attitudes
reflect that the innovation process can be opened to customers, but there are adverse effects if the firm closes the process off.

1.5 Scope of Data

The data for Essays 1 and 2 were obtained from 522 U.S. firms and collected via email survey over a total period of six months. The sampling frame for the study was constructed using multiple sources. First, multiple Chamber of Commerce directories from the states of Ohio, Pennsylvania, Kentucky, and Michigan were used to gain access to the emails of senior level management of firms whose headquarters are in those states. Second, a commercial list broker was contacted for an additional email address of senior management in the U.S. The sample for Essay 1 was reduced to 321 firms and Essay 2 was reduced to 305 firms due to some respondents not completing the questionnaire in regard to the variables of interest in this study, not having knowledge of new product development activities, answering “no” to the informed consent questions, or working in a position that is irrelevant to the study (e.g. assistant).

The overall response rate for the data collection is 20.8%. With the reduction of respondents in the specific studies, the response rate is similar to other primary data collection studies (e.g. Slater et al., 2011; Merrilees et al., 2012; Naidoo, 2010) and no bias is apparent from the re-prompting of respondents as a reminder to take the questionnaire (Armstrong and Overton, 1977).

The overall sample characteristics are as follows:

- Average annual sales of approximately $402 million
- Average of 579 employees
• Average firm age of 31 years

• Product Type – goods (32%); services (44%); both (24%)

• Customer Type – consumers (24%); businesses (44%); both (32%)

• Respondent Position – general management (77%); functional management (23%)

• Average number of years employed – 12 years

• Number of industries (NAICS) – 18
  ○ High—manufacturing (19%)
  ○ Low—agriculture, mining, transportation (1% each)

Data for Essay 3 was collected from Amazon M-Turk participants. In total, five hundred fifty eight participants completed the study. The essay used a 2 (high/low innovation reputation) X 2 (closed/customer participation beginning strategy) X 3 (closed/customer participation/open ending strategy) factorial design to test the hypotheses. Thus, there were a total of twelve cells for the five hundred fifty eight participants that were randomly assigned to conditions. On average, each cell had forty-seven participants, far exceeding the suggested minimum of 20-30 (Simmons et al., 2011).

1.6 Contribution to the Current State of Literature

While there is an ever-expanding literature on NPD, innovation and customer participation, much work still remains. I intend this dissertation to expand our current knowledge about the construct in several important ways.

First, because much of the knowledge about customer participation in the NPD process is grounded in case studies and specific contexts, there is a dearth of large-scale
empirical research on its antecedents, consequences, moderating variables, and the processes the relationships are mediated by. This research seeks to expand the nomological network of customer participation and examine the construct from a generalized perspective. Essay 1 examines antecedents of the construct, Essay 2 examines consequences and a potential mediator, Essay 3 examines the process of change that firms undergo to integrate customers into the NPD process, and all three essays explore potential moderators that strengthen or change the relationships between predictors and their outcomes. As such, this dissertation is the first step in building a more complete picture of the construct.

Second, the benefits of customer participation are the primary driver of the existing state of the literature. One impetus of my research is to examine if there is a customer participation paradox that needs to be managed by organizations. Recent research has suggested there is a potential dark side to customer participation. Chan and colleagues (2010) show that customer participation can hamper employee satisfaction and increase employee stress due to coordination difficulties associated with integrating external stakeholders into the process. In another study, Noordhoff and colleagues (2012) show that the relational embeddedness between customers and suppliers can debilitate the supplier from being more innovative due to worries about opportunism by the customer. While there may be benefits to customer participation, firms may need to worry about the use of customers as the driving force behind new products. Previous research has suggested there may be a self-selection bias (Bendapudi and Leone, 2003) with customers that wish to participate; moreover, with the growth of user entrepreneurs and more radical ideas from customers, firms may come to develop products that are
perceived to be too new for the remainder of the market. According to S-Curve theory, radical innovations may eventually displace incumbents (Sorescu et al., 2003), but there are periods of negative performance before radical innovations are profitable and widely accepted. As such, there may be an initial negative indirect effect with products co-created with customers. But not all is lost for firms; Essay 2 suggests that a firm’s cognitive structure and capabilities can mitigate the potential negative effects and maximize the benefits by utilizing its ACAP.

Third, there is a growing body of research on consumer outcomes and attitudes toward the brand when firms utilize customers in the innovation process. While this research seems promising, few studies have focused on the periphery (i.e. customers that do not participate) of customers and market segments. As such, Essay 3 builds on work by Fuchs and Schreier (2012) that were the first to begin examining such the periphery. One area of need in regard to consumer outcomes of customer participation is that of strategic change by the firm and how it aligns with a firm’s innovation reputation. Previous studies have focused on discrete events of customer participation and open innovation (e.g. Fuchs and Schreier, 2012; Schreier et al., 2012) and have not focused on the process of firms changing their innovation strategy to accommodate the growing preference by customers to be more involved in the innovation process (Hoyer et al., 2010). As such, Essay 3 examines strategic change and its impact on consumer attitudes toward the brand. While it is suggested that change in regard to opening up the innovation process is beneficial for firms, it may not always be the case. A firm’s innovation reputation is examined to determine whether change aligns with what
customers expect from firms. Substantively, this study builds upon the B2C customer participation literature and consumer outcomes of differing innovation paradigms.

Fourth, with the advent of more transparency between firms and consumers, how does a firm sort through and filter the information that is presented to them in order to maximize benefits? A major gap in the literature at this time is the use of theoretical perspectives that are primarily influential in the B2B channels. Transaction cost theory (Larsson and Bowen, 1989), agency theory (Mills and Morris, 1986), theory of planned behavior (Bagozzi and Dholakia, 2006), and resource dependence theory (Fang et al., 2008) have been the primary motivators of the current research. Moreover, following Coviello and Joseph (2012), the innovation process is a complex social system and “a single theoretical lens may be inappropriate” (page 88). As such, this dissertation applies the resource-based view of the firm, its extension the dynamic capabilities literature, organizational learning theory and reputation theory to examine the issues at hand and offer different theoretical perspectives than extant literature.
ESSAY 1

ANTECEDENTS OF CUSTOMER PARTICIPATION IN THE NEW PRODUCT DEVELOPMENT PROCESS: A STRATEGIC ORIENTATION PERSPECTIVE

2.1 Introduction

As firms seek to build sustainable competitive advantage, they seek more creative ways to enhance new product development (NPD) performance, the extent to which new products meet management’s perceptions of market share, sales, profit, and customer adoption rates (Atuahene-Gima and Ko, 2001; Gatignon and Xuereb, 1997). Firms have recognized that customers wish to be engaged by firms that supply their goods and services (Hoyer et al., 2010); as such, with the growing transparency between firms and customers due to technological advances (e.g. internet), more firms are utilizing customer participation in the NPD process. Customer participation is a collaborative NPD activity in which customers actively contribute to idea generation, selecting various attributes of a new product offering, and acting as a codeveloper of new products and services (Hoyer et al., 2010; Prahalad and Ramaswamy, 2004; Fang, 2008). Firms such as Nike, Proctor & Gamble, Unilever Best Foods, and BASF have achieved success by implementing programs to support the integration of customers into the NPD process (e.g. Prahalad and Ramaswamy, 2004; Ramaswamy, 2008).

This phenomenon has led researchers to focus on the outcomes of customer participation such as partnering effects on firm innovation (e.g. Cui and O’Connor, 2012), internal control issues for innovation and new product development (e.g. Sethi et
al., 2012; Joshi, 2010; Chan et al., 2010), network effects of new product adoption (e.g. Goldenberg et al., 2009), and firm innovation and performance outcomes (e.g. Fang 2008; Coviello and Joseph, 2012), among others. While there is a growing body of literature on the consequences of customer participation, the antecedents have been largely ignored. The primary goal of this research is to examine how the strategic orientation of the firm may impact the level of customer participation in NPD. This research suggests that under certain conditions, not all firms seek to integrate customers into the NPD process as it may take away from its core philosophy and resource deployments.

A firm’s strategic orientation is indicative of its resource deployments and learning objectives to build and sustain competitive advantage (Gatignon and Xuereb, 1997; Zhou and Li, 2010). Market orientation (MO) and entrepreneurial orientation (EO) are two dimensions of a firm’s strategic orientation that it may rely on to create customer value (Miles and Arnold, 1991; Boso et al., 2013). While both orientations have been shown to explain variance in firm performance (Zhou et al., 2005), the strategic approaches of the orientations are inherently different. MO is the organization-wide generation of market intelligence that pertains to current and future customer needs, dissemination of intelligence across departments, and organization-wide responsiveness to it (Hurley and Hult, 1998: 43; from Kohli and Jaworski, 1990). Firms that have a high MO focus seek to generate information that lies external to the firm by focusing on current and future customer needs and competitive actions. Alternatively, the EO of a firm refers to a firm’s internal culture in regard to processes, practices, and decision-making activities that lead to entry into new product markets (Lumpkin and Dess, 1996;
Zahra, 2005). High EO firms take a proactive approach to enter new markets, build innovative new products or services, and subsequently take on more risk, in regard to both financial and NPD failure risks.

Previous research suggests that high MO firms place customers at the top of the organizational chart and work closely with them in regard to generating new product ideas (Zhou et al., 2005) whereas firms that adopt an EO philosophy disregard customers when seeking to generate breakthrough innovations to shape the competitive landscape (Berthon et al., 1999). While some EO scholars believe that being customer led leads to lower rates of breakthrough innovation, the antithesis of an EO philosophy, recent work by Coviello and Joseph (2012) suggests that the collaboration between firms and customers in NPD activities can enhance a firm’s propensity to create major innovations.

In this regard, this research suggests that EO firms that pursue NPD projects that are innovative and risky will seek to generate products collaboratively with customers in order to reduce risk and identify latent needs during the NPD process. As such, both MO and EO firms will integrate customers into NPD activities while trying to gain competitive advantage.

While this research suggests that MO and EO firms will use customers similarly ceteris paribus, two contingency factors are examined that affect MO’s and EO’s impact on customer participation differently. First, environmental turbulence is examined to capture the effects of changes in technology, customer preference stability, and competitive intensity. Within rapidly changing environments, research suggests firms should avoid integrating new external information from the environment into the NPD process (Gatignon and Xuereb, 1997), but firms with different strategic philosophies may
make different choices in regard to integrating customers in the NPD process. Market
oriented firms, without the required resource base to undergo substantial new NPD
activities will increase their use of customers in the NPD process. Alternatively,
entrepreneurially oriented firms will avoid customer participation and focus on internal
idea generation and implementation to avoid uncertainty and shape the competitive
environment. Second, as firms become older they become more entrenched in product
markets and their resource deployments become more consistent and stabilized (Chandy
and Tellis, 2000). With MO’s primary focus on customers, MO’s reliance on customers
in NPD will increase with age. Alternatively, as EO firms develop the necessary
capabilities of enhancing innovative output over time (Day, 1994), EO firms will
decrease their use of customers in NPD to retain autonomy and flexibility in the NPD
process and avoid relational embeddedness. As such, a second contribution of this paper
is to show how both internal and external factors may impact the value firms place on
customer integration into NPD activities.

The remainder of the paper proceeds as follows. In the next section, the theory is
discussed regarding strategic orientations of the firm and their impact on customer
participation in NPD. Next, the methodology and results of the analysis are presented.
The paper concludes with a discussion of the implications for theory and practice and
recommendations for future research.
2.2 Theory and Hypotheses Development

To ease the interpretation of my theoretical framework and research hypotheses, the model specifying the variables and relationships in the framework is presented in Figure 1.

--- Insert Figure 1 about here ---

2.2.1 Background

Technology in today’s markets has provided customers with greater information and the ability to communicate with other customers and companies on a global scale (Sawhney et al., 2005; Prahalad and Ramaswamy, 2004). Research has suggested that customers wish to be more engaged by firms (Hoyer et al., 2010) and have a two-way flow of information versus the traditional one-sidedness of firm-customer interactions. While the consequences of customer participation in NPD are well documented (e.g. Fang et al., 2008; Sethi et al., 2012; Joshi, 2010; Chan et al., 2010; Goldenberg et al., 2009; Fang 2008; Coviello and Joseph, 2012), the antecedents have been largely ignored. Extant research has shown a positive relationship between customer participation and innovativeness, adoption rates, and firm performance (Coviello and Joseph, 2012), but given the differences between firms’ knowledge structures, resource bases, and capabilities, under certain conditions firms may wish to eschew the use of customers in NPD activities. The resource base of the firm and resource deployments determines how
it learns about its environment and customers, which subsequently affects a firm’s willingness or ability to integrate customers into the NPD process.

According to the resource-based view of the firm (RBV) and dynamic capabilities (DC) literature, resources are a prerequisite of sustainable competitive advantage, a value creating strategy not currently implemented by competitors and when the efforts of duplication have failed (Barney, 1991). Resources are considered to be “assets, capabilities, organizational processes, firm attributes, information, knowledge, etc. controlled by a firm that enable the firm to conceive of and implement strategies that improve its efficiency and effectiveness” (Barney, 1991: 101; Daft, 1983). At a more aggregate level, a firm’s resources consist of physical capital (e.g. technology), human capital (e.g. experience and insight), and organizational capital (e.g. planning, controlling, coordinating) (Williamson, 1975; Becker, 1964; Tomer, 1987; Barney, 1991). An extension of the RBV, the dynamic capabilities literature (Teece et al., 1997), suggests that possessing resources is not enough; firms must be able to organize and exploit existing internal and external firm competencies to address changing environments. As stated by Zhou and colleagues (2005), “capabilities are the glue that brings these [resources] together and enables a firm to deploy them advantageously” (page 44). The capabilities of an organization are deeply embedded in organizational routines and practices (Barney, 1991; Day, 1994) and develop over long periods of organizational and market learning via resource deployments.

The strategic orientation of the firm is, substantively, how a firm organizes and deploys its resources in order to achieve competitive advantage in the marketplace (Atuahene-Gima and Ko, 2001). Moreover, it assists in developing capabilities that help
dictate how firms generate and utilize information and knowledge in the NPD process. Essentially, strategic orientation is a firm capability that reflects a firm’s [strategic] philosophy, beliefs, and values (Zhou et al., 2005) and guides its strategic activities and behavior to achieve a sustainable competitive advantage (Gatignon and Xuereb, 1997).

Extant research across the fields of entrepreneurship, management and marketing suggest that MO and EO firms differ significantly in how they utilize customers in competitive advantage building activities, more specifically NPD (Zhou et al., 2005; Cheng and Huizingh, 2014; Berthon et al., 1999; Chen et al., 2012). MO firms are considered to listen closely to their customers to discover both current and future latent needs (Narver and Slater, 1990). MO firms seek to develop better insights in customer needs and competitive offerings (Cheng and Huizingh, 2014) and develop new products for markets that are currently served by the firm (Hamel and Prahalad, 1991). While customer participation in NPD activities demands additional resources to accommodate and utilize the information, research posits that MO firms develop processes and systems to integrate and utilize external knowledge across functional boundaries. Moreover, an MO philosophy provides the firm with customer-linking capabilities that assist in enhancing innovation and strategic efforts (Kirca et al., 2005). It assists firms in customer relational building and external knowledge integration for its innovative efforts. Given a market oriented firm’s focus on outside-in activities of generating and disseminating market intelligence, a high MO firm may be more prone to have customers participate in NPD than low MO firms.

The ability to proactively initiate change, develop breakthrough innovations, and take risks distinguishes entrepreneurial versus non-entrepreneurial firms (Naman and
(Slevin, 1993; Zhou et al., 2005). While the primary foci of EO firms (e.g. breakthrough innovations) differ from those of MO firms (e.g. customer focus), there is reason to believe that EO firms may value insights from customers and integrate them into NPD. Research suggests that entrepreneurially oriented firms similarly deploy resources to scan and monitor the external environment to identify new opportunities to strengthen competitive positions and develop new product markets (Covin and Miles, 1999; Lumpkin and Dess, 1996). An aspect of an EO’s environmental scanning efforts concerns looking for new information that assists in developing greater value for current customers and being proactive to develop future markets so as not to fall to incumbent inertia (Keh et al., 2007; Cheng and Huizingh, 2014). Coviello and Joseph (2012) suggest that entrepreneurial firms that co-develop products and services together create more innovative and successful products. Moreover, with a primary focus of entrepreneurially oriented firms on innovation, integrating customers into the NPD process may reduce the associated risk involved with developing more innovative products that have higher failure rates. As such, there is reason to believe that both MO and EO firms will seek to integrate customers into NPD activities.

While it is assumed that both MO and EO will impact customer participation positively, a firm’s strategic activities do not operate in a vacuum. In this regard, internal and external factors need to be considered. First, given the inherent differences in strategic philosophies between MO and EO firms, environmental turbulence may have a differing impact on how firms utilize customers in NPD. Turbulent environments are plagued with high levels of volatility (rate and amount of change) and uncertainty in predicting trends and demand of customer preferences (Miller and Friesen, 1983; Schilke,
A firm’s strategic decisions must consider and adapt to the external environment in order to maximize the effectiveness of resource deployments (Ginsberg and Venkatraman, 1985; Augusto and Coelho, 2009). Research is mixed on how firms should utilize customer interactions during NPD. On the one hand, research suggests that customers may hinder NPD performance in turbulent environments (Gatignon and Xuereb, 1997) due to the coordination difficulties and time commitments. On the other hand, researchers suggest that customer interaction may provide a direction for NPD efforts (Day and Wensley, 1988) as it provides greater opportunity for creating value to customers, thus constructing a more stable environment (Narver and Slater, 1990).

Moreover, exhaustive forecasting and analysis may be detrimental to NPD efforts as it may lead to slower NPD efforts and missed opportunities (Anderson et al., 1997). Here it is suggested that when MO firms encounter turbulent environments, they will have greater focus on customers to safeguard their current assets and resource deployments. MO firms are focused on current markets served and developing a value proposition that exceeds that of competitors. In highly competitive environments, customers can choose from a wider pool of product offerings (Augusto and Coelho, 2009), thus increasing the importance MO firms place on customer interactions and integration in NPD so as to ensure that customers do not select competitive alternatives (Kohli and Jaworski, 1990). MO firms will rely on customers for NPD activities to enhance intelligence generation efforts to ‘weather the storm’ and develop stronger bonds with customers.

Alternatively, EO firms will forego integrating customers into the NPD process as they wish to remain ahead of competition and develop technologies and markets proactively. Contingency theory and the environmental contingencies view suggest that
firms must fit their strategies to the environment by structuring the organization to be decentralized and more organic when in dynamic and turbulent environments (Calantone et al., 2003; Burns and Stalker, 1961). Moreover, research suggests that innovation represents the most effective way to deal with turbulent environments (Gupta et al., 1986; Weiss and Heide, 1993; Gatignon and Xuereb, 1997), a core focus of entrepreneurial firms. As such, in turbulent environments, it is expected that the inherent differences in philosophies (e.g. customers vs. innovation) and a firm’s core strategic building activities will lead MO firms to increase and EO firms to decrease the integration of customers in NPD.

Second, firm age is suggested to stabilize resource deployments and assist with the development of specific capabilities that firms garner useful in their strategic activities (Day, 1994; Chandy and Tellis, 2000). MO firms’ core focus is on the customer and building products to meet their current and future needs whereas EO firms have a focus on developing innovative new products, being proactive to preempt competition in developing new products and markets, and assuming the risk associated with the philosophy. In this regard, it is suggested that MO firms will stabilize their investments into relational building activities with customers due to their core focus being on customers, leading to greater involvement by customers in what products the firm develops. Alternatively, EO firms will have developed the capabilities to match their strategic philosophy of innovative products that develop new product markets, thus reducing their reliance on customer participation for new product co-creation. As such, older MO firms will increase the level of customer participation whereas EO firms will decrease the level of customer participation.
2.2.2 Market orientation and customer participation

Prahalad and Hamel (1990) suggest that a firm’s processes of intelligence generation and functional integration are core organizational capabilities that a firm can rely on for competitive advantage (Li and Calantone, 1998). MO’s focus is “finding out what the customer needs, wants, and values, and then delivering this as expeditiously and economically as possible” (Berthon et al. 1999: 39). As such, it is the generation and deliverance of products and services that are valued by current and potential customers. Essentially, its focus is on outside in learning with substantial knowledge generation deriving from customers in terms of current and future trends and needs in the marketplace. Previous research on the consequences of market orientation has focused on organizational performance, customer responses to the firm’s responsiveness to market intelligence, innovation performance, and employee consequences (e.g. Jaworski and Kohli, 1996; Kirca et al., 2005). Sanchez and Elola (1991) suggest that development of market and customer knowledge is the most frequent method of assessing the marketability of a new product.

High MO firms focus on generating new products based on insights from consumers and competitor’s strategic actions; they seek information about their environment to better understand and meet the needs and wants of the various stakeholders (Cadogan et al., 2002; Cadogan et al., 1999). Essentially, market oriented firms seek to develop competitive advantage via superior understanding of customers’ current and future needs and the ability to offer products or services that are superior to competitors’ offerings (Ellis, 2006). Market learning is a driving force behind MO firms’ resource deployments and developed capabilities; market oriented firms spend a vast
amount of resources on learning from customers and develop a depth of customer knowledge, which has been identified as a key source of new product development (Cooper and Kleinschmidt, 1995, 1996; Joshi and Sharma, 2004).

While research suggests that the organizational-wide responsiveness aspect of market orientation lies internal to the firm, due to customers wishing more engagement and having more dialogue with the company (Hoyer et al., 2010), this will lead market oriented firms to understand that customer participation is the next step in organizational evolution. The organizational learning about customers and latent needs (in products and relations with the firm) will become a more integrated approach and will lead to a greater level of customer participation. More formally, I hypothesize:

\[ H1: \text{Market orientation is positively related to customer participation in the NPD process.} \]

2.2.3 Entrepreneurial orientation and customer participation

Entrepreneurial orientation pertains to a firm’s focus on the processes, practices, and decision-making activities that lead to entry into new markets yet to be explored (Wales et al., 2013; Stam and Elfring, 2008; Rauch et al., 2009; Lumpkin and Dess, 1996). It consists of the proactiveness, innovativeness, and risk taking of the firm (Covin and Slevin, 1989). Firms that engage in a high level of EO focus on experimentation that may result in new products, services, or technological processes (Wiklund and Shepherd, 2005). This philosophy is mostly concerned with an internal NPD focus, or inside-out learning. While some researchers suggest that high EO firms may forego listening to their customers and use a technology push strategy (e.g. Berthon et al., 2009), others
content that high EO firms constantly scan and monitor the environment to find new opportunities and strengthen their competitive positions, manage risk taking, and challenge competitors (Keh et al., 2007). As such, there is reason to believe that the three dimensions of EO may facilitate the integration of customers into NPD activities.

Proactiveness refers to the opportunity-seeking, forward-looking perspective characterized by the introduction of new products and services ahead of competition and in anticipation of future demand (Rauch et al., 2009). Furthermore, proactiveness pertains to the development and entry into new markets by leveraging the firm’s core capabilities. While proactiveness relates to shaping the environment to the firm’s own advantage, research suggests that proactive firms are still responsive to their environment in terms of innovation and customers (Lumpkin and Dess, 2001; Chen and Hambrick, 1995). EO firms will seek new information that assists in developing greater value for current customers and being proactive to develop future markets (Cheng and Huizingh, 2014).

The innovativeness dimension refers to the predisposition to engage in creativity and experimentation through resource deployments in R&D to capture technological leadership positions (Rauch et al., 2009; Lumpkin and Dess, 1996). While in the traditional sense researchers posit that customers are a source of ideas for incremental improvement to existing ideas (e.g. Bennett and Cooper, 1979), but research stemming from Von Hippel’s (1986, 1988) lead user paradigm and Chesbrough’s (2003) open innovation research has suggested that customers may be able to compete with firms as a source of novel and innovative ideas. Customers may not be hampered by inertia that firms may succumb to due to previous success. Moreover, EO firms may be better able
to leverage knowledge spillovers to develop breakthrough innovations (Chandy and Tellis, 2000).

Risk taking refers to taking bold actions by committing significant resources to uncertain environments, product markets and physical markets (Rauch et al., 2009). In aggregate, the learning efforts of the firm for new products and services lie internal through trial and error, accessing organizational memory and linkages, and a strong focus on R&D to develop superior products. In this regard, firms may best be able to manage risk by integrating customers into NPD activities and by developing stronger relationships with customers. EO firms may be able to mitigate market risk by challenging competitors for key customers.

Substantively, it is hypothesized that EO firms will acquire and integrate customers into the NPD process in order to enhance their own competitive positions, gain access to knowledge spillovers, challenge competitors, and mitigate financial and market risk. More formally, I hypothesize:

\[ H2: \text{Entrepreneurial orientation is positively related to customer participation in the NPD process.} \]

2.2.4 Environmental dynamism and strategic orientations

Environmental turbulence concerns the stability of markets, technologies, and competitive intensity (Gatignon and Xuereb, 1997). Demand uncertainty is the instability and extent of difficulty predicting changes in consumer preferences (Sheng et al., 2012). Firms must modify product designs and features to cater to changing customer preferences (Jaworski and Kohli 1993). Extant research has demonstrated that a dynamic
competitive environment has a significant influence on a firm’s strategic posture (Covin and Slevin, 1991). The role of marketing in NPD becomes limited (Workman, 1993) and the optimal strategy is to pursue R&D alternatives without regard to consumer preferences (Gatignon and Xuereb 1997). Integrating customers into NPD processes when environmental change is rapid could be detrimental to firm adoption of consumer ideas. Firms are best suited to wait for more information from the market than to adhere to current market demand for new products. Evolutionary economy suggests that firms adapt their strategies to market conditions and develop actions that allow them to influence the competitive environment (Nelson and Winter, 1982; Ruiz-Ortega, 2013). A problem arises when a firm does not have the resources or capabilities to develop actions to influence the environmental conditions.

In line with previous research, greater uncertainty and change within an industry leads to greater learning efforts by the firm (e.g. Weerawardena et al., 2006). MO and EO philosophies differ in terms of how firms conduct learning efforts. MO firms focus on external learning through market information (e.g. customers and competitors) whereas high EO firms focus primarily on internal learning through R&D expenditures and being proactive with bringing new technologies to the market. As such, market oriented firms will continue to integrate customers into the NPD process as it is congruent with past resource deployments. Alternatively, entrepreneurially oriented firms will focus its efforts on shaping the external environment and reduce customer integration in the NPD process in turbulent environments. Firms oftentimes respond to dynamic business environments by becoming more innovative and proactive while taking on a greater amount of risk (Miller, 1983). To remain competitive, firms must develop
new products and change markets in dynamic business environments (Zhou, 2006).

More formally, I hypothesize:

\[ H3a: \text{Environmental turbulence positively impacts the relationship between market orientation and customer participation in the NPD process.} \]

\[ H3b: \text{Environmental turbulence negatively impacts the relationship between entrepreneurial orientation and customer participation in the NPD process.} \]

\[ \]

2.2.5 Firm age and strategic orientations

As firms become older, they become entrenched in product categories and resource deployments; they tend to stick to status quo and are reluctant to pursue alternative activities to create competitive advantage (Chandy et al., 2003; Chandy and Tellis, 2000). Incumbent firms that operate in specific product categories fail to invest resources into alternative strategic activities due to organizational processes and routines aligning with previous strategies, knowledge structures of the firm filtering out information irrelevant to previous resource investments, and perceived incentives to change course of action (Gilbert, 2005; Chandy and Tellis, 2000; Ghemawat, 1991; Nelson and Winter, 1982; Chandy and Tellis, 1998). Firms have built competitive positions, capabilities, and significant streams of rents from existing routines and processes; as such, this leads to focused response on previously learned routines (Gilbert, 2005).

Market oriented firms, over time, will become more adept at utilizing external information for the NPD process (Atuahene-Gima, 2005). When resources are deployed
to generate information that originally resides external to the firm, processes and practices will become more stabilized and routines normalized. High MO firms that integrate customers into the NPD process will rely more on customers and focus less on exploration of new knowledge through internal idea development and R&D expenditures. The exploitation of a firm’s past and current capabilities crowds out its ability to develop new routines and structures to develop new capabilities (Leonard-Barton, 1992). As such, it is suggested that high MO firms will have greater levels of customer participation as the firm becomes older and more entrenched within their resource deployments.

Alternatively, an EO firm’s core philosophy is not on engaging customers, yet developing the necessary capabilities to enhance its innovativeness and ability to develop new products and markets proactively while taking on the associated risk. High EO firms become more entrenched in resource deployments and become more adept at internal idea development and knowledge exploration as they become older. EO firms will avoid deploying resources into activities that other firms rely on for competitive advantage. The organizational processes, routines, and knowledge structure will become more conducive to internal idea development and thus they will deem integrating customers into organizational processes as less necessary. As such, as firm age increases, it will lead to more commitment to resource deployments in line with a firm’s strategic philosophy. More formally, I hypothesize:

\[H4a: \text{Firm age positively impacts the relationship between market orientation and customer participation in the NPD process.}\]

\[H4b: \text{Firm age negatively impacts the relationship between entrepreneurial orientation and customer participation in the NPD process.}\]
2.3 Method

2.3.1 Data Collection

The data for this study was obtained from 321 U.S. firms and collected via email survey over a total period of six months. The sampling frame for the study was constructed using multiple sources. First, multiple Chamber of Commerce directories from the states of Ohio, Pennsylvania, Kentucky, and Michigan were used to gain access to the emails of senior level management of firms whose headquarters are in those states. In total, 1,700 email addresses of senior level management were input into the mailing list from the directories. Second, a commercial list broker was contacted for an additional 1,100 email addresses of senior management in the U.S. In total, 2,800 emails were sent to potential respondents. 290 email addresses came back as undeliverable to the recipient, which could be the result of many factors (e.g. respondent no longer works for company, mortality, or information was incorrectly published/recorded). As such, 2,510 emails were delivered successfully. Initially, a total of 421 completed questionnaires were received. Two weeks after the initial email, a friendly reminder was sent requesting that potential respondents fill out the questionnaire. An additional 101 questionnaires were filled out for a total of 522 completed questionnaires and a 20.8% response rate. The sample was reduced to 321 firms due to some respondents not completing the questionnaire in regard to the variables of interest in this study, not having knowledge of new product development activities, answering “no” to the informed consent questions, or working in a position that is irrelevant to the study (e.g. assistant).

The response rate is similar to other primary data collection studies (e.g. Slater et al., 2011; Merrilees et al., 2012; Naidoo, 2010) and no bias is apparent from the re-
prompting of respondents as a reminder to take the questionnaire (Armstrong and Overton, 1977).

The sample characteristics are as follows:

- Average annual sales of approximately $580 million
- Average of 614 employees
- Average firm age of 39 years
- Product Type – goods (33%); services (45%); both (22%)
- Customer Type – consumers (26%); businesses (42%); both (32%)
- Respondent Position– general management (56.7%); functional management (43.3%)
- Average number of years employed – 12 years
- Number of industries (NAICS) – 18
  - High—manufacturing (23%)
  - Low—agriculture, mining, transportation (1% each)

2.3.2 Measures

*Customer Participation.* The dependent variable for this study is customer participation in the NPD process, a collaborative NPD activity in which customers actively contribute to idea generation, selecting various attributes of a new product offering, and acting as a codeveloper of new products and services (Hoyer et al., 2010; Prahalad and Ramaswamy, 2004; Fang, 2008). It was measured on a ten-item scale assessing the level of participation in various NPD activities such as information

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2 The list of constructs and their respective items for Essay 1 is located in Appendix A.
generation, idea evaluation, co-development of the idea, among others where 1 = very superficially to 7 = very deeply. The items in the scale initially ask firm respondents if customers participate in the ten NPD activities and if so, to what extent. Specific NPD activities where a firm did not have customers participate in were coded as “0”. After deleting one item due to reliability concerns, all items loaded onto their respective latent factor ($\alpha = .93$). The scale was adopted from Fang and colleagues (2008), which showed good reliability in their study.

**Market Orientation.** Market orientation was assessed using the ten-item scale adopted from Deshpande and Farley (1998). The scale was developed by conducting a meta-analysis by integrating and validating three previously used scales in the market orientation literature—the MARKOR scale (Kohli, Jaworski, and Kumar, 1993), Narver and Slater’s scale (1990), and additional items from Deshpande and Farley (1998). According to Homburg and Pflesser (2000), previous research has conceptualized market orientation from both behavioral and cultural perspectives. The behavioral perspective focuses on intelligence generation, dissemination, and organizationwide responsiveness to it, in accordance with the Kohli and Jaworski (1990) definition (Kirca et al., 2005). The cultural perspective focuses on norms and values inside the firm that are aligned with a market orientation philosophy (Deshpande et al., 1993; Narver and Slater, 1990; Kirca et al., 2005). The scale utilized in this study has items pertaining to both the behavioral and cultural aspects of market orientation to adopt a more inclusive latent construct.

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3 The reported Cronbach’s alphas in this study were computed using SPSS 21.0 reliability analysis since it is not output as a statistic in AMOS. Cronbach’s alpha measures the internal consistency or how closely related a set of observed items is as a group Cronbach (1951). The suggested threshold is 0.70 to establish reliability of the items measuring the construct (Nunnally, 1978).
After deleting three items due to reliability concerns, all items loaded onto their respective latent factor ($\alpha=.88$).

**Entrepreneurial Orientation.** Entrepreneurial orientation was assessed using the nine-item scale adopted from Covin and Slevin (1989), who borrowed from the work of Miller (1983). The questions pertain to the innovativeness, risk taking, and proactiveness of the firm. Due to the high intercorrelations of the EO dimensions, researchers on EO agree that it should be treated as an aggregated construct that includes the three dimensions (e.g. Covin et al., 2006; Rauch et al., 2009; Ruiz-Ortega et al., 2013). As such, in this study it is treated as a second order factor with three items for each dimension of EO measured as paired statements. After deleting one item from the proactiveness dimension and one item from the innovativeness dimension, the remaining items loaded onto their respective latent factor. Subsequently, the three dimensions loaded onto the EO factor ($\alpha=.85$).

**Environmental Turbulence.** Environmental turbulence concerns the firm’s external environment; a firm must navigate through the demands of its external environment and match it with its internal management systems in order to survive and succeed (Venkatraman, 1990; Simerly and Li, 2000). Three primary environmental factors are believed to affect all firms equally within a given industry—competitive intensity, technological turbulence, and demand uncertainty (Gatignon and Xuereb, 1997). As such, the multi-item scale that assesses these factors is adopted from Jaworski and Kohli (1993). After deleting one item due to reliability concerns, all items loaded onto their respective latent factor ($\alpha=.75$).
Firm Age. Firm age was assessed as the number of years since the firm was founded, as reported by the respondent. The average age that firms in the study have been in operation is 39 years.

2.3.3 Analysis

This research involves studying associations among latent and directly observed constructs; a structural equation modeling (SEM) technique was utilized that allowed to estimate both measurement and structural models simultaneously to test the hypotheses. The major benefit of SEM with respect to this research is the ability to incorporate multi-level confirmatory factor analysis with path analysis. As a result, an overall good fit of the model to the data was obtained. The estimation procedure of the analysis utilized maximum likelihood estimation\(^4\) (MLE), which iteratively improves parameter estimates to minimize a specified fit function (Hair et al., 1998); MLE maximizes the likelihood of a sample that is actually observed (Winer et al., 1991) and is efficient and unbiased when the assumption of multivariate normality is met (Hair et al., 1998). Furthermore, MLE in SEM is simultaneous where the estimates of the model parameters are calculated all at once (Kline, 2005), a major benefit with respect to multiple independent and dependent variables being present in the model.

Measurement Model. The confirmatory factor analysis showed a good fit to the data \(\chi^2=489.36, \chi^2/df=1.80, p<.001\). Since the model is significant, additional fit indices

\(^4\) Maximum likelihood estimation is the default procedure in SEM programs. Following Kline (2005), MLE is a normal theory method because MLE assumes that the population distribution for the endogenous variables is multivariate normal; the use of alternative estimation methods in SEM requires explicit justification (i.e. multivariate normality not being met) due to alternative methods being based on different parameter estimation theories (Hoyle, 2000).
were examined to assess fit of the model: CFI=0.95, NNFI=0.94, RMSEA=0.05, SRMR=0.05. The comparative fit index (CFI) compares the sample covariance matrix with the null model that all latent variables are uncorrelated. A cutoff criterion of CFI>0.90 is needed in order to ensure that misspecified models are not accepted (Hu and Bentler, 1999; Hooper et al., 2008). The non-normed fit index (NNFI), also known as the Tucker-Lewis index, assesses the model by comparing the $\chi^2$ value of the model to the $\chi^2$ value of the null model. Values greater than 0.80 have been considered acceptable (Hooper et al., 2008). The root square mean error of approximation (RMSEA) tells how well the model would fit the population covariance matrix (Byrne, 1998). Values less than 0.08 are considered to be a good fit (Steiger, 2007). The standardized root mean square residual (SRMR) is the square root of the difference between the residuals of the sample covariance matrix and the hypothesized covariance model (Hooper et al., 2008). Values as high as 0.08 are acceptable and considered a good fit to the data (Hu and Bentler, 1999). The model fit statistics are presented in Table 1.

Since the framework involve interaction effects, multiplicative terms were constructed for the four interaction variables. Based on the results of the measurement model and after removing items that did not load onto their respective latent factor, the items were factor analyzed and standardized scores were computed for MO, EO and Turbulence. Firm age was also standardized. In order to properly test the moderation hypotheses, multiplicative interactions were created by multiplying the standardized variables of MO with Turbulence, EO with Turbulence, MO with Age and EO with Age (Cohen et al., 2003).

In assessing reliability, Cronbach’s $\alpha$ and composite reliability (CR) for each
latent variable were computed. Cronbach’s \( \alpha \) and CR were above the threshold of 0.70, supporting reliability of the measures. Convergent validity was achieved by having a greater than a 0.50 value for the average variance extracted (AVE) recommended by (Fornell and Larcker, 1981). The discriminant validity of the measurement model was assessed by comparing the square root of the AVE scores, shown in the off diagonal in Table 2, to the off-diagonal numbers; the diagonal values are much greater than the off-diagonal values, showing support for discriminant validity. Moreover, discriminant validity is supported due to the maximum-shared variance (MSV) between two constructs being lower than the average variance extracted. The support for reliability, convergent validity and discriminant validity is reported in Table 2.

Due to the self-reported nature of the data, the Harman one-factor test was conducted to determine the extent of common method bias. The unrotated factor analysis showed that the unrotated factor accounted for only 30.96% of the variance, suggesting that common method bias is not an issue in the study (Podsakoff et al., 2003; Wu and Lin, 2013).
2.4 Results

Structural Model. The model presented in Figure 1 was tested using SEM in AMOS 21.0. First, a chi-square difference test was conducted to assess the significance of the model. The hypothesized paths were constrained and the constrained model was compared to the unconstrained model to determine the appropriateness of the unconstrained model. The chi-square difference test shown in Table 1 shows that the unconstrained model is superior; therefore, the unconstrained model was utilized to test the hypotheses. Overall, the model demonstrated a good fit to the data ($\chi^2 (298) = 559.11$, CFI=0.94, NNFI=0.93, RMSEA=0.05, $\chi^2$/df=1.88). Hypothesis 1 predicted a positive relationship between market orientation and customer participation. Opposite to expectations, the model showed a negative regression coefficient but did not approach statistical significance ($\beta=-0.05$, p>0.10) thus not providing support for Hypothesis 1. Hypothesis 2 predicted a positive relationship between entrepreneurial orientation and customer participation. The analysis showed that entrepreneurial orientation is a significant predictor of the level of customer participation in NPD ($\beta=0.18$, p<0.001), providing support for Hypothesis 2. Hypothesis 3a predicted that environmental turbulence would strengthen the relationship between market orientation and customer participation. The regression coefficient was positive as expected, but did not approach significance ($\beta=0.04$, p>0.10), thus not providing support for Hypothesis 3a. Hypothesis 3b predicted that environmental turbulence would weaken the relationship between entrepreneurial orientation and customer participation. The analysis showed that the relationship between entrepreneurial orientation and customer participation is indeed reduced under high levels of turbulence, thus providing support for Hypothesis 3b ($\beta=-
0.10, p<0.001). Hypothesis 4a predicted that the relationship between market orientation and customer participation would be strengthened as firms become older. The regression coefficient is positive and significant, thus providing support for Hypothesis 4a (β=0.09, p<0.01). Hypothesis 4b predicted that firm age would weaken the relationship between entrepreneurial orientation and customer participation. The model showed that the relationship is indeed weakened as firms become older (β= -0.07, p<0.05) and thus provides support for Hypothesis 4b.

The model results can be seen in Table 3. To ease the interpretation of the moderating effects of environmental turbulence and firm age, the statistically significant interactions of H3b, H4a, and H4b are plotted in Figures 2, 3, and 4, respectively.

2.5 Discussion and Conclusion

In this paper, the effects of a firm’s strategic orientation on customer participation in NPD were examined. While the majority of existing literature focuses on consequences of customer participation, the goal of this research was to explicate how
firms’ strategic orientations impact the level of customer integration in the NPD process. While the first hypothesis (H1) is not supported, the results show that EO firms value customer information and knowledge, similar to core MO philosophies. As such, this research highlights the importance that EO firms place on customer input. However, the results also demonstrated that strategic philosophy differences are expounded when certain contingency factors are accounted for. The results show that organizations will substantiate their strategic philosophies and resource deployments in regard to customer participation as they get older or when they operate in turbulent environments. The results show that MO firms’ resource deployments are substantiated into customer relational building by developing new products with customers as they become more entrenched in their strategic philosophy as they age. Conversely, EO firms eschew integrating customers into NPD activities at deeper levels as they get older and operate in turbulent environments suggesting they seek to shape the competitive landscape, in line with their core philosophy. This research suggests that under high age conditions and high environmental turbulent conditions, a primary difference among MO and EO firms comes to light.

Market oriented firms are considered to put customers at the top of the organizational hierarchy (Zhou et al., 2005), with an emphasis on intelligence gathering and ideation for new product ideas. Previous research shows that customers are a primary source of NPD ideation for MO firms, but the results of this study do not show that customers are integrated at deep levels in NPD activities. A possible explanation for this could be that MO firms are focused on external intelligence rather than integrating customers into NPD processes, thus increasing coordination costs of the organization.
Moreover, it is possible that MO firms are more concerned with a broad range of input from customers rather than deeper levels as the transfer of tacit knowledge may prove to be difficult (Szulanski, 1996). While the main effect of MO on customer participation was not significant, the results of the study show that under certain conditions MO firms are more likely to engage customers and integrate them into NPD activities. As firms become older, their resource deployments become more stabilized and this study shows that as MO firms become older, they integrate customers into NPD at deeper levels. This suggests that as MO firms mature, the value of customer input becomes more critical to firm operations. In line with previous research on the effects of firm age (Gilbert, 2005), MO firms are likely to have invested heavily in processes, procedures, and coordination of intelligence that makes them more prone to develop new products alongside customers.

Entrepreneurially oriented firms are known focus on proactive actions to develop innovative products to unseat competitors and shape the competitive landscape. While previous research suggests that technology push strategies should be at the behest of the customer, the results suggest that EO firms place value on co-creating new products with customers. This is in line with other avenues of collaborative innovation programs such as the lead user concept (Von Hippel, 1986, 1988) and the open innovation model (Chesbrough, 2003) that suggests that customers are a source of innovative ideas and may enhance NPD success. Moreover, EO firms place value on scanning the external environment and integrating external knowledge into the firm to build upon its own capabilities (Keh et al., 2007). The results of the study support this notion and empirically test how customers are used in the NPD process. It is possible that EO firms
wish to mitigate risk associated with breakthrough innovations and by integrating customers into NPD processes, relationships developed may be an organic way to unseat competitors. While this highlights an overlap between philosophies of MO and EO, as the environment becomes more turbulent, EO firms reduce the level that customers are co-creators of new products. A primary philosophy of EO firms is to shape the competitive landscape. Under turbulent conditions, EO firms have greater opportunity to develop new products that do so. As such, to prevent knowledge spillovers to competitors EO firms may reduce the integration of external knowledge sources. Furthermore, the results of the study show that as EO firms become older they may develop the necessary capabilities to focus on internal NPD to develop the competitive landscape with innovative products. In line with the RBV and its extension, the dynamic capabilities literature, this study shows that under turbulent conditions and as firms develop capabilities that align with their core philosophies, they are able organize and exploit existing internal and external firm competencies.

2.5.1 Limitations of the Study

The results need to be interpreted in light of the study’s limitations. Managers who responded to the survey may answer the items to enhance the firm’s favorability. This may have possibly skewed the variables to be inflated. The design of this study sought to control for this by sending the questionnaire to more than one executive or functional manager when contact information was available for more parties, but due to the anonymity of the questionnaire the number of managers per firm is unknown. Another possible limitation is that environmental turbulence is perceptual rather than
empirical. It is possible to collect secondary information on industries to determine the extent of competitive intensity and rates of innovation, among other values. Future research should explore this notion. Another limitation of this study is that it is possible that firms may seek input from customers in NPD, yet do not use or value the actual input from customers. Future studies should explore the consequential impact of the mediating process that customer participation has between a firm’s strategic orientation and outcome variables such as NPD performance or financial performance of the firm. Finally, research should explore what type of customers are being integrated into NPD. It is possible that large customers that hold power over their suppliers are integrating themselves into NPD activities to benefit themselves rather than the firm selecting what customers to integrate. As such, the selection of customers and the power differential of suppliers and customers needs to be considered by future research as it was not explicated in this study.
Figure 1. Essay 1 Conceptual Framework

Market Orientation

Firm Age

Customer Participation in NPD

Entrepreneurial Orientation

Environmental Turbulence

H1: +

H2: +

H3a: +

H3b: -

H4a: +

H4b: -
Table 1. Model Fit Statistics

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<tr>
<th>Model</th>
<th>$\chi^2$</th>
<th>df</th>
<th>p</th>
<th>$\chi^2$/DF</th>
<th>CFI</th>
<th>GFI</th>
<th>NNFI</th>
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<tr>
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<td>0.00</td>
<td>1.99</td>
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<td>Cronbach’s α</td>
<td>CR</td>
<td>AVE</td>
<td>MSV</td>
<td>Cust. Part.</td>
<td>MO</td>
<td>EO</td>
<td>Turb</td>
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<tr>
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<tr>
<td>Customer Participation</td>
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<td>0.57</td>
<td>0.76</td>
<td></td>
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</tbody>
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CR=Composite Reliability  
AVE=Average Variance Extracted  
MSV=Maximum Shared Variance  
Numbers in diagonal represent square root of AVE  
Numbers in off diagonal represent correlations of latent constructs
Table 3. Unconstrained Model Results

<table>
<thead>
<tr>
<th></th>
<th>Unstandardized B</th>
<th>Standardized B</th>
<th>Standard Error&lt;sup&gt;a&lt;/sup&gt;</th>
<th>p-value</th>
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<td>-0.05</td>
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<td>0.18</td>
<td>0.08</td>
<td>***</td>
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<td>0.05</td>
<td>NS</td>
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<tr>
<td>Firm Age</td>
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<td>-0.06</td>
<td>0.06</td>
<td>*</td>
</tr>
<tr>
<td>MO * Turb</td>
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<td>0.04</td>
<td>0.06</td>
<td>NS</td>
</tr>
<tr>
<td>EO * Turb</td>
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<td>-0.10</td>
<td>0.07</td>
<td>**</td>
</tr>
<tr>
<td>MO * Age</td>
<td>0.18</td>
<td>0.09</td>
<td>0.06</td>
<td>**</td>
</tr>
<tr>
<td>EO * Age</td>
<td>-0.15</td>
<td>-0.07</td>
<td>0.06</td>
<td>*</td>
</tr>
</tbody>
</table>

<sup>†</sup>p<0.10, <sup>*</sup>p<0.05, <sup>**</sup>p<0.01, <sup>***</sup>p<0.001

<sup>a</sup> Standard errors of the unstandardized betas
Figure 2. Entrepreneurial Orientation and Environmental Turbulence Interplay
Figure 3. Market Orientation and Firm Age Interplay
Figure 4. Entrepreneurial Orientation and Firm Age Interplay
ESSAY 2

MANAGING THE CUSTOMER PARTICIPATION PARADOX: THE ROLE OF ABSORPTIVE CAPACITY

3.1 Introduction

New product development (NPD) is considered the lifeblood of companies as it helps build competitive advantage to meet constantly changing customer needs and adjust to changing technological uncertainty (Yli-Renko and Janakiraman, 2008; Atuahene-Gima and Ko, 2001). Research suggests that failure rates of new products range from 40 to 75% (Joshi and Sharma, 2004; Cooper and Edgett, 2012). Given the importance of NPD to a firm’s competitive stability, coupled with high failure rates of new products, firms are seeking more creative ways to enhance NPD efforts. A current trend in NPD is customer participation in the NPD process, a collaborative NPD activity in which customers actively contribute to idea generation, selecting various attributes of a new product offering, and acting as a codeveloper of new products and services (Hoyer et al., 2010; Prahalad and Ramaswamy, 2004; Fang, 2008).

Recent research on customer participation suggests that greater levels of customer participation in the NPD process can enhance innovation efforts by the firm (Fang, 2008), improve financial performance (Coviello and Joseph, 2012), and reduce costs of development and production (Auh et al., 2007; Coviello and Joseph, 2012). While research has been fruitful in uncovering positive consequences of customer participation, there is a dearth of research on negative aspects of integrating customers into the NPD
process. Chan and colleagues (2010) suggest that there may be a dark side to customer participation in NPD; in their study they show that integrating customers into firm activities increases employee stress levels and decreases job satisfaction, thus potentially impacting the coordination efforts of the firm – customer relationship. In a different study, Noordhoff and colleagues (2011) studied the potential dark side of co-creating value with customers; in their study they found that embedded ties with customers hampers innovation efforts by suppliers due to worries about opportunism by the customer. These studies suggest that much work remains in uncovering both positive and negative aspects of customer participation.

This research posits that there may be a customer participation paradox. On the positive side, integrating customers at deeper levels in firm activities may have numerous benefits such as developing an abundant source of new product ideas (Von Hippel, 1978), discovering latent needs (Yli-Renko and Janakiraman, 2008), developing relationships with customers, bringing in complementary knowledge and resources (Coviello and Joseph, 2012), decrease development time and costs (Lettl et al., 2006), and improve decision quality during NPD (Griffin and Hauser, 1993). Moreover, customer integration may decrease the ‘fuzzy front end’ of NPD, which is oftentimes the most costly and time-consuming aspect of NPD (Alam, 2006). As such, there is reason to believe that customer participation may enhance the NPD performance of the firm, which has yet to be examined by researchers.

Lin and Huang (2013) examined efficiency, effectiveness, and product innovativeness outcomes and labeled them collectively as NPD performance. In this study, NPD performance is the extent to which new products meet management’s perceptions of market share, sales, profit, and customer adoption rates (Atuahene-Gima and Ko 2001). As such, there is a conceptual distinction between this study and that of Lin and Huang. Moreover, they did not test the direct path between customer participation and their conceptualization of NPD performance and the dimension of product innovativeness. They tested the mediating role of inter-organization relationship.

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While there may be direct positive benefits of customer participation, as suggested by Noordhoff et al. (2012) and Chan et al. (2010), there may be a potential dark side. This study examines the indirect effect of how customers impact the degree of product newness and subsequently NPD performance. Research posits that developing radical innovation may displace incumbents (Chandy and Tellis, 2000), but S-curve theory suggests that radical innovations have extended periods of negative performance before widespread adoption and displacement of current technologies and products takes place (Sood and Tellis, 2005). In this regard, recent research suggests that customers may be a source of radical new product ideas (Hirunyawipada and Paswan, 2006; Lettl, 2007) and if radical customer ideas are implemented new products will have a higher degree of learning associated with them. Moreover, with the growth of user entrepreneurs (Haefliger et al., 2010; Shah and Tripsas, 2007) firms may be inclined to integrate customers into NPD to ward off potential competition. While customers may be a source of radical new ideas, when products that are too new or radical, additional market segments may forego initial trial and adoption due to perceived risk (Lawton and Parasuraman, 1980), thus impacting performance adversely. The customer portfolio may be unaware of potential utility that they may receive and will avoid behavioral changes and learning efforts required to attain the benefits (Atuahene-Gima, 1995).

While this research suggests there is a customer participation paradox, the absorptive capacity (ACAP) of the firm may help manage it effectively. ACAP is a dynamic capability that can help utilize the firm’s knowledge structure to acquire, transform, assimilate and exploit external knowledge and apply it to commercial means (Zahra and George, 2002; Cohen and Levinthal, 1990). Firms that possess higher levels
of ACAP may have greater capabilities to build meaningful products that will be in
demand by the marketplace, thus enhancing NPD performance of products developed
jointly with customers. Moreover, ACAP may help decrease negative aspects such as the
degree of product newness due to firms being able to transform and assimilate the
knowledge into firm activities. High ACAP allows firms to perceive meaningful patterns
of external knowledge, redefine and reclassify problems, and use domain specific
knowledge to implement new product solutions (Chandy et al., 2006). High ACAP may
assist firms in transforming radical ideas into more usable form that aligns with current
firm processes and capabilities. As such, this research seeks to explain how to manage
the customer participation paradox with ACAP.

The remainder of the paper is as follows. Next, the conceptual framework and
hypothesis development for the study is presented, followed by the methodology and
results of the analysis. Last, a general discussion is presented while addressing the
paper’s limitations and directions for future research.

3.2 Theory and Hypotheses Development

To ease the interpretation of the theoretical framework and research hypotheses, the
model specifying the variables and relationships in the framework is presented in Figure
1.

------------------------------------------------ Insert Figure 1 about here ------------------------------------------------
3.2.1 Background

New product development is essential for companies vying for competitive advantage to meet the demands of changing customer needs and adjust to changing technological uncertainty (Yli-Renko and Janakiraman, 2008; Atuahene-Gima and Ko, 2001). Benefits of successful new products are competitive differentiation, the establishment of entry barriers, development of new markets, and an increase in revenue and profits (Sheng et al., 2012; Chandy and Tellis, 1998; Cooper, 1993; Chen, 2009). Due to rapidly changing competitive and technological environments, the impact of NPD on firm performance has been increasing over time and is deemed mandatory to substantiate competitive positions (e.g. Cooper, 2001; Zirger and Madique, 1990; Hamilton, 1968; Ayers et al., 1997; Chen et al., 2010). While NPD is advantageous to a firm’s competitive position, researchers posit that developing new products solely with internal knowledge is no longer enough to retain or strengthen competitive positions (Joshi and Sharma, 2004; Stevens and Burley, 2003).

A common trend among a multitude of companies across industries is integrating customers into the firm’s NPD activities (e.g. Unilever Best Foods Collaborating with Us, Procter & Gamble’s Advisors Program, Cisco Connections Online, Mattel’s My Design Barbie, Levi Strauss Original Spin Jeans, etc.). Customer participation in NPD is, essentially, the degree to which customers and firms create new knowledge and value through mutual, ongoing interactions (Blazevic and Lievens, 2008). Due to NPD performance depending on the deep understanding of latent customer needs and developing products that meet those needs (both current and future), research suggests that ideas generated through customer participation will more closely mirror consumer
needs since they provide first hand solutions to the problems they face (Hoyer et al. 2010; Yli-Renko and Janakiraman, 2008) and lead to greater levels of adoption by customers (Gruner and Homburg, 2000; Hauser et al., 2006).

Extant customer participation research suggests that customers can help reduce the costs of NPD by bringing in required resources (e.g. capital and knowledge), industry contacts, or complementary technologies (Coviello and Joseph, 2012) when developing new products. Moreover, customers may help decrease the development time and costs (Lettl et al. 2006), improve decision quality across all stages of NPD (Griffin and Hauser, 1993), improve the effectiveness of NPD (Cooper and Kleinnschmidt, 1987; Griffin and Hauser, 1996), enhance new product value (Coviello and Joseph, 2012), increase information sharing and collaboration (Fang et al., 2008), and generate customer empowerment (Fuchs and Schreier, 2011; Schreier et al., 2012), all of which may affect NPD performance of the firm positively.

While there is reason to believe that customer participation may impact NPD performance positively, previous value co-creation research suggests that customer participation may lead to greater levels of innovativeness of new products (Von Hippel, 1986, 1988; Fang, 2008). While certain levels of innovation are required to enhance firm performance, previous research suggests that higher levels of product newness may initially impact NPD performance negatively as radically new products take time to displace current products and technologies (Sood and Tellis, 2005). The degree of product newness, defined as “the extent to which an innovation is compatible with experiences and consumption patterns of customers” (Atuahene-Gima, 1995: 278), increases the degree of learning required by customers (Lawton and Parasuraman, 1980).
and end users may forego trial and adoption. Potentially, firms may integrate customers with grandiose ideas that differ from the majority of consumers with certain market expectations of firm offerings. The majority of consumers may be unaware of the utility that they may receive from too innovative co-developed products which subsequently may lead to resistance on their part—they will avoid behavioral changes associated with learning effort and attaining potential benefits (Alexander et al., 2008; Hoeffler, 2003). If a firm becomes too radical in its innovations, the products may not realize success at the time of commercialization; as such, customers among multiple market segments may associate radicalness to riskiness of trial that subsequently affects adoption (Gatignon and Robertson, 1985; Gatignon and Xuereb, 1997).

While there may be drawbacks to integrating customers into NPD, all is not lost for firms. ACAP may enhance success and mitigate negative repercussions of integrating customers into NPD. ACAP is a dynamic capability that pertains to knowledge creation and utilization that enhances a firm’s ability to gain and sustain competitive advantage (Zahra and George, 2002). Essentially, it facilitates organizational learning, knowledge accumulation and its subsequent use (Flatten et al., 2011; Lane and Lubatkin, 1998). ACAP has been shown to enhance innovation efforts, NPD performance, firm performance, and interorganizational learning as it assists in integrating external knowledge into the firm for commercial use (Tsai, 2001; Szulanski, 1996; Cohen and Levinthal, 1990). Possessing a high ACAP may be essential to maximize customer participation effectiveness as customer participation is considered a process that involves the combination and exchange of knowledge and multiple resources (Nambisan, 2002). Firms need to be able to access, deploy, exchange, and combine such resources in order
to create and enhance potential value for commercial use (Moran and Ghoshal, 1999). In the case of the firm – customer knowledge exchange process, firms that possess greater ACAP may be able to convert customer knowledge and resources into convertible form (Zahra and George, 2002) to enhance NPD efforts. Additionally, firms with greater ACAP can mold products into more readily adoptable form by identifying meaningful patterns, redefining and reclassifying problems by noting underlying principles, and anticipating the outcomes of actions during the NPD process (Chandy et al., 2006). By transforming and assimilating the external knowledge from customers and identifying patterns across market segments, ACAP may help firms build new products that are not deemed as radical and risky. As such, a firm’s ACAP may enhance NPD and assist in developing new products that do not require a radical degree of change in consumer learning for new products.

3.2.2 Customer participation and NPD performance

Benefits of customer participation span across all three major functions of NPD; first, customers are an abundant source of new product ideas (Von Hippel, 1978) since they provide first hand solutions to the problems they face (Yli-Renko and Janakiraman, 2008). By integrating customers into the ideation process at deeper levels, firms are able to discover latent needs and develop products that mirror such needs. As such, they provide the firm with the impetus to enhance current product offerings and potentially develop new products that are not available on the market, thus providing an opportunity to develop new markets.
In the product concept development stage, NPD is typically conducted as a collaborative activity among the firm and its external stakeholders (Chesbrough, 2003; Von Hippel 1988). Oftentimes, customers bring in required resources, capabilities, capital and complementary technologies (Yli-Renko and Janakiraman 2008; Coviello and Joseph, 2012) when developing a prototype for product testing. Customers may help decrease development time and costs (Lettl et al., 2006) and improve decision quality in the fuzzy front-end stages where uncertainty is high (Griffin and Hauser, 1993).

During product testing, customers can serve as the basis of whether products make it to full commercialization. By testing the product, customers can assess the viability and potential adoptability by market segments. Customers essentially provide important input into the market research process used to evaluate and refine new product ideas (Griffin and Hauser, 1993). This may help the firm avoid potential market failure of new products and correct any faults before incurring greater costs of market rollout.

In sum, customer participation in NPD may help create products that mirror latent needs, decrease costs associated with NPD activities, and develop products that are less easily imitable by competitors. More formally, I hypothesize:

\[ H1: \text{Customer participation in NPD is positively related to NPD performance.} \]

### 3.2.3 Customer participation and the degree of product newness

While previous research on NPD suggests that customers may be the driving force behind ‘me-too’ products (Berthon et al., 1999), it has primarily examined such relationships from an arm’s-length relationship perspective. More recent research on the
link between customer ideation and co-creation suggests that lead users focus on radical product improvements that often disrupt market positions (Von Hippel, 1998, 2005) due to having a strong incentive to solve their own needs. Moreover, with the advent of sharing information among user communities, more consumers and customers are becoming “user-entrepreneurs” where if the products are not co-created with the firm, the customer may eventually become a competitor and displace incumbents (Chandy and Tellis, 1998). Additionally, due to firms focusing on existing capabilities to solve user needs, developing new products from a strictly internal focus may create products that are more incremental in nature (Tushman and Anderson, 1986). By using solely internal knowledge to develop new products, firms seek to maximize the rents gained from current processes and procedures currently in place, thus avoiding cannibalizing its current investments and focusing on current product improvements. Moreover, customers have a broader sense of potential solutions, technologies, and ideas for new products given that they are not constrained by organizational reference points (e.g. product platforms). More formally, I hypothesize:

\[ H2: \text{Customer participation in NPD is positively related to the degree of product newness.} \]

3.2.4 Degree of product newness and NPD performance

Previous research suggests that technology novelty and product newness are major sources of NPD uncertainty that affect a firm’s ability to produce radical new products efficiently (Tatikonda and Rosenthal, 2000) and can impact customer adoption
rates (Chen et al., 2010). Firms may lack the internal knowledge, procedures, and processes to produce radical new products without undergoing capital investments in equipment and training employees on the production of the new products. Moreover, new products that are deemed radical in nature require higher levels of post-launch support, subsequently lowering profit margins (Athaide and Stump, 1999). Customers that are early adopters of the radical new products will require greater levels of information and training to assist them in the early stages of product usage and overcome any learning curve associated. Research has shown that customers deem learning novel new technologies, unfamiliar product attributes, and products or services that require behavioral change as risky and may initially forego trial and adoption (Sheng et al., 2012; Lawton and Parasuraman, 1980; Atuahene-Gima, 1995). They may be unaware of the utility associated with learning novel new products and will forego trial until later periods, thus affecting NPD performance in the early stages of introducing radical new products (Alexander et al., 2008; Hoeffler, 2003). Due to the costs borne to the company for implementing new procedures, equipment, and training of employees coupled with the perception of riskiness of trial by consumers, it is suggested here that greater levels of innovativeness will decrease NPD performance. While previous research has empirically tested this main effect (e.g. Morgan et al., 2014), this study retests it in a new context and different path. More formally, I hypothesize:

\[ H3: \text{Product newness is negatively related to NPD performance} \]
3.2.5 Absorptive capacity of the firm

Absorptive capacity refers to a firm’s dynamic capability that helps utilize the firm’s knowledge structure to acquire, transform, assimilate and exploit external knowledge and apply it to commercial means (Zahra and George, 2002; Cohen and Levinthal, 1990). It develops cumulatively and builds on prior related knowledge (Tsai, 2001). The conversion of ideas into new products is viewed as a problem solving process (Coviello and Joseph, 2012). Organizations that possess greater ACAP have a better understanding of ideas and technologies that can be converted to new products. Without the ability to acquire, assimilate, transform and exploit information, firms may succumb to increased costs, information overload, and the development of new products that are too easily imitated by competitors. ACAP derives from the development of new knowledge and insights from common experiences within the organization and has the potential to improve a firm’s commercial use of external knowledge (Jiminez-Jiminez and Sanz-Valle, 2011). Absorbing external knowledge has been shown to be the impetus behind generating successful new products (e.g. Cohen and Levinthal, 1990; Sawhney and Prandelli, 2000; Fuller and Matzler, 2007). Due to rapidly changing technology and consumer preferences (Atuahene-Gima and Ko, 2001), firms must be able to integrate external knowledge due to the costs of continually changing internal processes and procedures to meet environmental changes. When firms have greater ACAP, they can more easily integrate the customers into the NPD process at lower costs and overcome information overload issues. It has been shown to enhance the perception of meaningful patterns that novices miss; as such, it allows easier matching between ideas from customers and the knowledge base of the firm (Chandy et al., 2006). Moreover, ACAP
allows the implementation of solutions with greater ease (Chandy et al., 2006) suggesting that firms can take a wide array of problems and minimize the complexity of the task to reduce costs and thus enhance the overall performance outcomes. More formally, I hypothesize:

\[ H4a: \text{The relationship between customer participation and NPD performance is strengthened by the absorptive capacity of the firm.} \]

ACAP may be able to enhance the viability of co-created new products via customer ideation and co-development, while reducing the perceived degree of product newness by market segments. ACAP within a specific domain can sort through irrelevant information, use pieces of information to make inferences, and have a strong schema associated with past development of their domain (Chandy et al. 2006). While firms seek to be innovative, with greater levels of ACAP they may stay close to their core competencies and allow current routines and processes guide specific NPD steps (Varadarajan, 1983; Eisenhardt and Tabrizi, 1995). By having a more developed organizational schema, firms will be able to capture environmental information and combine it with knowledge from customers that participate in NPD and develop products that are not radically different from customer expectations or learning experiences. Stated differently, ACAP allows for the combination of multiple knowledge sources to build new products that better match market expectations. Firms that have low ACAP may have difficulties in integrating the customer knowledge into firm routines and procedures. They will most likely not have the knowledge structure and developed
schema to take radical product ideas and convert them to marketable form. More formally, I hypothesize:

\[ H4b: \text{The relationship between customer participation and degree of product newness is weakened by the absorptive capacity of the firm.} \]

3.3 Method

3.3.1 Data Collection

The data for this study was obtained from 305 U.S. firms and collected via email survey over a total period of six months. The sampling frame for the study was constructed using multiple sources. First, multiple Chamber of Commerce directories from the states of Ohio, Pennsylvania, Kentucky, and Michigan were used to gain access to the emails of senior level management of firms whose headquarters are in those states. In total, 1,700 email addresses of senior level management were input into the mailing list from the directories. Second, a commercial list broker was contacted for an additional 1,100 email addresses of senior management in the U.S. In total, 2,800 emails were sent to potential respondents. 290 email addresses came back as undeliverable to the recipient, which could be the result of many factors (e.g. respondent no longer works for company, mortality, or information was incorrectly published/recorded). As such, 2,510 emails were delivered successfully. Initially, a total of 421 completed questionnaires were received. Two weeks after the initial email, a friendly reminder was sent requesting that potential respondents fill out the questionnaire. An additional 101 questionnaires were filled out for a total of 522 completed questionnaires and a 20.8%
response rate. The sample was reduced to 305 firms due to some respondents not completing the questionnaire in regard to the variables of interest in this study, not having knowledge of new product development activities, answering “no” to the informed consent questions, or working in a position that is irrelevant to the study (e.g. assistant).

The response rate is similar to other primary data collection studies (e.g. Slater et al., 2011; Merrilees et al., 2012; Naidoo, 2010) and no bias is apparent from the re-prompting of respondents as a reminder to take the questionnaire (Armstrong and Overton, 1977).

The sample characteristics are as follows:

- Average annual sales of approximately $605 million
- Average of 571 employees
- Average firm age of 38 years
- Product Type – goods (33%); services (44%); both (23%)
- Customer Type – consumers (27%); businesses (39%); both (33%)
- Respondent Position – general management (60%); functional management (40%)
- Average number of years employed – 11.5 years
- Number of industries (NAICS) – 18
  - High—manufacturing (25%)
  - Low—agriculture, mining, transportation, utilities (1% each)
3.3.2 Measures

*NPD Performance.* NPD performance is defined as the extent to which new products meet management’s perceptions of market share, sales, profit, and customer adoption rates (Atuahene-Gima and Ko, 2001; Gatignon and Xuereb, 1997). The scale for this measure was adopted from Atuahene-Gima and Ko (2001) and has shown good validity and reliability among multiple studies (e.g. Atuahene-Gima and Ko, 2001; Frishammar and Horte, 2007; Morgan et al, 2014). This was measured using four items on a seven-point scale ranging from 1 = strongly disagree to 7 = strongly agree. The use of a perceptual measure of performance is acceptable due to previous studies showing that subjective measures have high correlations with objective performance measures. An additional benefit is the added advantage of being able to compare NPD performance among firms across multiple industries (i.e. performance across industries inflates variance and reduces comparability) (Atuahene-Gima and Ko, 2001; Ancona and Caldwell, 1992; Zahra, 1993; Zahra and Covin, 1993). After deleting one item due to reliability concerns, all items loaded onto their respective latent factor (α=0.93).

*Customer Participation.* Customer participation was measured on a ten-item scale assessing the level of participation in various NPD activities such as information generation, idea evaluation, co-development of the idea, among others where 1 = very superficially to 7 = very deeply. The items in the scale initially ask firm respondents if customers participate in the ten NPD activities and if so, to what extent. Specific NPD activities where a firm did not have customers participate in were coded as “0”. After

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6 The list of constructs and their respective items for Essay 2 is located Appendix B.
7 The reported Cronbach’s alphas in this study were computed using SPSS 21.0 reliability analysis since it is not output as a statistic in AMOS. Cronbach’s alpha measures the internal consistency or how closely related a set of observed items is as a group (Cronbach, 1951). The suggested threshold is 0.70 to establish reliability of the items measuring the construct (Nunnally, 1978).
deleting one item due to reliability concerns, all items loaded onto their respective latent factor ($\alpha=0.92$). The scale was adopted from Fang and colleagues (2008), which showed good reliability in their study.

*Degree of Product Newness.* To assess the degree of a product’s innovativeness, Atuahene-Gima’s (1995) degree of product newness scale has been adopted. The degree of product newness is defined as “the extent to which an innovation is compatible with experiences and consumption patterns of customers” (Atuahene-Gima, 1995: 278). The scale assesses the degree of learning and effort required by customers to understand the benefits of a new product vis-à-vis existing products. The degree of product newness to customers scale had a total of six items that ranged from 1 = strongly disagree to 7 = strongly agree. All items for degree of product newness loaded onto their respective latent factor ($\alpha=0.88$).

*Absorptive Capacity.* ACAP was measured using the multi-item absorptive capacity scale developed by Flatten et al. (2011). Past research has used Cohen and Levinthal’s (1990) measure of R&D normalized by sales (i.e. R&D intensity) as a measure of absorptive capacity and expertise, but research has suggested that there are a multitude of knowledge variables that can affect a firm’s ability to integrate external knowledge into the firm (e.g. Zahra and George, 2002; Flatten et al., 2011; Jimenez-Jimenez and Sanz-Valle, 2011). As such, the purpose of adopting the scale rather than the traditional method is to capture a more aggregate level of organizational learning and expertise, rather than a measure that strictly focuses on R&D. The scale had a total of 14 items assessing a firm’s ability to acquire, transform, assimilate, and exploit knowledge originating from the external environment. The items ranged from 1 = strongly disagree
to 7 = strongly agree. ACAP was treated as a second order factor where individual items initially loaded onto their respective ACAP dimension – acquire, transform, assimilate, and exploit. The four dimensions of ACAP then were allowed to load onto the second order factor of the aggregate ACAP. This allowed more items to be used in the analysis for the variable and it provided a better model fit. After deleting one item due to reliability concerns, all items loaded onto their respective latent factor ($\alpha=0.89$).

### 3.3.3 Analysis

This research involves studying associations among latent and directly observed constructs; a structural equation modeling (SEM) technique was utilized that allowed to estimate both measurement and structural models simultaneously to test the hypotheses. The major benefit of SEM with respect to this research is the ability to incorporate multi-level confirmatory factor analysis with path analysis. As a result, an overall good fit of the model to the data was obtained. The estimation procedure of the analysis utilized maximum likelihood estimation\(^8\) (MLE), which iteratively improves parameter estimates to minimize a specified fit function (Hair et al., 1998); MLE maximizes the likelihood of a sample that is actually observed (Winer et al., 1991) and is efficient and unbiased when the assumption of multivariate normality is met (Hair et al., 1998). Furthermore, MLE in SEM is simultaneous where the estimates of the model parameters are calculated all at once.

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\(^8\) Maximum likelihood estimation is the default procedure in SEM programs. Following Kline (2005), MLE is a normal theory method because MLE assumes that the population distribution for the endogenous variables is multivariate normal; the use of alternative estimation methods in SEM requires explicit justification (i.e. multivariate normality not being met) due to alternative methods being based on different parameter estimation theories (Hoyle, 2000).
once (Kline, 2005), a major benefit with respect to multiple independent and dependent variables being present in the model.

**Measurement Model.** The confirmatory factor analysis showed a good fit to the data ($\chi^2=489.36$, $\chi^2/df=1.80$, $p<.001$). Since the model is significant, additional fit indices were examined to assess fit of the model: $CFI=0.97$, $NNFI=0.94$, $GFI=0.90$, $RMSEA=0.05$. The comparative fit index (CFI) compares the sample covariance matrix with the null model that all latent variables are uncorrelated. A cutoff criterion of $CFI>0.90$ is needed in order to ensure that misspecified models are not accepted (Hu and Bentler, 1999; Hooper et al., 2008). The non-normed fit index (NNFI), also known as the Tucker-Lewis index, assesses the model by comparing the $\chi^2$ value of the model to the $\chi^2$ value of the null model. Values greater than 0.80 have been considered acceptable (Hooper et al., 2008). The root square mean error of approximation (RMSEA) tells how well the model would fit the population covariance matrix (Byrne, 1998). Values less than 0.08 are considered to be a good fit (Steiger, 2007). The standardized root mean square residual (SRMR) is the square root of the difference between the residuals of the sample covariance matrix and the hypothesized covariance model (Hooper et al., 2008). Values as high as 0.08 are acceptable and considered a good fit to the data (Hu and Bentler, 1999). The model fit statistics for the measurement model are presented in Table 1.

Since the study involves interaction effects, multiplicative terms were constructed for the two interaction variables. Based on the results of the measurement model and after removing items that did not load onto their respective latent factor, the items were factor analyzed and standardized scores were computed for customer participation and
ACAP. In order to properly test the moderation hypotheses, multiplicative interactions were created by multiplying the standardized variables of customer participation and ACAP (Cohen et al., 2003).

In assessing reliability, Cronbach’s α and composite reliability (CR) for each latent variable were computed. Cronbach’s α and CR were above the threshold of 0.70, supporting reliability of the measures. Convergent validity was achieved by having a greater than a 0.50 value for the average variance extracted (AVE) recommended by (Fornell and Larcker, 1981). The discriminant validity of the measurement model was assessed by comparing the square root of average variance extracted AVE scores, shown in the off-diagonal in Table 2, to the off-diagonal numbers; the diagonal values are much greater than the off-diagonal values, showing support for discriminant validity. Moreover, discriminant validity is supported due to the maximum-shared variance (MSV) between two constructs being lower than the average variance extracted. The support for reliability, convergent validity and discriminant validity is reported in Table 2.

--- Insert Table 1 about here -----------------------------

--- Insert Table 2 about here -----------------------------

Due to the self-reported nature of the data, the Harman one-factor test was conducted to determine the extent of common method bias. The unrotated factor analysis showed that the unrotated factor accounted for only 33.55% of the variance, suggesting
that common method bias is not an issue in the study (Podsakoff et al., 2003; Wu and Lin, 2013). In addition to the unrotated factor analysis showing that common method bias is not an issue, an attempt was made to seek multiple respondents from firms when more than one name and contact information was available. Due to the anonymity of the responses, I am unable to determine the extent that more than one respondent from each firm answered the questionnaire.

3.4 Results

Structural Model. The model presented in Figure 1 was tested using SEM in AMOS 21.0. First, a chi-square difference test was conducted to assess the significance of the model. The hypothesized paths were constrained and the constrained model was compared to the unconstrained model to determine the appropriateness of the unconstrained model. The chi-square difference test shown in Table 1 shows that the unconstrained model is superior; therefore, the unconstrained model was utilized to test the hypotheses. Overall, the model demonstrated a good fit to the data ($\chi^2_{(279)} = 501.31$, CFI=0.97, NNFI=0.96, RMSEA=0.05, $\chi^2$/df=1.80). Hypothesis 1 predicted a positive relationship between customer participation and NPD performance. The model showed a positive regression coefficient ($\beta=0.16$, $p<0.01$) indicating that a greater level of involvement by customers in NPD is a significant predictor of NPD performance thus providing support for Hypothesis 1. Hypothesis 2 predicted a positive relationship between the level of customer participation and the degree of product newness. The analysis showed that customer participation in NPD is a significant predictor of the newness ($\beta=0.40$, $p<0.001$), providing support for Hypothesis 2. Hypothesis 3 predicted
a negative relationship between the degree of product newness and the performance of NPD. The model showed that the degree of product newness is negatively associated with the performance of NPD ($\beta = -0.15$, $p<.01$) and thus provides support for Hypothesis 3. Hypothesis 4a predicted that a firm’s ACAP positively moderates the relationship between customer participation and NPD performance. The results from the analysis show that the coefficient is positive and not significant ($\beta = 0.02$, $p>.10$), thus not providing support for Hypothesis 4a. Hypothesis 4b predicted that a firm’s ACAP negatively moderates the relationship between customer participation and the degree of product newness. The results from the analysis show that the coefficient is positive and not significant ($\beta = 0.02$, $p>.10$), thus not providing support for Hypothesis 4b. The results from the analysis can be seen in Table 3.

In order to test for the significance of the indirect negative path: customer participation’s impact on NPD performance mediated by the degree of product newness, the Preacher and Hayes bootstrapping procedure was conducted. The results from the bootstrap show that the path between customer participation and NPD performance is not mediated by the degree of product newness ($p>.10$). Due to the non-significance of the mediation, the results are not reported.

------------------------- Insert Table 3 about here -------------------------

**Post-hoc Multi-Group Analysis.** Although the interaction between customer participation and ACAP on NPD performance and degree of product newness was not significant in the full model, a post-hoc comparison between low and high ACAP groups
was conducted. The sample for the study was divided into two subgroups based on high/low expertise. The sample size was n = 147 for the low ACAP group and n = 158 for the ACAP expertise group. Chi-square difference tests were conducted to test the statistical difference between the subgroups for each path. H4a hypothesizes that the effect of customer participation on NPD performance is contingent upon the level of a firm’s ACAP; as such, the path coefficient between customer participation and NPD performance was constrained and results show significant statistical differences between effects of customer participation on NPD given the two levels of ACAP ($\Delta \chi^2 = 6.45^*$). Specifically, $\beta = 0.34$ in the high-ACAP group ($p<.001$) and $\beta = -0.02$ ($p>.05$) in the low-ACAP group. This lends support to hypothesis 4a. However, the chi-square difference test showed no significant difference between the two groups after constraining the path between the customer participation and the degree of product newness, thus indicating no empirical support for Hypothesis 4b.

3.5 Discussion and Conclusion

In this paper, the effects of customer participation on NPD performance and the degree of product newness were examined to understand the direct and indirect effects of customer participation on performance. This research suggests that there is both a direct bright side and an indirect dark side to customer participation. The results confirm that customer participation is indeed positively associated with NPD performance. As such, the benefits of customer participation seem to be evident. However, it is also demonstrated that companies should be wary of developing products that are too radical as it has a significant negative effect on the performance of new products. A high degree
of product newness may limit the success of new products due to the riskiness of trial in which consumers will forgo trial and adoption. While the mediating path of customer participation on NPD performance through the degree of product newness was not significant, future research should explore this notion among other mediating paths between customer participation and performance.

This research suggested that a firm’s ACAP would enhance customer participation’s impact on NPD performance. Due to customers’ external knowledge, a firm must be able to acquire, transform, assimilate, and exploit the knowledge to maximize its impact on competitive advantage. While the interaction results show that ACAP does not moderate the relationship between customer participation and NPD performance, results from the multi-group analysis show that the high ACAP group significantly impacts NPD performance while the low ACAP group did not have a significant effect in terms of the customer participation – NPD performance relationship. The results of the study show that the ACAP of the firm may help a firm’s efforts on NPD performance indicating that having a greater ability to internalize external knowledge (i.e. from customers) and exploit it to commercial ends enhances the relationship between customer participation and NPD performance. When firms have low ability to integrate customer information into the firm’s processes, the NPD performance of new products may suffer. In other words, if firms wish to have customers participate in NPD activities, they must be able to build upon the knowledge presented to them in order to maximize the information’s effectiveness. This is in line with organizational learning theory (e.g. Moorman, 1995) that suggests that firms may become overwhelmed with information overload unless they have the capabilities of sorting and
filtering through such information. In other words, firms should forego listening to customers during the new products process unless they have the ability and experience to internalize the information, capitalize on it, and convert it to commercial ends (Cohen and Levinthal, 1990). Future studies need to explore the notion of how a firm’s ACAP can impact the integration and exploitation of customer knowledge.

This study also suggested that ACAP helps mitigate the high degree of product newness, which negatively impacts NPD performance. It is suggested that by having greater capabilities of scanning the external environment and converting radical product ideas into more adoptable products, firms can solve the customer participation paradox. While the final hypothesis (H4b) was not supported in both the interaction model and the split-group analysis model, future research should explore the notion of ACAP moderating such relationships and other interactions of NPD relationships. Research has shown that customer orientation may help (e.g. Atuahene-Gima, 1995) or hinder NPD efforts (e.g. Morgan et al., 2014), but further studies may benefit from investigating these relationships in new contexts. Perhaps the customer orientation of a firm will lead to lower degrees of product newness, which may assist in NPD efforts if customers participation in NPD functions. I hope this study opens the scholarly dialogue on the issue.

Managers need to be concerned with the impact of how customers may affect performance outcomes of new products. In this study, results show that customers can affect NPD performance positively, but deeper levels of customer involvement may also impact the innovativeness of new products positively, which is shown to impact NPD performance negatively. Perhaps integrating customers at a deeper level may be too
much of a good thing. As firms seek to gain a competitive advantage in terms of NPD performance and commercializing new innovations, they need to understand the differing impacts of new product attributes. Firms can benefit by being proactive and seeking customer involvement while developing innovative new products, but managers need to understand that products that have a high degree of product newness may initially deter consumers from adopting such products. This may be related to a firm’s current resource base and product lines; if customer involvement leads to products that are new to the firm, this may negatively impact NPD performance by way of not having the internal capabilities or processes to accommodate for said products.

Substantively, this research builds upon the continually growing stream of customer participation literature. While previous research has shown that customer participation is valuable to outcome variables of the firm, such as financial performance (e.g. Coviello and Joseph, 2012), this study explicited the NPD performance of the firm. Thus, this research has extended the literature by showing that there is an additional benefit of customer integration into NPD processes. However, recent research has suggested there may be potential downsides to customer participation (e.g. Noordhoff et al., 2012; Chan et al., 2010). Building upon those studies, the results of this research show that customer participation does indeed increase the degree of product newness and subsequently negatively impacts NPD performance. As such, this study shows that there is a customer participation paradox. While it was suggested that ACAP solves the paradox for managers, the results from the study did not prove to be fruitful. This suggests that more avenues along the dark side of customer participation need to be
explicated and understand how firms can deploy resources or utilize capabilities to solve the paradox.

### 3.5.1 Limitations of the Study

The results need to be interpreted in light of the study’s limitations. The measures for the variables may be slightly skewed to the right given the firm’s propensity to enhance its favorability. Parts of the questionnaire, such as degree of product newness, are better off being answered by the customer rather than the firms, since the implications for the firm lie within consumer perceptions and learning. The customers’ perceptions in regard to this variable would seem to matter more than the degree of product newness that managers place on new products. Customers are best able to ascertain how the degree of learning and behavioral change is associated with new products. While a firm may not perceive a radical degree of change in product newness, the customer may feel what is offered by the firm in fact is a radical change. Another possible limitation is that NPD performance is perceptual rather than empirical; NPD performance is the extent to which new products are perceived to meet their market share, sales and customer use, sales growth, and profit objectives. While previous research has explicated the correlations between objective and subjective firm performance measures are high and there are many benefits to subjective measures such as inter-industry comparisons, future research should explore the notion of measuring these variables directly rather than using a perceptual measure by the firm. Future research should also explore the notion of customer participation breadth versus depth and how it affects NPD performance. The cost of integrating customers deeply into the NPD process includes financial
commitment, communication and coordination difficulties, and external knowledge integration. Customer participation breadth may show different results provided by this study. While the results show a potential dark side to customer participation, future research should explore how firm resources and capabilities can solve the paradox. I hope this study opens the scholarly dialogue on these issues.
Figure 1. Essay 2 Conceptual Framework

- ACAP
- Customer Participation in NPD
- Product Newness
- NPD Performance

H1: +
H2: +
H3: -
H4a: +
H4b: -
Table 1. Fit Measures for the Models

<table>
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<th>Model</th>
<th>$\chi^2$</th>
<th>df</th>
<th>p</th>
<th>$\chi^2$/DF</th>
<th>CFI</th>
<th>GFI</th>
<th>NNFI</th>
<th>RMSEA</th>
<th>SRMR</th>
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<tr>
<td>Measurement Model</td>
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### Table 2. Construct Descriptive Statistics

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<th>CR</th>
<th>AVE</th>
<th>MSV</th>
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<th>Newness</th>
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<td>0.63</td>
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</table>

CR=Composite Reliability  
AVE=Average Variance Extracted  
MSV=Maximum Shared Variance  
Numbers in diagonal represent square root of AVE  
Numbers in off diagonal represent correlations of latent constructs
### Table 3. Unconstrained Model Results

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<th>Product Newness</th>
<th>NPD Performance</th>
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<td>0.01</td>
</tr>
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</table>

* $p<0.10$,  † $p<0.05$, ‡ $p<0.01$, ‡‡ $p<.001$

*a Standard errors of the unstandardized betas
ESSAY 3

STRATEGIC CHANGE AND INNOVATION REPUTATION: OPENING UP THE INNOVATION PROCESS

4.1 Introduction

How new products are effectively generated and adopted is an issue that scholars and practitioners alike deem to be an issue of high relevance (Poetz and Schreier, 2012; Schulze and Hoegl, 2008). Should firms develop new products internally and resort to their innovation reputations as the key to building brand equity? Should they rely on customers to a great extent? Or should they combine both knowledge sources? Firms across a multitude of industries are beginning to open up the innovation process to customers to enhance their competitive advantage, address changing technological environments, and placate customers that have a strong desire to create value that meets their individual needs (Chan et al., 2010; Prahalad and Ramaswamy, 2004; Bendapudi and Leone, 2003). Changing technological and competitive environments have given way to greater engagement and information flow between consumers and firms (Hoyer et al., 2010; Firat and Venkatash, 1995; Prahalad and Ramaswamy, 2004; Bendapudi and Leone, 2003), but a primary concern for firms should be how changing innovation strategies to accommodate the desire of customers affects the periphery (i.e. customers that do not participate in co-creation) of consumers’ perceptions of the firm.

Extant literature has uncovered a plethora of examples of how firms are designing and implementing programs to accommodate external knowledge sources to become
more competitive in continually changing dynamic environments (e.g. Sawhney et al., 2005; Ramaswamy, 2008, 2009). Firms such as Nike, VitaminWater, Proctor and Gamble (P&G), Cisco, and Frito-Lay among others have implemented programs that allows customers to co-create value or choose product offerings that dictates what the firm develops. Research suggests that by accessing external knowledge sources, firms may come to better understand customers’ points of view and identify their wants and needs (Lusch and Vargo, 2006; Chan et al., 2010). Moreover, research has uncovered that joint production of products and services serves as a better preference – fit with customers that may lead to greater levels of adoption (Coviello and Joseph, 2012; Fuchs and Schreier, 2012). Furthermore, research has suggested that customers wished to be more engaged by firms and will reward firms with loyalty when programs are implemented that utilize customer ideas and suggestions (Schreier et al., 2012; Hoyer et al., 2010). While the majority of studies have uncovered advantages of customer participation and open innovation programs, a primary concern has been the static nature of the firm’s innovation strategy employed in previous studies. Primarily, research has failed to examine the process of strategic change by firms.

Strategic change is defined as an “attempt to change current modes of action to take advantage of important opportunities or to cope with consequential environmental threats” (Gioia and Chittipeddi, 1991: 433). In this regard, strategic change is considered to be fundamental to modern organizations to keep up with evolving demands and to stay competitive (Ye et al., 2007; Day, 1994). With the growing trend of building brand equity by integrating users into firm processes or solely relying on users for NPD, firms should be concerned about how strategic change impacts consumer attitudes. With
changing trends in the marketplace, more firms are integrating customers into NPD activities to develop a deep understanding of consumer needs and developing products that meet those needs. As such, a primary contribution of this paper addresses how strategic change impacts consumer attitudes toward the firm. This research suggests that undergoing strategic change may be beneficial when the innovation process is opened up to customers due to firms building relationships with customers through co-production activities, developing products that more closely meet the wants and needs of the market segments and opening up firm activities to signal that firms value customer input whereas firms may be penalized in situations when they close off customers from participating in innovation activities.

While this study suggests that strategic change may be beneficial to enhance consumer attitudes toward the brand, it may not always be the case. Firms need to be cautious of how changing their current innovation strategy may be misaligned with their current innovation reputation, “[stakeholders’] perceptions of a firm’s track record of product innovations, degree of creativity, and potential for continued innovative activity in the future” (Henard and Dacin, 2010: 321-322). A firm’s innovation reputation is considered an intangible asset that involves the equity a brand accumulates with consumers and provides sustained competitive advantage (Barone and Jewell, 2013; Gibson et al., 2006; Fombrun and Shanley, 1990). Moreover, in complex environments it decreases consumer uncertainty and enhances the credibility of the firm (Ganesan, 1994; Abimbola and Vallaster, 2007). The reputation of the firm is rooted in its historical behavior and if a change of behavior is misaligned with how the firm built its reputation, there may be negative repercussions if the change is extreme (Lange et al., 2011).
In this regard, firms that have built a high reputation may benefit by staying with status quo in terms of its innovation strategy or at most making moderate changes to how it develops new products. By developing continuity, consumers know what to expect from the firm’s offering, thus reducing uncertainty that may adversely impact attitudes toward the firm. Moreover, recent research on innovation reputation suggests that leaders of organizations may receive a credit to deviate from group norms (Abrams et al., 2008; Barone and Jewell, 2013), but here it is suggested that too much deviation (i.e. extreme change) will have penalty. In contrast, the benefits or disbenefits of strategic change for lowly reputable firms may lie within how the firm built its innovation reputation. First, for firms that have built a low reputation using a closed innovation strategy, opening up the innovation process to customers will be beneficial regardless of the degree of change (i.e. moderate or extreme). It is suggested that the firm has signaled to the market that it lacks the capabilities to develop innovative new products using strictly internal R&D and may need to rely on customers to a moderate or great extent. Second, firms that have built a low reputation using a customer participation strategy may not see any penalty or benefit by undergoing strategic change. Firms in this regard have built a poor reputation using both internal and external knowledge sources, so consumers may perceive the firm as lacking both the ability to utilize its internal R&D and access valuable ideas from its customer base.

Substantively, this research contributes to the literature in two important ways. First, it is the first to suggest and empirically test the notion that strategic change to open up the innovation process to customers may be beneficial in affecting attitudes toward the firm. Attitudes are a key component in building brand equity and are considered to be an
antecedent of purchase intent and customer loyalty (Fishbein and Ajzen, 1975; Ha, 1998). By increasing consumer attitudes toward the firm, it assists in remaining competitive in dynamic environments and avoiding organizational mortality. Second, this research suggests that strategic change and integrating customers into the innovation process may be contingent upon a firm’s innovation reputation. For firms that have a high reputation, staying the current course of action, or enacting moderate change, may be beneficial as extreme change may lead to end-user uncertainty and decreased consumer attitudes. Alternatively, lowly reputable firms may be subject to different outcomes based on how their innovation reputation was established. Lowly reputable closed innovation firms may benefit by implementing strategic change that utilizes customers in their NPD efforts whereas lowly reputable firms that previously used customers in its NPD efforts will not be penalized or rewarded by making strategic changes.

The remainder of the paper proceeds as follows. Next I introduce the background and conceptual framework for the study. Then the methodology and results of the analysis are presented. Last, the theoretical and managerial implications of the paper are discussed along with the limitations of the study.

4.2 Theory and Hypotheses Development

4.2.1 Background

A key question by academics and practitioners is how firms should divide their resources to enhance their NPD and innovative performance (Poetz and Schreier, 2012). The traditional NPD approach is focused on closed innovation, a problem solving effort solely by the firm where it makes all choices regarding product development (Almirall
and Casadesus-Masanell, 2010; Prahalad and Ramaswamy, 2004; Bendapudi and Leone, 2003). Internal R&D was previously considered a strategic asset and entry barrier to markets given the cost of developing strong R&D capabilities; firms such as AT&T, DuPont and IBM dominated their respective markets by becoming industry leaders based on internal R&D (Chesbrough, 2003). Research suggests that firms that adopt the closed innovation strategy may subscribe to the belief that customers do not always know what they want and they are not the source of innovative ideas that can assist in developing sustained competitive advantage (Berthon et al., 1999). As such, closed innovation paradigms use a technology push strategy to shape and develop product markets and displace competitors (Bennett and Cooper, 1979) rather than relying on customer insight.

On the other end of the customer involvement in NPD spectrum is open innovation. Open innovation concerns outsourcing NPD to user communities on a permanent basis (Schreier et al., 2012). It is considered a permanent and exclusive empowerment of a firm’s user community to generate promising ideas and potentially full-scale development for new products (Lichtenthaler, 2008; Ulrich, 2007). An example of open innovation is Threadless.com. Threadless.com lets users create and submit t-shirt designs and then the remainder of the brand community can vote on the best designs to be commercialized. The CEO of Threadless.com states that the company does not perform any NPD activities internally (Bogers et al., 2010; Schreier et al., 2012) and relies exclusively on customer design for new products. With open innovation paradigms, the firm usually provides a platform (e.g. Threadless.com website) for users to conduct product design, submit ideas, vote on ideas and designs, communicate with other users, and purchase, among other functions.
A third concept within the NPD literature is that of customer participation, a collaborative NPD activity in which customers actively contribute to idea generation, selecting various attributes of a new product offering, and acting as a codeveloper of new products and services (Hoyer et al., 2010; Prahalad and Ramaswamy, 2004; Fang, 2008). Customer participation is concerned with integrating the customer into the firm’s NPD processes to co-create new products and services. The NPD process is a problem solving effort by both the firm and its customers (Coviello and Joseph, 2012). An example of customer participation is Proctor & Gamble’s (P&G) Advisors program. P&G allows submission of new product ideas, invites customers to their headquarters for product concept testing, prototype testing, and potentially co-development of new ideas and services.

Extant research suggests that ideas generated through customer participation and open innovation programs will more closely mirror consumer needs and lead to greater levels of adoption by customers (Gruner and Homburg, 2000; Von Hippel, 1978; Chesbrough, 2003). It is purported that open innovation is for users and by users in that end users of goods and services are the best source of the problems and solutions that they face (Von Hippel, 2007). Moreover, customer participation is deemed to have the added benefit of the combination of firm capabilities and resources and the integration of customer knowledge to enhance the value proposition to customers. While previous research on closed innovation has shown benefits such as erecting barriers to imitation and being the first to develop product markets (Almirall and Casadesus-Manell, 2010), recent research suggests that customer participation and open innovation strategies enhance consumers’ product evaluations (Fuchs et al., 2010; Troye and Supphellen,
2012), satisfaction (Chan et al., 2010), attitudes (Franke et al., 2009), and purchase intent (Schreier et al., 2012). It is deemed that customer designed products provide a benefit in regard to product-preference fit (Franke and Schreier, 2010) and may align with customer needs more than if a firm focuses solely on internal R&D. While all three types of innovation strategies have shown to be advantageous, a greater number of firms are undergoing strategic change to placate customers and uncover latent needs to develop products to meet those needs. Previous research on innovation strategies and their outcomes have focused on discrete events and opening up the innovation process to customers has not been examined by previous research.

In this regard, it is suggested that strategic change to opening up the innovation process will benefit firms in terms of consumer perceptions toward the brand. Consumers will value companies that integrate customers into the NPD process, as new products will subsequently reflect their needs and wants. Customer co-creation and open innovation strategies are adept at developing new products that reflect the customers’ point of view and their needs and wants (Lusch and Vargo, 2006; Chan et al., 2010). Moreover, integrating customers into the NPD process may enhance the relational aspect of the firm – customer dyad due to customers seeking more engagement and involvement with firms (Hoyer et al., 2010). In contrast, firms that currently involve customers in the innovation process may be punished by way of consumer perceptions when firms close off customer involvement in NPD. Closing the innovation process to customers may be a signal that firms do not value the customer’s opinion and products may potentially not mirror end users’ wants and needs. As such, it will be beneficial for firms to undergo strategic change and open up the innovation process to customers.
While opening up the innovation process to customers may prove to be beneficial for firms, they should be cautious of how strategic change may be misaligned with their innovation reputation. Reputation theory posits that stakeholders construct opinions from available information about firms’ activities originating from personal experience, the firms themselves, from the media, and from other available sources (Fombrun and Shanley, 1990). The reputation of a firm is an intangible resource that can provide a sustainable competitive advantage (Barney, 1991) via greater loyalty from consumers (Houston, 2003), the ability to charge higher premiums relative to competitors (Rao and Bergen, 1992; Rindova et al., 2005), increases brand equity (Barone and Jewell, 2013) and enhances firm performance (Shapiro, 1983; Boyd et al., 2010). A firm’s reputation is rooted in its historical behavior and relations but can be abruptly changed if new information about its behavior (e.g. strategic change) comes into view or if the most recent behaviors of the firm are somewhat inconsistent with its past behavior (Lange et al., 2011). In this regard, if a firm possesses a high reputation, strategic change may not reflect consumer expectations from the firm as to how it built its innovation reputation and the products commercialized (Rindova et al., 2005; Lange et al., 2011). As such, firms may suffer from decreased consumer attitudes when they undergo extreme degrees of strategic change (i.e. closed to open innovation) as there may be a penalty from deviating too far from what consumers expect from the firm.

In regard to lowly reputable firms, the consequences of strategic change may lie within the firms’ beginning strategy. First, firms that begin with a closed innovation strategy may benefit by increasing customer involvement in the innovation process regardless of the degree of change (i.e. moderate or extreme). Having developed a poor
reputation through strictly internal NPD, the firm signals to the market that it lacks the capabilities to develop superior products and subsequently needs assistance from (i.e. customer participation) or reliance on (i.e. open innovation) customers for NPD. As such, firms that utilize a closed innovation strategy and have a low reputation will benefit by switching to a customer participation or open innovation strategy. Alternatively, it is suggested that lowly reputable firms that subscribe to a customer participation innovation strategy will not benefit by moving to a closed strategy or open strategy. Given that the firm has developed a poor reputation by utilizing internal capabilities coupled with external knowledge sources, firms may have shown that they lack the ability to implement successful change, utilize customers in NPD, and develop products that meet the needs of customers. As such, it is suggested that developing a low reputation via customer participation and implementing change will not change attitudes toward the firm by consumers.

### 4.2.2 Strategic change on consumer attitudes

Previous research on customer involvement in the NPD process suggests that customers have higher evaluations and are more accepting of products if they are involved in the co-production of new products (e.g. Fuchs et al., 2012). Customers are considered ideal sources of NPD ideas that build upon existing product lines and improve current products and technologies (Cooper, 1993; Cooper and Kleinschmidt, 1996). Due to customers not falling into the competency trap that succumbs firms to incumbent inertia (Chandy and Tellis, 2000), undergoing strategic change to integrate customers in the innovation process will help improve product lines and features to meet the needs of
the marketplace. Research has suggested that involving customers in firm activities will enhance how consumers perceive products developed by the firm advantageously (Henard and Dacin, 2010).

NPD has evolved into a joint problem solving process between firms and external stakeholders (Coviello and Joseph, 2012; Chesbrough, 2003) and customers reward firms with loyalty when firms value the opinion and involvement of customers (Schreier et al., 2012; Sawhney et al., 2005; Bendapudi and Leone, 2003; Franke and Schreier, 2010) products co-developed by firms and customers. Customers have the inherent desire to be engaged by firms, have more involvement with firm activities, and wish to be empowered to have greater control over what products and services are commercialized (Hoyer et al., Fuchs et al., 2010). By initiating strategic change that opens up the innovation process, firms are better able to build relationships with customers, enhance loyalty, and build products that better resemble current demands of consumers and market segments. Moreover, with a greater number of firms implementing programs to take advantage of external knowledge sources and building relationships with customers, firms that forego developing and implementing such programs may be penalized. Due to the desire to be more engaged and involved, customers may deem firms that do not open up the innovation process as lacking the motivation to value what they want in terms of new products. More formally, I hypothesize:

**H1:** Change of innovation strategy has a positive effect on consumer attitudes toward the brand when the firm integrates customers into the innovation process as such that firms beginning with a closed innovation strategy will benefit by
changing to a customer participation or open innovation strategy whereas firms beginning with a customer participation strategy will be penalized for changing to a closed innovation strategy and receive no penalty or benefit for changing to an open innovation strategy.

4.2.3 Low innovation reputation’s impact on strategic change

A firm’s reputation is rooted in its historical behavior and serves as a signal to the marketplace the quality of inputs and end goods that it provides to the marketplace (Nayyar, 1990). By developing a reputation, it provides a signal to consumers and they can assess the quality of goods a priori (Wilson, 1985). By signaling quality (or lack thereof) to the marketplace a firm can improve consumer perceptions by enhancing buyer confidence (Rindova et al., 2007). Any potential information asymmetries stakeholders face are reduced by reputation when firms make choices that represent their true attributes and those choices serve as a signal to the market; this enables buyers to determine if the firm truly offers high or low quality goods (Fombrun and Shanley, 1990; Shapiro, 1983). As such, when firms are faced with a low reputation firms they must implement change to improve the perceptions by consumers.

Firms that initially start with a closed innovation program can signal to the market that it is seeking to enhance the value proposition to consumers by integrating customers into the process or handing over innovation activities to customers. This will help assist firms in engaging customers to develop better products by combining internal resources with external knowledge sources. Alternatively, firms that begin with a customer participation strategy may not receive any benefits by undergoing strategic change, either
by closing the innovation process to customers or by relegating all NPD to customers through open innovation. Lowly reputable firms that have developed their poor reputations using the combination of customer knowledge and internal R&D will be deemed unable to provide valuable offerings to the market. These firms have already opened up the innovation process to customers, to which they built a poor reputation. Moreover, they failed to utilize their internal knowledge and capabilities to maximize the combination of knowledge and the value proposition to market segments. More formally, I hypothesize:

\[ H2a: \text{When firms possess a low reputation, firms that begin with a closed innovation strategy will benefit by changing to a customer participation or open innovation strategy whereas firms beginning with a customer participation strategy will not benefit nor be penalized for changing innovation strategy.} \]

4.2.4 High innovation reputation’s impact on strategic change

Firms with a high reputation are likely to have a track record of successful new products that sends a signal to the market for future products it develops. Firms with a high innovative reputation are perceived as creative and progressive with regard to products they have previously developed and consumers expect similar product introductions in the future (Henard and Dacin, 2010). Given that a firm’s reputation is rooted in its historical behavior, innovative firms will be rewarded for innovation strategy continuity. If a firm values its innovation reputation then the desire to protect its reputation can inhibit the firm and its managers from engaging in activities that
constituents may deem too incongruent with past actions that helped build the reputation (Doney and Cannon, 1997). Consumers develop the expectation that firms will continue to provide similar products that meet their needs, thus reducing uncertainty and enhancing loyalty. Furthermore, previous research on innovation reputation and the innovation credit suggests that innovative firms may be able to deviate from norms without penalty (Abrams et al., 2008; Barone and Jewell, 2013). In this regard, it is suggested that moderate change is acceptable if it involves opening up the innovation process to integrate customer knowledge sources. By moderately changing the innovation process to accommodate customers, firms may receive benefit (or avoid penalty) by building relations with external stakeholders while retaining the firm’s core identity as an innovator. Based on the firm’s past actions, consumers will not discredit the firm’s moderate changes and will accept them as being innovators that develop valuable products.

In contrast, a firm that undergoes extreme change (i.e. closed strategy to an open strategy) may harm the firm’s efforts to build brand equity through consumer perceptions. The license to innovate (Abrams et al., 2008; Barone and Jewell, 2013) may have its limits. While recent research has suggested that customer involvement in the NPD process positively impacts several consumer level outcomes such as commercial attractiveness, better perceived product differentiation, and high novelty of new products (Franke et al., 2006; Magnusson et al., 2003; Song and Adams, 1993), deviating too far from a firm’s core identity may have negative repercussions. Consumers may associate extreme change with uncertainty and riskiness of firm offerings (Lawton and Parasuraman, 1980). More formally, I hypothesize:
H2b: When firms possess a high reputation, they will benefit by continuing their current innovation strategy or not be penalized for moderately opening up the innovation process to customers (i.e. closed strategy to customer participation and customer participation strategy to open) whereas firms that close the innovation process to customers (i.e. customer participation to closed) or undergo extreme change will be penalized.

4.3 Pilot study

In order to test the appropriateness of the product category chosen for the main study, a pilot study was conducted to assess consumer perceptions of closed innovation, customer participation, and open innovation strategies for five product categories—consumer electronics, computer software, computer hardware, consumer packaged goods, and clothing. The goal of the pilot study was to select a product category that consumers deemed appropriate for all three types of innovation strategies based on finding no significant differences among all three strategies within a product category.

Sixty Amazon M-Turk workers were recruited for participation in the study. The workers were exposed to each product category, provided a definition of each type of strategy (i.e. closed, customer participation, open) and asked how they perceive customer involvement with each type of strategy. The participants were then asked about their perceptions of each type of strategy for the product category (e.g. appropriate vs. inappropriate, a bad idea vs. a good idea). The results of the analysis showed that clothing, consumer packaged goods, and consumer electronics were appropriate product
categories for the main study due to all three strategies having no significant difference in the repeated measures ANOVA. Based on having the highest p-value and the greatest range of averages between the three types of strategy without reaching significant differences, the computer software category was chosen for inclusion in the study.

4.4 Main Study

4.4.1 Design and Procedures

Five hundred fifty eight Amazon M-Turk workers were randomly assigned to one of twelve conditions of a 2 (current strategy: closed/customer participation) X 2 (innovation reputation: low/high) X 3 (ending strategy: closed/customer participation/open) between-subjects factorial design (61% male, M_age = 32 years). Guided by the pilot study, computer software was used as the product category. All participants first read background information about the fictitious company of interest, “Genesis Software.”

After reading the background information on Genesis Software, participants were randomly assigned to the group-specific treatment of how Genesis Electronics currently uses customers in the innovation process; that is, the company’s beginning strategy. For the closed innovation group, participants were told that Genesis has built new products “strictly internally” and “Genesis does not use customers in its new product development efforts.” In contrast, for the customer participation group, participants were told that “Genesis works closely with customers” and “Genesis Software has used customers for new product ideas, concept testing, product design, and co-development of prototypes.”

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9 The manipulations of the independent variables and the items for the dependent variables are located in Appendix C.
As a manipulation check, participants were required to fill in the radio button that completes the sentence “Genesis Software uses customers in the new product development process…” where 1 = “never” and 9 = ”always”. The manipulation check showed that the mean differences are significant as to how participants perceive customer involvement in the innovation process based on the current strategy (M\text{Closed} = 1.44, 
M\text{Participation} = 7.56, p<.001).

Participants then received the group-specific treatment of the company’s innovation reputation; they were provided with recent results of a fictitious research study where 1,000 consumers evaluated Genesis Software on multiple aspects of innovation perceptions. In particular, the low reputation treatment group saw that the average innovation reputation score of Genesis Software is 1.49/7.00. In contrast, the high reputation group saw that the average innovation reputation score of Genesis Software is 6.46/7.00. Respondents were then asked: “In regard to Genesis Software’s innovation reputation, I believe it to have…” where 1 = “a bad reputation” and 9 = “an excellent reputation”. The manipulation check showed that mean differences are significant as to how participants perceive Genesis’s innovation reputation (M\text{Low} = 1.88, M\text{High} = 7.83, p<.001).

Next, participants received the group-specific treatment of Genesis Software’s change in innovation strategy. For the no change group, participants were told that after the company’s annual new product development meeting that no changes were taking place to the company’s current strategy in regard to how customers are used in the innovation process. For the treatment groups that received a change in strategy, they were informed that Genesis conducted its annual new product development review and
have decided to make changes to how they use customers in the innovation process: (1) Genesis would change to a customer participation strategy where Genesis will now “develop new products by having customers participate in the generation of new product ideas, concept testing, product design and engineering, and co-development of prototypes”; (2) Genesis would change to an open innovation strategy where “new product development is outsourced to user communities on a permanent basis. Customers will now, and in the future, design new products without any assistance from Genesis”; or (3) Genesis would change to a closed innovation strategy where Genesis will now “develop new products strictly from an internal perspective, without help or feedback from customers” or the aforementioned open innovation strategy.

Participants in all treatments were then asked to select the radio button that completes the sentence “Compared to Genesis Software’s previous innovation strategy, their new innovation strategy is…” where 1 = “the same” and 9 = “completely different”. The manipulation check showed that mean differences are significant as to how participants perceive no change in strategy compared to a change in strategy ($M_{\text{no change}} = 2.25$, $M_{\text{change}} = 7.75$, $p<.001$).

4.4.2 Measures

The dependent variable for this study is consumers’ attitude towards the brand ($A_b$). It was measured using six items that have been consistently used in consumer behavior literature. A factor analysis found all six items loaded onto one factor accounting for 89% of the variance and reliability was above the threshold of 0.70. Following previous research, the six items were averaged and used as one measure of
attitude (e.g. Fuchs and Schreier, 2011; Barone and Jewell, 2013). The means and standard deviations of the dependent variable for each treatment group can be seen in Table 1.

--------------------- Insert Table 1 here---------------------

4.5 Results

To test the hypotheses, a three-way between subjects ANOVA was utilized. Hypothesis 1 suggests that strategic change has a positive effect on consumer attitudes toward the brand when the firm integrates customers into the innovation process such that firms beginning with a closed innovation strategy will benefit by changing to a customer participation or open innovation strategy whereas firms beginning with a customer participation strategy will be penalized for changing to a closed innovation strategy and receive no penalty or benefit for changing to an open innovation strategy. The results of the analysis show that strategic change (beginning strategy x ending strategy) is a significant predictor of consumer attitudes ($F(2, 555) = 3.26, p<.05$). To determine the nature of the interaction, a two-way ANOVA was conducted to examine mean differences between ending strategy based on beginning strategy. Within the closed innovation beginning strategy, there was a significant difference ($p<.001$) between no change ($M_{	ext{no change}} = 4.86$) and change to customer participation ($M_{	ext{customer participation}} = 5.80$) and a marginally significant difference ($p<.10$) between no change and change to open

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10 The mean difference tests from the two-way ANOVAs (to determine the nature of the interaction and where the mean differences lie) in this study are from the Bonferroni post hoc comparison test; SPSS 21.0 only outputs the p-value of the test, which is reported in this study.
innovation \( (M_{\text{open}} = 5.14; \, F_{(2, 275)} = 16.37, \, p<.001)^2 \). Within the customer participation beginning strategy, there was a significant difference \( (p<.01) \) between no change \( (M_{\text{no change}} = 5.46) \) and change to a closed strategy \( (M_{\text{closed}} = 4.93) \) and no significant difference between no change and change to open innovation \( (M_{\text{open}} = 5.36; \, F_{(2, 277)} = 6.03, \, p<.01) \). As such, Hypothesis 2 is supported by showing that firms benefit by changing their innovation strategy to integrating customers into the NPD process whereas they are penalized for closing the process to customers.

Hypotheses 2a and 2b suggest that strategic change is moderated by a firm’s innovation reputation. The three way interaction, reputation X beginning strategy X ending strategy, is significant \( (F_{(2, 546)} = 20.26, \, p<.001) \). Hypothesis 2a suggests when firms possess a low reputation, firms that begin with a closed innovation strategy will benefit by changing to a customer participation or open innovation strategy whereas firms beginning with a customer participation strategy will not benefit nor be penalized for changing innovation strategy. To determine the nature of the interaction, a two-way ANOVA test was conducted to examine mean differences of ending strategy based on levels of reputation and beginning strategy. Within the low reputation and closed innovation beginning strategy group, there was a significant difference \( (p<.001) \) between no change \( (M_{\text{no change}} = 3.14) \) and change to customer participation \( (M_{\text{customer participation}} = 4.86) \) and a significant difference \( (p<.01) \) between no change and change to open innovation \( (M_{\text{open}} = 4.06; \, F_{(2, 136)} = 20.63, \, p<.001) \). Within the low reputation and customer participation beginning strategy, there were no significant differences between no change \( (M_{\text{no change}} = 4.11) \), change to a closed strategy \( (M_{\text{closed}} = 4.13) \) and change to

\footnote{The F-statistic and p-value reported are from the model. The model, if significant, shows that there is a difference between means but does not report where the difference lies. As such, the Bonferroni post-hoc comparison is used to determine mean differences.}
open innovation \( (M_{\text{open}} = 4.17; F_{(2, 140)} = 0.03, p>.05) \). As such, Hypothesis 2a is supported.

Hypothesis 2b suggests when firms possess a high reputation, they will benefit by continuing their current innovation strategy or not receive penalty for moderately opening up the innovation process to customers (i.e. closed strategy to customer participation and customer participation strategy to open) whereas firms that close the innovation process to customers (i.e. customer participation to closed) will be penalized. Within the high reputation and closed innovation beginning strategy group, there was no significant difference between no change \( (M_{\text{no change}} = 6.58) \), change to customer participation \( (M_{\text{customer participation}} = 6.75) \), and change to open innovation \( (M_{\text{open}} = 6.21; F_{(2, 136)} = 3.74, p<.05) \). However, the difference between customer participation and open innovation is significant \( (p<.05) \), providing partial support that moderately opening the process with customer participation provides greater benefits than moving toward an open innovation strategy from a closed position. Within the high reputation and customer participation beginning strategy, there was a significant difference \( (p<.001) \) between no change \( (M_{\text{no change}} = 6.75) \) and change to a closed strategy \( (M_{\text{closed}} = 5.74) \) and no significant difference when changing to open innovation \( (M_{\text{open}} = 6.59; F_{(2, 134)} = 16.47, p<.001) \). As such, Hypothesis 2b is partially supported.

The interaction plots of Hypotheses 1, 2a and 2b can be seen in Figures 1, 2, and 3.

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4.6 Discussion

In this study, a firm’s strategic change was examined to determine how it impacts consumer attitudes toward the firm. It was suggested that when firms change their innovation strategies, it might be beneficial to open up the innovation process to customers. The results of the analysis show that when firms start with a closed innovation strategy and open the innovation process to customers, consumers may perceive the brand as more attractive, more so when the firm undergoes moderate change to a customer participation strategy. The results also show that changing from a closed innovation strategy to an open innovation strategy may provide benefit, albeit the differences were marginally significant. In contrast, when firms start with a customer participation strategy and close the innovation process to develop products strictly internally, it decreases consumer attitudes toward the brand. The results show that the firm receives no benefit in regard to consumer attitudes when it changes from a customer participation strategy to an open innovation strategy, suggesting that the voice of the customer is satisfied when firms have a mixed strategy of internal R&D and customer integration.

An additional variable of interest in this study was that of a firm’s innovation reputation. The results show that innovation reputation moderates the strategic change relationship and consumer attitudes. In regard to firm’s that have a low reputation and begin with a closed innovation strategy, firms may benefit by undergoing either moderate
or extreme change to integrate customers into the NPD process or rely on customers solely for NPD efforts. The results show that a customer participation strategy is the preferred strategy followed by open when a firm has a low reputation and has built that reputation using closed innovation processes. In regard to having a low reputation and having built that reputation on a customer participation strategy, consumers perceive change as not making a difference in how the brand is perceived. It is possible that consumers believe that the firm has already used its own resources and capabilities coupled with external knowledge sources, so regardless of which direction the firm takes after developing a low reputation with a customer participation strategy, strategic change does not matter.

When firms have developed a high reputation with their original strategy, it was suggested that continuation of the current strategy or moderate change forward is the preferred course of action. The results show that highly reputable firms that begin with a closed strategy are not penalized or reward for undergoing strategic change, even under extreme change contrary to expectations. While there is not difference using the closed innovation strategy as the beginning reference point, there was a significant difference between customer participation and open innovation in this regard, suggesting that customers may prefer the customer participation strategy. Highly reputable firms that begin with a customer participation strategy were not penalized for moderately opening the innovation process to customers (i.e. to an open innovation strategy), but if they moved backward in regard to how customers are used in NPD (i.e. to a closed innovation strategy) they were penalized.
Substantively, the results show that opening the innovation process can benefit firms by way of increasing consumer attitudes. Moreover, firms with a low reputation that currently adopt a closed innovation strategy have much to benefit by opening up the innovation process to customers, either at moderate or extreme levels of change. Firms with a low reputation that currently use customers in the innovation process may not benefit from strategic change, but they still ascertain higher consumer attitudes than firms that built their low innovation reputation using a closed innovation strategy and not changing their course of action.

This research builds upon the continually growing area of innovation strategies and consumer outcomes (e.g. Fuchs and Schreier, 2010). While previous studies use innovation strategies as discrete events, this study is the first to examine strategic change within the realm of innovation strategies. With a greater number of customers becoming involved in firms’ innovation processes and having a greater desire to be engaged and have two-way flow of information, the results show that firms are rewarded for opening up the innovation process when they currently use a closed innovation strategy. Moreover, the results show that the differences become more pronounced when a firm’s innovation reputation is taken into account. As such, firms need to consider certain factors when determining whether to undergo strategic change. The results show that opening up the innovation process can enhance attitudes, but if customers are already used in the innovation process and the firm has developed a low innovation reputation, strategic change may not be the anecdote to fix the firm’s woes. As such, it may be more beneficial to develop the capabilities of acquiring and utilizing external knowledge sources in combination with internal processes and resources. Firms that have the most
to benefit are those that build a poor innovation reputation using solely internal R&D for new products. By initiating change, regardless of the degree, firms may reap the rewards of consumer attitudes when trying to build valuable new products.

4.5.1 Limitations and future research

The results of this study need to be considered in light of its limitations. First, consumer attitudes were not measured after each manipulation. As such, main effect differences were unable to be analyzed in this study. Future research should explore the differences in strategies by consumers without regard to strategic change. While recent research has uncovered consumer benefits of customer participation and open innovation strategies, previous research has shown that closed innovation can be beneficial for firms in several ways. Second, future research should expand on this study by examining reputation, the use of customers in innovation, and the degree of change as continuous variables. By treating them as grouped variables, it is possible that the results may not hold across types of analysis. Another limitation of the study is that potential mediating variables were overlooked. In regard to a firm’s reputation, research has shown that trust and expectations are outcomes of the construct. It is possible that those variables may have significant impact on the variables in this study. As such, future research should explore avenues that mediate the relationships in this study. Moreover, additional product categories should be explored to examine if the results hold, falter, or become more pronounced. Firms across a multitude of industries are integrating programs and internal capabilities to integrate customers into the firm’s processes. It is possible that there may be significant differences across industries.
Table 1. Means and Standard Deviations for Dependent Measure for Each Level of Factors

<table>
<thead>
<tr>
<th>Reputation</th>
<th>Begin Strategy</th>
<th>End Strategy</th>
<th>N</th>
<th>Mean</th>
<th>Std. Dev.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
<td>Closed</td>
<td>Closed</td>
<td>45</td>
<td>3.14</td>
<td>1.12</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CP</td>
<td>47</td>
<td>4.86</td>
<td>1.35</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Open</td>
<td>47</td>
<td>4.06</td>
<td>1.36</td>
</tr>
<tr>
<td></td>
<td>CP</td>
<td>Closed</td>
<td>44</td>
<td>4.11</td>
<td>1.04</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CP</td>
<td>49</td>
<td>4.17</td>
<td>1.34</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Open</td>
<td>50</td>
<td>4.13</td>
<td>1.38</td>
</tr>
<tr>
<td>High</td>
<td>Closed</td>
<td>Closed</td>
<td>42</td>
<td>6.58</td>
<td>0.91</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CP</td>
<td>47</td>
<td>6.75</td>
<td>0.90</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Open</td>
<td>50</td>
<td>6.21</td>
<td>1.13</td>
</tr>
<tr>
<td></td>
<td>CP</td>
<td>Closed</td>
<td>43</td>
<td>5.74</td>
<td>1.16</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CP</td>
<td>50</td>
<td>6.75</td>
<td>0.72</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Open</td>
<td>44</td>
<td>6.59</td>
<td>0.74</td>
</tr>
</tbody>
</table>

Attitude toward the Brand
Figure 1. Strategic Change
Figure 2. Low Reputation Effect on Strategic Change
Figure 3. High Reputation Effect on Strategic Change
REFERENCES


Appendix A: Essay 1 Operational Measures

<table>
<thead>
<tr>
<th>Item</th>
<th>Average Variance Extracted</th>
<th>Maximum Shared Variance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Customer Participation (adopted from Fang and colleagues, 2008)</td>
<td>0.93</td>
<td>0.94</td>
</tr>
</tbody>
</table>

How deeply do customers participate in the following activities
1. Idea generation
2. Concept screening
3. Product specification
4. Business evaluation
5. Product design
6. Product engineering
7. Prototyping
8. Product testing**
9. Formation of cross-functional new product development team
10. Controlling and monitoring of the development process

Response format: 1='very superficially' to 7='very deeply'

Market Orientation (adopted from Deshpande and Farley, 1998)

<table>
<thead>
<tr>
<th>Item</th>
<th>Average Variance Extracted</th>
<th>Maximum Shared Variance</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0.88</td>
<td>0.90</td>
</tr>
</tbody>
</table>

1. Our business objectives are driven primarily by customer satisfaction.**
2. We constantly monitor our level of commitment and orientation to serving customer needs.
3. We freely communicate information about our successful and unsuccessful customer experiences across all business functions.
4. Our strategy for competitive advantage is based on our understanding of customers' needs.
5. We measure customer satisfaction systematically and frequently.
6. We have routine or regular measures of customer service.
7. We are more customer focused than our competitors.**
8. I believe this business exists primarily to serve customers.**
9. We poll end-users at least once a year to assess the quality of our products and services.
10. Data on customer satisfaction are disseminated at all levels in this business unit on a regular basis.

Response format: 1='strongly disagree' to 7='strongly agree'
Appendix A Continued

<table>
<thead>
<tr>
<th>Item</th>
<th>Coefficient α</th>
<th>Composite Reliability</th>
<th>Average Variance_extracted</th>
<th>Maximum Shared Variance</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Entrepreneurial Orientation (adopted from Covin and Slevin, 1989)</strong></td>
<td>0.85</td>
<td>0.87</td>
<td>0.69</td>
<td>0.33</td>
</tr>
</tbody>
</table>

**Innovativeness**
1. In general, the management of my company...[has a strong emphasis on tried products and services] vs. [has a strong emphasis on R&D, technological leadership, and innovations]**
2. How many new products or services has your company marketed in the past 5 years? [No new products or services in the past 5 years] vs. [Hundreds of new products and services in the past 5 years]
3. Changes in Products or Services for the most part have been [mostly of a minor nature] vs. [have been dramatic]

**Proactiveness**
4. In dealing with its competitors, my firm typically [responds to actions that competitors initiate] versus [typically initiates actions that competitors then respond to].
5. In dealing with its competitors, my firm [is very seldom the first business to introduce new products/services, techniques, technologies, etc.] versus [is very often the first business to introduce new products/services, techniques, technologies, etc.]
6. In dealing with its competitors, my firm [typically seeks to avoid competitive clashes, preferring a ‘live-and-let-live’ posture] versus [typically adopts a very competitive, ‘undothe-competitors’ posture]**

**Risk Taking**
7. My firm has a strong proclivity for low-risk projects (with normal and certain rates of return) versus a strong proclivity for high-risk projects (with chances of very high returns).
8. My firm believes that with respect to the environment, it is best to explore it [gradually via timid, incremental behavior] versus [bold, wide-ranging acts are necessary to achieve the firm’s objectives].
9. When confronted with decision-making situations involving uncertainty, my firm typically adopts [a cautious, posture in order to minimize costly decisions] versus [a bold, aggressive posture in order to maximize potential opportunities].

Response formats for innovativeness, proactiveness and risk taking: paired statements, 1-7
### Appendix A Continued

<table>
<thead>
<tr>
<th>Item</th>
<th>Coefficient α</th>
<th>Composite Reliability</th>
<th>Average Variance Extracted</th>
<th>Maximum Shared Variance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environmental Turbulence (adopted from Jaworski and Kohli, 1993)</td>
<td>0.75</td>
<td>0.80</td>
<td>0.58</td>
<td>0.33</td>
</tr>
<tr>
<td>1. In our industry, customers’ preferences change quickly over time.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. In our industry, market demand and consumer tastes have been unpredictable.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. In our industry, actions of competitors have been highly unpredictable**</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. The technology in our industry is changing rapidly.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Appendix B: Essay 2 Operational Measures

<table>
<thead>
<tr>
<th>Item</th>
<th>Cronbach’s α</th>
<th>Composite Reliability</th>
<th>Average Variance Extracted</th>
<th>Maximum Shared Variance</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>NPD Performance</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Our new products/services meet the performance objectives set for them.**</td>
<td>0.93</td>
<td>0.93</td>
<td>0.74</td>
<td>0.86</td>
</tr>
<tr>
<td>2. Overall, our new products/services are successful</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. New products/services at my firm generally achieve its market share objectives.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. New products/services at my firm generally achieve its sales and customer use objectives.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. New products/services at my firm generally achieve its sales growth objectives.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. New products/services at my firm generally achieve its profit objectives.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(Response format: 1='strongly disagree' to 7='strongly agree')

<table>
<thead>
<tr>
<th><strong>Customer Participation</strong></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>How deeply do customers participate in the following activities</td>
<td>0.92</td>
<td>0.92</td>
<td>0.54</td>
<td>0.16</td>
</tr>
<tr>
<td>1. Idea generation</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Concept screening</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Product specification</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Business evaluation</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Product design</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Product engineering</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Prototyping</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. Product testing**</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. Formation of cross-functional new product development team</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10. Controlling and monitoring of the development process</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(Response format: 1='very superficially' to 7='very deeply'
If customer does not participate in certain activity, response coded as "0")
### Appendix B Continued

<table>
<thead>
<tr>
<th>Item</th>
<th>Cronbach’s α</th>
<th>Composite Reliability</th>
<th>Average Extracted Variance</th>
<th>Maximum Shared Variance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Product Newness</td>
<td>0.88</td>
<td>0.86</td>
<td>0.78</td>
<td>0.30</td>
</tr>
</tbody>
</table>

1. New products/services at our firm usually require major learning efforts or experience by our customers.
2. It usually takes a long time before our customers can understand the full advantages of our new products/services.
3. Our new product/service concepts are usually difficult for our customers to evaluate and understand.
4. Our new products/services usually require considerable advance planning by the customers before use.
5. Our new products/services usually involve high changeover costs for the customers.
6. Products/services we launch nowadays are usually more complex than products/services previously launched into the same market by our firm.

(Response format: 1='strongly disagree' to 7='strongly agree'

### Absorptive Capacity

<table>
<thead>
<tr>
<th></th>
<th>Cronbach’s α</th>
<th>Composite Reliability</th>
<th>Average Extracted Variance</th>
<th>Maximum Shared Variance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acquire</td>
<td>0.89</td>
<td>0.92</td>
<td>0.50</td>
<td>0.30</td>
</tr>
</tbody>
</table>

*Acquire*
1. The search for relevant information concerning our industry is ever-day business in my company.
2. Our management motivates the employees to use information sources within our industry.
3. Our management expects that the employees deal with information beyond our industry.
Appendix B Continued

<table>
<thead>
<tr>
<th>Item</th>
<th>Assimilate</th>
<th>Transform</th>
<th>Exploit</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.</td>
<td>In our company, ideas and concepts are communicated cross-departmental.</td>
<td>8. Our employees have the ability to structure and use collected knowledge.</td>
<td>12. Our management supports the development of prototypes.</td>
</tr>
<tr>
<td>5.</td>
<td>Our management emphasizes cross-departmental support to solve problems.</td>
<td>9. Our employees are used to absorbing new knowledge as well as to prepare it for further purposes and to make it available.</td>
<td>13. Our company regularly considers technologies and adapts them accordant to new knowledge.</td>
</tr>
<tr>
<td>6.</td>
<td>In our company there is a quick information flow.**</td>
<td>10. Our employees successfully link existing knowledge with new insights.</td>
<td>14. Our company has the ability to work more effectively by adopting new technologies.</td>
</tr>
<tr>
<td>7.</td>
<td>Our management demands periodical cross-departmental meetings to interchange new developments, problems, and achievements.</td>
<td>11. Our employees are able to apply new knowledge in their practical work.</td>
<td></td>
</tr>
</tbody>
</table>

(Response format for Absorptive Capacity items: 1='strongly disagree' to 7='strongly agree'

** Item deleted due to reliability concerns
Appendix C: Essay 3 Manipulations and Operational Measures

Introduction

Today, you will be involved in a short study in which you will be asked to consider several pieces of information detailing the marketplace actions of a consumer electronics brand. Due to proprietary reasons, this brand manufacturer will be referred to as Genesis Electronics. The information that you will be presented with is designed to allow you to evaluate this brand.

In just a moment, we’ll present to you some information regarding Genesis Electronics. After you have looked at this information, you will be asked some questions designed to elicit your opinion about how you perceive this brand from various standpoints.

Manipulation of Innovation Reputation Foundation Strategy (2)

Closed Innovation Strategy

Genesis Electronics is an established company that manufactures and sells consumer electronics through traditional retail channels that sell consumer electronics products. The company was established in 2004 and since its inception it has focused its innovation activities on developing new products strictly internally (only with employees of the company, such as its research and development department involved in the innovation process). In other words, Genesis Electronics does not use customers for any aspect of their new product development efforts.
Appendix C continued

Customer Participation Strategy

Genesis Electronics is an established company that manufactures and sells electronics through traditional retail channels that sell electronics products. The company was established in 2004 and since its inception it has built its innovation reputation on developing new products by working closely with customers (the marketing and research and development departments communicate with customers regularly and at times the customers visit the company to be involved with innovation activities). In other words, Genesis Electronics has used customers for new product ideas, concept testing, product design, and co-development of prototypes.
Appendix C continued

**Manipulation of Innovation Reputation Level (2)**

Genesis is interested in better understanding people’s opinions of them and their image.

Results of a recent research study of 1,000 consumers show the following results of questions asked about Genesis Electronics’ innovation reputation:

<table>
<thead>
<tr>
<th>Question</th>
<th>Average score of 1,000 consumers*</th>
</tr>
</thead>
<tbody>
<tr>
<td>This company has a track record of successful electronics</td>
<td>6.41/7</td>
</tr>
<tr>
<td>This company is a cutting-edge electronics company</td>
<td>6.54/7</td>
</tr>
<tr>
<td>This company is a new product leader in its industry</td>
<td>6.33/7</td>
</tr>
<tr>
<td>This company is an innovative company when it comes to electronics</td>
<td>6.25/7</td>
</tr>
<tr>
<td>This company is a progressive company when it comes to electronics</td>
<td>6.36/7</td>
</tr>
<tr>
<td>With regard to consumer electronics, this is a creative company</td>
<td>6.23/7</td>
</tr>
<tr>
<td>I expect this company to introduce innovative electronics in the future</td>
<td>6.44/7</td>
</tr>
</tbody>
</table>

*On a 1-7 scale where 1=strongly disagree and 7=strongly agree

<table>
<thead>
<tr>
<th>Question</th>
<th>Average score of 1,000 consumers*</th>
</tr>
</thead>
<tbody>
<tr>
<td>This company has a track record of successful electronics</td>
<td>1.47/7</td>
</tr>
<tr>
<td>This company is a cutting-edge electronics company</td>
<td>1.34/7</td>
</tr>
<tr>
<td>This company is a new product leader in its industry</td>
<td>1.29/7</td>
</tr>
<tr>
<td>This company is an innovative company when it comes to electronics</td>
<td>1.31/7</td>
</tr>
<tr>
<td>This company is a progressive company when it comes to electronics</td>
<td>1.79/7</td>
</tr>
<tr>
<td>With regard to consumer electronics, this is a creative company</td>
<td>1.57/7</td>
</tr>
<tr>
<td>I expect this company to introduce innovative electronics in the future</td>
<td>1.64/7</td>
</tr>
</tbody>
</table>

*On a 1-7 scale where 1=strongly disagree and 7=strongly agree
Appendix C continued

**Manipulation of Strategic Change/No Change (3)**

**Continuation of Current Strategy**

*Continuation of Closed Innovation Strategy*

Genesis Software has recently conducted its annual new product development strategy meeting and has determined that it is in its best interests to continue developing new products internally, without help or feedback from customers. In other words, it will continue to forego using customers in its new product development efforts. The top management of the company feels that Genesis’ best interests are with developing products internally.

*Continuation of Customer Participation Strategy*

Genesis Software has recently conducted its annual new product development strategy meeting and has determined that it is in its best interests to continue developing new products by working closely with customers. In other words, it will continue to develop new products by having customers participate in the generation of new product ideas, concept testing, product design and engineering, and co-development of prototypes. The top management of the company feels that Genesis’s best interests are with developing products alongside the customer.
Appendix C continued

Change of Current Strategy

Change to Closed Innovation Strategy

Genesis Software has recently conducted its annual new product development strategy meeting and has determined that it is in its best interests to change its current course of new product development efforts. The top management of the company has concluded that it will now, and in the future, develop new products strictly from an internal perspective, without help or feedback from customers. In other words, it will now forego using customers in its new product development efforts. The top management of the company feels that Genesis’ best interests are with developing products internally.

Change to Customer Participation Strategy

Genesis Software has recently conducted its annual new product development strategy meeting and has determined that it is in its best interests to change its current course of new product development efforts. The top management of the company has concluded that it will now, and in the future, develop new products by having customers participate in the new product development process. In other words, it will now develop new products by having customers participate in the generation of new product ideas, concept testing, product design and engineering, and co-development of prototypes. The top management of the company feels that Genesis’ best interests are with developing products alongside the customer.
Appendix C continued

*Change to Open Innovation Strategy*

Genesis Software has recently conducted its annual new product development strategy meeting and has determined that it is in its best interests to change its current course of new product development efforts. The top management of the company has concluded that it will not conduct any internal effort in regard to the new product development process. In other words, it will now, and in the future, use an open innovation strategy where new product development is outsourced to user communities on a permanent basis. Customers will now, and in the future, design new products without any assistance from Genesis. The top management of the company feels that Genesis’ best interests are with an open innovation strategy.

**Essay 3 measured variables**

*Innovation Reputation Level*

In regard to Genesis Electronics innovation reputation, I believe it to have: \(1=\text{a bad reputation} \), \(9=\text{a good reputation} \)

*Level of Customer Involvement in Strategy*

Genesis Software uses customers in new product development: \(1=\text{rarely} \), \(9=\text{always} \)

*Change in Strategy*

Compared to Genesis Software’s previous innovation strategy, their new strategy is: \(1=\text{the same} \), \(9=\text{completely different} \)
Appendix C continued

Brand Attitude (General)

My overall opinion of Genesis is: 1=unfavorable, 9=favorable; 1=bad, 9=good; 1=negative, 9=positive; 1=pleasant, 9=unpleasant; 1=worthless, 9=valuable; 1=useless, 9=useful